Advance Edition

Falling Long-Term Growth Prospects

Trends, Expectations, and Policies

Edited by M. Ayhan Kose
and Franziska Ohnsorge

WORLD BANK GROUP

Advance praise for *Falling Long-Term Growth Prospects: Trends, Expectations, and Policies*

This book presents a sobering analysis of the secular growth slowdown based on the most comprehensive database of potential growth estimates available to date. With nearly all the forces that have driven growth and prosperity in recent decades now weakened, the book argues that a prolonged period of weakness is underway, with serious implications for emerging market and developing economies. The authors call for bold policy actions at both the national and global levels to lift growth prospects. The book is essential reading for policy makers, economists, and anyone concerned about the future of the global economy.

Beatrice Weder di Mauro
Professor of International Economics, Geneva Graduate Institute,
and President of the Centre for Economic Policy Research (CEPR)

A terrific book that couldn't be published at a better time. As economic growth is in the midst of a sustained slowdown across regions, there is an urgent need for understanding the factors behind these developments and for identifying policy solutions. This volume tremendously delivers on both fronts and more as it also introduces a comprehensive global database on potential growth that will facilitate much needed research in this area. Undoubtedly, the book's insightful analysis and policy recommendations will be a useful tool for policy makers around the world for years to come. A tour de force that is a must read!

Liliana Rojas-Suarez
Director of the Latin America Initiative and Senior Fellow,
Center for Global Development (CGD)

Economic policy making is becoming increasingly complicated in the 2020s. In addition to tackling traditional tradeoffs in aggregate demand management and improving efficiency on the supply-side, policy makers need to address new priorities and challenges, from addressing climate change and its impacts to improving income distribution, all in the context of lower growth rates, waning productivity growth, and flattening of the globalization process that has brought unprecedented prosperity across the globe and lifted more than a billion people out of poverty. In *Falling Long-Term Growth Prospects*, the authors do a phenomenal job of assessing these trends at the global and regional levels, identifying and unpacking salient 21st century policy challenges, and providing thoughtful and evidenced-based policy prescriptions for leaders in advanced, emerging market, and developing economies. Importantly, the book underscores that these challenges tend to be global and, hence, global cooperation at all levels is necessary to achieve optimal results. Alas, we seem to be going in the opposite direction; this book offers a roadmap to put us back on the path to creating a more integrated, prosperous, and equitable global community.

Michael G. Plummer
Director, SAIS Europe and Eni Professor of
International Economics, Johns Hopkins University

Advance praise for *Falling Long-Term Growth Prospects: Trends, Expectations, and Policies*

The book is a timely, lucid, and comprehensive compendium of papers analyzing the growth experiences of emerging and developing economies during the last three decades. It especially focuses on the economic slowdown of the last decade and predicts that the slowdown could easily continue for at least another decade. The prognosis is thus stark, and urges timely policy actions. Not just policy makers and practitioners, but equally academics and students will find the book to be a compelling resource for better comprehending the dynamics of the ongoing structural slowdown around the world, specifically in the developing world. This will also enable all the key stakeholders to come up with innovative ways and out-of-the-box solutions to address this worrisome issue. All in all, the book therefore offers compelling reading as well as a roadmap for future policies.

Poonam Gupta
Director General of the National Council of Applied Economic Research (NCAER),
and Member of the Economic Advisory Council to India's Prime Minister

As if the convulsions of COVID, extreme weather events and the Russia-Ukraine war were not enough, developing countries are facing a silent crisis: their long-term growth prospects are declining. This carefully researched and compellingly argued book shows that, thanks mainly to demographic and climate change, potential growth will be significantly lower in the future than in the past. The book also identifies policies that can reverse this trend. We must adopt these policies now; we owe it to our children.

Shanta Devarajan
Professor of the Practice of International Development
at Edmund A. Walsh School of Foreign Service, Georgetown University

Nobel Laureate Robert Lucas once wrote that the consequences of economic growth for human welfare are staggering and that once one starts thinking about what drives growth *"it is hard to think about anything else."* In the aftermath of the Global Financial Crisis, economic growth in emerging and developing economies started slowing down. This important volume shows that this growth slowdown was not fully driven by cyclical factors and that, absent a massive effort, in terms of structural policy reform it may persist for the remainder of this decade. Without sustained growth and investment, it will be impossible to reach global development goals in terms of poverty reduction or addressing climate change. The volume provides a unified framework centered on the concept of potential growth and, by identifying the drivers of potential growth, it provides a set of empirically grounded policy suggestions aimed at increasing potential growth. It also develops and describes a novel dataset of measures of potential growth covering more than 170 countries for a 40-year period. The book and the associated data will be invaluable tools for researchers who are trying to uncover what Lucas called the *"mechanics of economic development."*

Ugo Panizza
Pictet Chair in Finance and Development, Geneva Graduate Institute,
and Vice President of the Centre for Economic Policy Research (CEPR)

Advance praise for *Falling Long-Term Growth Prospects: Trends, Expectations, and Policies*

This is timely and important work. It breaks new ground by assembling and analyzing the most comprehensive international database to date on potential growth and its drivers. It offers valuable advice on policy options to countries as they face the prospect of slowing long-term economic growth and a range of shocks. An essential reading for both policy makers and more broadly for those interested in current global economic trends and challenges.

Zia Qureshi
Senior Fellow, Brookings Institution

This book is a must read for economists and policy makers alike. It provides a new and unique database for potential output growth covering a large set of countries. The book also offers a thorough analysis of the drivers of potential output growth. It argues that the recent weakness in growth will continue for the remainder of the present decade and comes up with policy conclusions to reverse this trend.

Jakob de Haan
Professor of Political Economy,
University of Groningen, The Netherlands

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WORLD BANK GROUP

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Foreword

The overlapping crises of the past few years have ended a span of nearly three decades of sustained economic growth that brought the world a massive reduction in extreme poverty. Starting in 1990, productivity surged, incomes rose, and inflation fell. Within a generation, about one out of four developing economies leaped to high-income status.

Today nearly all the economic forces that drove economic progress are in retreat. In the decade before COVID-19, a global slowdown in productivity—which is essential for income growth and higher wages—was already adding to concerns about long-term economic prospects. In this decade, total factor productivity is expected to grow at its slowest clip since 2000. Investment growth is weakening: the 2022-24 average will be half that of the previous two decades. The global labor force is also growing sluggishly as populations age in advanced economies and many emerging-market and developing economies (EMDEs). In addition, reversals in human capital triggered by the health shock, school closures and learning losses will have long-lasting effects on the growth of potential output. International trade—which from the 1990s through 2011 grew twice as fast as GDP growth—is now barely matching it.

The result could be a lost decade in the making—not just for some countries or regions as has occurred in the past—but for the whole world. Without a big and broad policy push to rejuvenate it, the global average potential GDP growth rate—the theoretical growth rate an economy can sustain over the medium term based on investment and productivity rates without risking excess inflation—is expected to fall to a three-decade low of 2.2 percent a year between now and 2030, down from 2.6 percent in 2011-21. That's a steep drop of nearly a third from the 3.5 percent rate that prevailed in the first decade of this century. The decline in potential GDP growth will also be sharp for developing economies, largely because of low investment rates: from an annual average of 6 percent between 2000 and 2010 to an average of 5 percent in 2011-21 and 4 percent over the remainder of this decade.

This broad-based slowdown in the growth rate of potential GDP has profound implications for the world's ability to tackle the growing array of challenges unique to our times. An economy's potential GDP growth rate sets boundaries on key policies affecting development—including the level of benchmark interest rates, the range of possible government spending, and the expected size of returns to investors.

The potential growth rate *can* be raised through policies that grow the labor supply, increase productivity, and incentivize investment. Our analysis shows that, if all countries make a strong push, potential global GDP growth can be boosted by 0.7 percentage point—to an annual average rate of 2.9 percent. That would convert an expected slowdown in potential GDP growth into an acceleration. This book lays out an extensive menu of policies to boost growth and highlights six priority interventions:

- **Increasing investment:** A major global push for greater investment to achieve development and climate goals, without undermining fiscal sustainability, could

boost potential growth rates by as much as 0.3 percentage point per year. Business-enabling reforms can be carried out to address a range of impediments to private sector development, such as high business startup costs, weak property rights and corporate governance, inefficient labor- and product-market policies, and shallow financial sectors. Investments aligned with climate goals—such as in transportation and energy, climate-smart agriculture and manufacturing, and land and water systems—can increase long-term growth and economic resilience to natural disasters.

- **Aligning monetary and fiscal frameworks:** Robust macroeconomic policy frameworks are critical to support investor confidence and can moderate the ups and downs of business cycles. They help countries attract investment by instilling investor confidence in national institutions, policy making, and currencies. Such frameworks are most effective when monetary and fiscal policies are aligned in their purpose. They should prioritize inflation, debt, fiscal prudence, and financial-sector stability.

- **Cutting trade costs:** Trade costs—mostly those associated with shipping, logistics, and regulations—can double the cost of internationally traded goods. Countries with the highest shipping and logistics costs could cut their trade costs in half by adopting the trade-facilitation practices of countries with the lowest shipping and logistics costs. Moreover, trade costs can be reduced in climate-friendly ways—by removing the current bias toward carbon-intensive goods inherent in many countries' tariff schedules and by eliminating restrictions on access to environmentally friendly goods and services.

- **Capitalizing on services:** As international trade in goods has ebbed, the services sector has become an increasingly important engine of growth for developing economies. Exports of digitally delivered professional services related to information and communications technology climbed to more than 50 percent of total service exports in 2021, up from 40 percent in 2019. Developing economies enjoy significant room to grow in this area because of their limited use of such technology in everyday interactions. This requires a renewed focus on education and skills, particularly language and digital skills.

- **Upping labor-force participation.** If overall labor-force participation rates, especially among women and older workers, could be boosted to match the best ten-year increase on record, this could increase global potential growth rates by 0.2 percentage point on average by 2030. Globally, average female labor force participation remains three-quarters that of men, and the gap is even larger in EMDEs. In some regions, such as South Asia and the Middle East and North Africa, an increase in female labor-force participation rates to match the EMDE average could boost their potential GDP growth by as much as 1.2 percentage points a year by 2030. Increasing the average participation rate of workers aged 55 years or older—which is about half that of 30-to-45-year-old workers—is similarly valuable, but will require further investments in work ability, retraining and new skills.

- **Strengthening global cooperation:** From 1990 through the mid-2010s, the global economy fired on nearly all cylinders partly because of broad-based international

cooperation following the breakup of the Soviet Union. That cooperation has since faltered. Effective new methods of cooperation—on trade, climate, finance, debt transparency, fragility, health and infrastructure, to name a few—will be essential if the world is to mobilize the investment that will be needed to achieve sustainable growth and poverty alleviation.

An extraordinary series of setbacks has brought the world to another crossroads. It will take an exceptional mix of focused policies and effective international cooperation to revive growth. The World Bank Group is fully engaged in helping countries design and implement policies and projects that boost growth and median incomes while fostering environmental sustainability and resilience.

David Malpass
President
The World Bank Group

Acknowledgments

As Robert Lucas once wrote: *"Once one starts to think about [economic growth], it is hard to think about anything else."* We are extremely fortunate to have worked with many outstanding colleagues who helped us to think through complex growth challenges confronting the global economy, put together a brand-new dataset of potential growth, and formulate policy responses to deliver better growth outcomes. It would not have been possible to finalize a study of this magnitude without such a dedicated group of collaborators. We are deeply grateful for their insightful contributions.

The seven chapters of this book were produced by our tireless co-authors: Elwyn Davies, Sergiy Kasyanenko, Philip Kenworthy, Sinem Kilic Celik, Gaurav Nayyar, Lucia Quaglietti, Franz Ulrich Ruch, Kersten Stamm, Ekaterine Vashakmadze, Dana Vorisek, and Collette Wheeler. We are also thankful to Hayley Pallan, Cordula Rastogi, and Shu Yu for their contributions to annexes, boxes, and background literature reviews.

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We are indebted to our colleagues who worked on the production process, media relations, and dissemination. We truly appreciate the herculean efforts of Adriana Maximiliano in assembling the print publication and designing the cover, with assistance from Hazel Macadangdang. Graeme Littler produced the online publication and provided editorial support, with contributions from Adriana Maximiliano. Therese Reginaldo provided extensive logistical support. Joseph Rebello, Chisako Fukuda, Patricia Katayama, Jewel McFadden, Koichi Omori, and Nandita Roy managed media relations and dissemination.

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Abbreviations

AEs	advanced economies
BK	Baxter-King filter
CF	Christiano-Fitzgerald filter
COVID-19	coronavirus disease 2019
EAP	East Asia and Pacific
ECA	Europe and Central Asia
EMDEs	emerging market and developing economies
EU	European Union
FDI	foreign direct investment
GCC	Gulf Cooperation Council
GDP	gross domestic product
GEP	*Global Economic Prospects*
GVC	global value chain
HICs	high-income countries
HP	Hodrick-Prescott filter
ICRG	International Country Risk Guide
ICT	information and communications technology
IMF	International Monetary Fund
LAC	Latin America and the Caribbean
LICs	low-income countries
MICs	middle-income countries
MNA	Middle East and North Africa
MVF	multivariate filter
NDCs	nationally determined contributions
OECD	Organisation for Economic Co-operation and Development
PF	production function approach
PMI	purchasing managers' index
PPP	purchasing power parity
R&D	research and development
RHS	right-hand side
RTA	regional trade agreement
SAR	South Asia
SDGs	Sustainable Development Goals

SMEs	small and medium enterprises
SSA	Sub-Saharan Africa
TFP	total factor productivity
UCM	Unobserved Components Model
WDI	World Development Indicators
WEO	*World Economic Outlook*

OVERVIEW

Across the world, a structural growth slowdown is underway: at current trends, the global potential growth rate—the maximum rate at which an economy can grow without igniting inflation—is expected to fall to a three-decade low over the remainder of the 2020s. Nearly all the forces that have powered growth and prosperity since the early 1990s have weakened, not solely because of a series of shocks to the global economy over the past three years. The growth rates of investment and total factor productivity are declining. The global labor force is aging—and expanding more slowly. International trade growth is much weaker now than it was in the early 2000s. The slowdown could be even more pronounced if financial crises erupt in major economies and spread to other countries as these types of episodes often lead to lasting damage to potential growth. A persistent and broad-based decline in long-term growth prospects imperils the ability of emerging market and developing economies (EMDEs) to combat poverty, tackle climate change, and meet other key development objectives. These challenges call for an ambitious policy response at the national and global levels. The slowdown can be reversed by the end of the 2020s—if all countries replicate some of their best policy efforts of recent decades and accompany them with a major investment push grounded in robust macroeconomic frameworks. Boosting human capital and labor force participation and making sound climate-related investments can also make a measurable difference in lifting growth prospects. Bold policy actions at the national level will need to be supported by increased cross-border cooperation and substantial financing from the global community.

Slowing growth, dimming prospects

In 2015, Kaushik Basu, the World Bank Group's Chief Economist at the time, asked us to assess long-term growth prospects of emerging market and developing economies (EMDEs). His request inspired us to prepare the study "Slowdown in Emerging Markets: Rough Patch or Prolonged Weakness?"[1] The question in the title was a deliberate choice since the study documented a synchronous slowdown in these economies during 2010-15 but concluded that cyclical factors partly played a role and that policies could reverse the decline in growth. We now have a definitive answer to the question we posed in the title: These economies are in the midst of a prolonged period of weakness.

Note: This chapter was prepared by M. Ayhan Kose and Franziska Ohnsorge.

[1] Our earlier study focused on both cyclical and structural drivers of the slowdown (Didier at al. 2015). This study also acknowledges the importance of cyclical factors but focuses on structural drivers that have become more prominent in explaining the decline in growth. It is much more comprehensive than our earlier paper as it builds on, and expands, multiple studies we have conducted since then. Some of these were featured in the World Bank Group's flagship *Global Economic Prospects* report in which we examined different aspects of growth in EMDEs.

This book argues that the weakness in growth will likely extend for the remainder of the 2020s. It could be even more pronounced if financial crises erupt in major economies and, especially, if they trigger a global recession. The experience of the past two decades has shown that financial crises and recessions cause lasting damage to growth; this would compound the weaknesses in the main drivers of growth that are already embedded in current trends. In addition, the necessary policy interventions could be delayed, as often happened during the past decade, such that global growth over the 2020s could disappoint once again.

It will take a herculean collective policy effort to restore growth in the next decade to the average of the previous one. At the national level, this effort will require these economies to repeat their own best 10-year record in a wide range of policies. At the global level, given the cross-border nature of many challenges confronting growth, the policy response requires stronger cooperation, larger financing, and reenergized push for mobilization of private capital.

Major shocks have battered the global economy over the past three years— including the COVID-19 pandemic and the war in Ukraine. After countries had provided the necessary support for businesses and individuals hurt by the pandemic, cyclical policies turned contractionary. The steep rise in inflation over the past two years has led to the sharpest tightening of global monetary policy in four decades. Fiscal policy has also become less supportive following the significant deterioration of government budget balances during the 2020 global recession, when debt levels reached historical highs. Amid these multiple adverse shocks and limited policy space, the global economy experienced over the past three years the sharpest growth slowdown following a global recession.

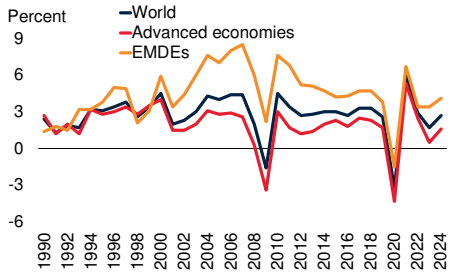
Even as policy makers confront these short-term challenges, a longer-term setback of considerable importance has been brewing quietly: a persistent decline in long-term growth prospects. In the past decade, growth in EMDEs and advanced economies alike has slowed sharply (table A.1). Global growth declined from a recent peak of 4.5 percent in 2010 to a projected low of 1.7 percent in 2023 (figure o.1). The slowdown was widespread: in 80 percent of advanced economies and 75 percent of EMDEs, average annual growth was lower during 2011-21 than during 2000-10.

The slowdown was pronounced in EMDEs. As a result, the pace at which the per capita incomes of these economies are catching up to those of advanced economies (so-called income convergence) has fallen: In 2011-21, EMDE per capita incomes grew 2.0 percentage points a year faster than advanced-economy per capita incomes. But that was considerably smaller than the differential of 3.4 percentage points a year during 2000-10. The convergence process was set back in all EMDE regions. Middle-income EMDEs (MICs) were somewhat harder hit than low-income countries (LICs). MIC per capita income growth slipped by 1.4 percentage points, from 4.9 percent in 2000-10 to 3.5 percent in 2011-21 (table A.2). LIC per capita income growth also slowed, by 1.2 percentage points, to 1.7 percent in 2011-21 from 2.9 percent in 2000-10.

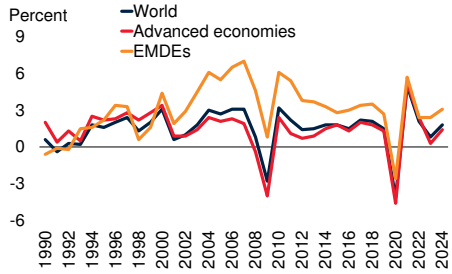
FIGURE o.1 Growth

Growth has slowed sharply—in aggregate and per capita terms and in the majority of countries—from its elevated rates in the early 2000s. The pace of per capita income convergence toward advanced economies has slowed in all EMDE regions.

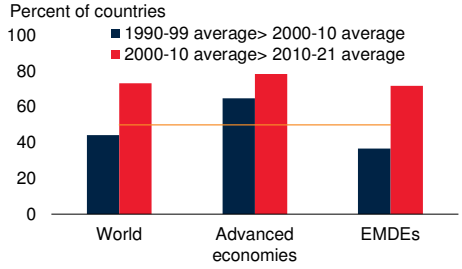
A. Growth



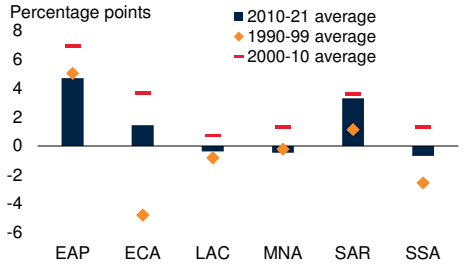
B. Per capita growth



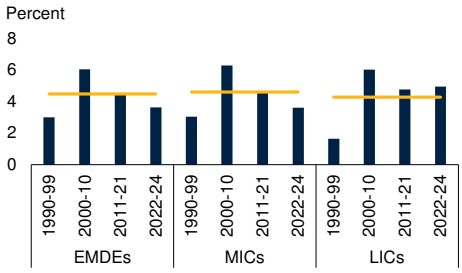
C. Share of countries with slower growth than in the previous decade



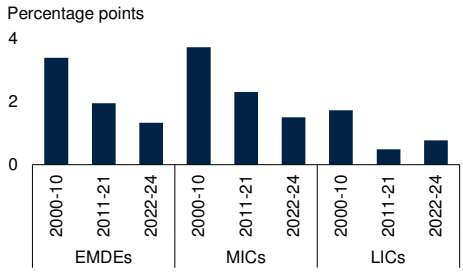
D. Annual average per capita income growth relative to advanced economies



E. Growth



F. Per capita growth relative to advanced economies



Source: World Bank.

Note: EMDEs = emerging market and developing economies.

A.B. Projections for 2023-24. GDP-weighted averages (at 2010-19 average exchange rates and prices).

C. Yellow horizontal line indicates 50 percent.

D. EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

E.F. MICs = Middle-income countries; LICs = low-income countries. GDP-weighted averages (at 2010-19 average exchange rates and prices). Unbalanced sample of up to 105 MICs and 26 LICs. Projections for 2022-24 from the World Bank's January 2023 *Global Economic Prospects* report.

The slowdown represents a deepening crisis of development—because all the fundamental drivers of economic growth have faded (figure o.2). Ordinarily one of the most powerful drivers of economic growth, global trade in 2010-19 grew only as fast as overall economic growth, down from twice as fast during 1990-2011. Factor reallocation from less to more productive firms and sectors has also slowed. Gains from better education and health have faded as improvements in education and health care systems have leveled off. Continuing a decade of weakness prior to the pandemic, EMDE investment growth in 2022-24 is projected to average 3.5 percent per year, about half its 2000-21 average.[2] After rising over the preceding decades, the growth of the working-age population relative to overall global population growth declined to a three-decade low in 2017. Global policy uncertainty has risen while attitudes towards trade integration have turned more cautious.

On top of this fading growth momentum, a series of shocks—including the pandemic and climate-related disasters—over the past decade have done lasting damage to the development process. This has been reflected in stalling poverty reduction.

Magnifying challenges

Weaker long-term growth gives rise to a wide range of challenges. First, it slows the pace of poverty reduction. At projected growth rates, the goal of reducing global extreme poverty to 3 percent of the population by 2030 is now out of reach. Second, slower output growth tends to reduce the resources available to invest in solving problems confronting the global economy. Without sustained investment growth, it will be difficult, if not impossible, to address climate change and make material progress towards other development goals. Third, slower long-term output growth implies limited job creation and wage growth, which provides fertile ground for social tensions and is likely to entail slower transitions from informal to formal economic activity. Finally, weaker long-term output growth curtails the resources available to pay off mounting debt loads, potentially undermining debt sustainability and leading to financial stress.

One tool to meet multiple policy priorities

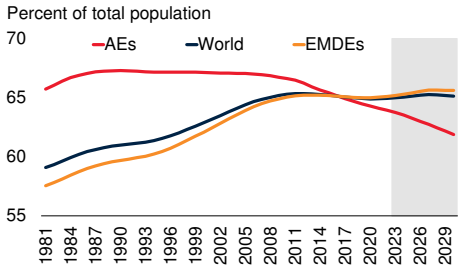
The intensifying development challenges the world faces are accompanied by a raft of sometimes competing policy priorities: eliminating extreme poverty, reducing inequality, achieving higher growth, or combating climate change. The good news is that addressing these priorities requires the same recipe: sustained and robust investment and productivity growth. Through this mechanism, policy makers can overcome these enormous challenges and deliver sustained, sustainable, and inclusive growth. Such efforts will need to be accompanied by measures to promote investment in human capital, foster gender equality, and strengthen social protection systems.

[2] Throughout this book, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined).

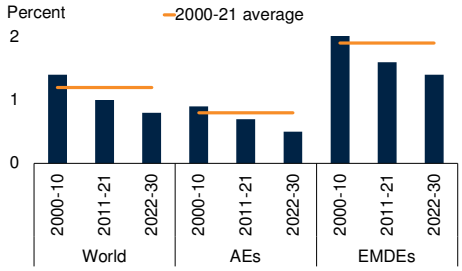
FIGURE o.2 Drivers of output growth

All the fundamental drivers of output growth slowed in the past decade. Improvements in human capital, the growth of the labor force, investment (including because of policy uncertainty) and total factor productivity (including through factor reallocation) all decelerated. These drivers of growth are expected to slow further in the remainder of the current decade.

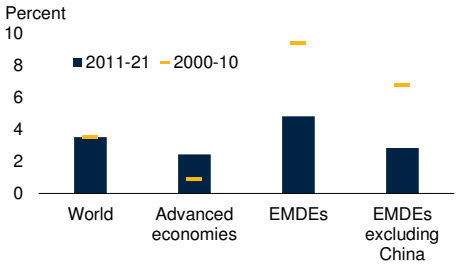
A. Working-age population



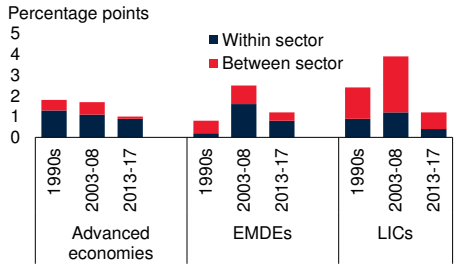
B. TFP growth



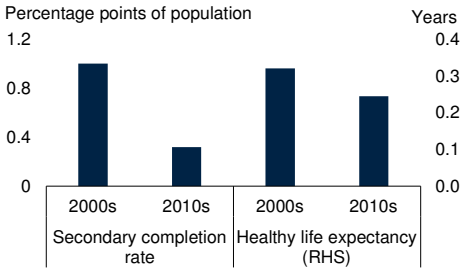
C. Investment growth



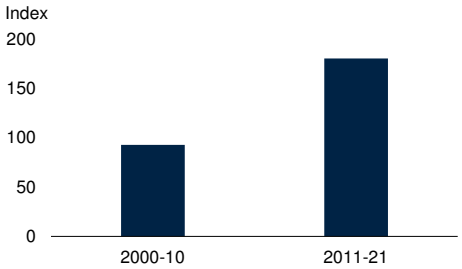
D. Contributions to labor productivity growth



E. Improvement in human capital indicators



F. Global policy uncertainty



Sources: Baker, Bloom, and Davies (2016); Dieppe and Matsuoka (2019); United Nations Population Statistics; World Health Organization, Global Health Outlook; World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; LICs = low-income countries.

A. Population weighted averages. The working-age population is defined as people aged 15-64 years.

B. GDP-weighted arithmetic average of total factor productivity growth. Includes 53 EMDEs and 29 advanced economies.

B.-E. Arithmetic annual averages.

C. GDP-weighted averages for the period indicated.

D. Based on samples of 94 countries during 1995-1999 and 103 countries during 2003-2017. Median of country-specific productivity contributions . Within-sector growth shows the contribution of initial real value added-weighted productivity growth and between-sector growth shows the contribution from changes in the employment share.

E. For healthy life expectancy (HALE) at birth, annual average change in population-weighted average for 179 countries between 2000 and 2010 and between 2011 and 2019. For lower secondary school completion rate (in percent of relevant age group), annual average change in world aggregate between 2000 and 2010 and between 2010 and 2019.

F. Period averages. Global policy uncertainty is a GDP-weighted average of national Economic Policy Uncertainty indices for 21 countries: Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States (Baker, Bloom, and Davies 2016).

Achieving this is not easy: policies that are effective in lifting long-term growth and investment are often difficult to design and even more difficult to implement. They tend to involve structural interventions that can sometimes impose substantial, asymmetric costs on parts of the society and therefore can face stiff resistance from vested interests. Some of these policies need to be accompanied by supportive measures to ensure inclusive growth. Moreover, the growth dividends of these policies often take time to accrue. Nonetheless, achieving strong and sustained growth is the only plausible path to durably address climate, poverty and a wide range of other development challenges.

Understanding long-term growth: A framework

The book frames long-term growth around the concept of potential growth—the maximum growth rate that an economy can sustain in the long term at full employment and full capacity without igniting inflation. An economy's potential GDP growth rate is effectively its speed limit. It influences the full spectrum of policies that determine economic and development outcomes: the level of benchmark interest rates, the scale of government spending, and even the expected size of returns to investors. The speed limit can be raised—through policies that expand the labor supply, boost productivity, and ramp up investment.

Although the concept of potential growth has been much explored, it is not directly observable and must be inferred from other data. The book develops a variety of measures of potential growth and examines their evolution over time. It presents a detailed discussion of linkages between potential growth and its underlying drivers: capital accumulation (through investment growth), labor force growth, and the growth of total factor productivity (TFP), which is the part of economic growth that results from more efficient use of inputs and which is often the result of technological changes. The book also pays special attention to developments in the trade and services sectors—both of which have been key contributors to productivity growth and changes in labor markets.

Contributions to the literature

There is a rich literature on policies to improve long-term growth prospects.[3] This book makes three key contributions with its introduction of a new database of potential

[3] Several studies have examined the links between growth and inequality (for example, Cerra et al. 2021) or between short-term shocks and long-term output trends (for example, Cerra, Fatas, and Saxena 2020). Others have looked in depth at specific drivers of growth, such as innovation (Aghion, Akcigit, and Howitt 2015; Aghion, Antonin, and Bunel 2021; Aghion and Howitt 2005); institutions (Acemoglu 2012; Acemoglu, Johnson, and Robinson 2005); culture (Gorodnichenko and Roland 2011); political economy (Allen et al. 2014; Acemoglu and Robinson 2012); trade (Rodrik 2017); finance (Arcand, Berkes, and Panizza 2015; Obstfeld 2009); digitalization (Brynjolfsson and McAfee 2014, 2017); or human capital (Schady et al. 2023). Some studies have examined growth prospects in different regions, such as Gill and Raiser (2012) for Europe; Ulku and Zaourak (2022) for Central America; Alvarez and de Gregorio (2014) for Latin America; and McMillan, Rodrik, and Sepulveda (2017) for seven country case studies in Africa, Asia, and Latin America. Others, such as Loayza and Pennings (2022), have developed tools to model long-term growth. Finally, a group of studies have examined firm-level drivers of growth prospects (for example, Comin and Mulani 2009; Fisman and Svensson 2007; and Goehuys and Veugelers 2012).

growth, emphasis on global and region-specific growth trends and prospects, and the presentation of a rich menu of policies to deliver better growth outcomes.

Comprehensive database of potential growth. The book introduces the first comprehensive database of the nine most commonly used estimates of potential output growth for the largest available country sample of up to 173 economies (37 advanced economies and 136 EMDEs) over 1981-2021 (chapter 1). These estimates are based on multiple methodologies. The book also examines prospects for potential growth based on projections of its structural drivers—growth of physical and human capital, growth of labor supply, and growth of TFP.[4] In addition, using the new database, it presents the first detailed analysis of the damage to potential growth from many adverse developments in EMDEs—including recessions, banking crises, epidemics, and natural disasters (chapters 1 and 5).[5]

Regional aspects of potential growth and investment. This book is the first to examine EMDE regional trends and the prospects for the growth of potential output and investment since the onset of the COVID-19 pandemic. In dedicated chapters, the book also discusses regional policy priorities and options to strengthen investment and potential growth (chapter 2 and chapter 4). Its analysis draws on the specific literature and data for each of the six World Bank Group regions: East Asia and the Pacific (EAP), Europe and Central Asia (ECA), Latin America and the Caribbean (LAC), the Middle East and North Africa (MNA), South Asia (SAR), and Sub-Saharan Africa (SSA).

Policies. The book explores, in a consistent framework, policy options to lift potential growth. In contrast to earlier studies, the discussion of policy options is directly based on empirical analysis.[6] Some of these policies include reforms of education and healthcare systems as well as labor markets (chapter 5). The book also presents an extensive menu of policies to boost investment and productivity growth and examines policy interventions geared toward promoting growth in services activity and international trade.

- *Investment as a key driver of potential growth.* As noted above, investment is essential to deliver sustained potential output growth, improve living standards, and make progress in achieving the Sustainable Development Goals (SDGs) and fulfilling

[4] Previous studies have been confined to a single methodology, such as the production function approach (OECD 2014) or multivariate filters (ADB 2016; IMF 2015). Some earlier studies estimated trends for only a subset of measures of potential growth (for example, Chalaux and Guillemette 2019; Kilic Celik, Kose, and Ohnsorge 2020). The book's focus on long-term potential growth projections also contrasts with the previous literature, which has examined past trends (Asian Development Bank 2016; Dabla-Norris et al. 2015; IMF 2015; OECD 2014).

[5] Earlier work has estimated the effects of recessions on potential growth but they were primarily confined to OECD countries and to one specific measure of potential growth (Furceri and Mourougane 2012; Mourougane 2017).

[6] Previous studies have investigated the link between actual growth of output or productivity and structural reforms, focusing on the near-term benefits (Prati, Onorato, and Papageorgiou 2013), productivity effects (Adler et al. 2017; Dabla-Norris, Ho, and Kyobe 2016), or a sample consisting of mostly advanced economies (Banerji et al. 2017; IMF 2015, 2016).

commitments made under the Paris Agreement on climate change. This book provides the first comprehensive analysis of investment growth in a large sample of EMDEs since the pandemic and Russia's invasion of Ukraine. It examines the likely medium- and long-term consequences of the damage to investment in EMDEs from recent adverse shocks, focusing on the effects on productivity, potential output growth, trade, and the ability to achieve the SDGs and climate-related goals. It also describes a rich menu of policies to revive investment growth.

- *Trade as a traditional engine of growth.* Trade has been a powerful engine for EMDE growth over the past four decades but its role is now under threat. The book presents a comprehensive analysis of trade costs and avenues to promote trade growth (chapter 6). It goes beyond previous research in assessing the role of trade policy—including on tariffs and participation in trade agreements—in determining trade costs (Arvis et al. 2016; Chen and Novy 2012; World Bank 2021). This analysis is complemented by an event study of the evolution of trade in goods and services around global recessions, including the pandemic-induced global recession of 2020. Building on the econometric analysis, the chapter derives policy options to lower trade costs.

- *Services as a new engine of growth.* High hopes have been placed on the services sector as a new engine of economic growth as traditional engines of growth such as goods trade and resource sectors sputter.[7] This book establishes a set of stylized facts that summarize the role of the services sector in growth and development over the past three decades (chapter 7). It presents growth decompositions that provide estimates of the contributions of subsectors of services as well as the contributions of the growth of factor inputs versus TFP. The book also documents how the pandemic has affected prospects and policy priorities for services-led growth, building on some recent studies. It assesses future growth opportunities linked to the acceleration in digitalization, building on the literature on how the digital economy is expanding opportunities to boost productivity in the services sector.

Key findings and policy messages

Using a comprehensive database of multiple measures of potential growth, this book examines trends in potential growth and its drivers (especially investment), global and regional prospects for potential growth and investment over the 2020s, and a range of policy options to lift potential growth. It documents three major findings. First, there

[7] Major shifts are underway in commodity markets as part of the energy transition, as discussed in Baffes and Nagle (2022). Recent work considers the potential of services as an engine of growth and trade (Nayyar, Hallward-Driemeier, and Davies 2021a, 2021b; Park and Noland 2013; OECD 2005; Lee and McKibbin 2018) and trade (Baldwin 2016; Francois and Hoekman 2010). Some recent studies also consider the effects of the pandemic on growth and household income or firm sales distribution (Apedo-Amah et al. 2020; Chetty et al. 2020; Narayan et al. 2022). The book expands on the growing literature on structural change and productivity growth in EMDEs, which highlights changes in the relative contributions of the broader manufacturing and services sectors, and demand- and supply-side factors (Fan, Peters, and Zilibotti 2021; Kinfemichael and Morshed 2019; McMillan and Rodrik 2011; Nayyar, Hallward-Driemeier, and Davies 2021a, 2021b; Rodrik 2016).

has been a protracted, broad-based decline in potential growth and its underlying drivers. Major adverse shocks also reduce potential growth by leaving a lasting impact on these drivers. Second, the slowdown in potential growth is expected to persist for the rest of this decade. Finally, while they are significant challenges confronting EMDEs, they are not insurmountable. It is possible to reverse the slowdown in potential growth and chart a sustained, sustainable, and inclusive growth path by implementing ambitious, broad-based and forceful policies at the national and global levels.

Longstanding, widespread decline in potential growth

All measures document a widespread decline in potential growth in the decade 2011-21, relative to the preceding decade (chapter 1). Global potential growth fell to 2.6 percent a year during 2011-21 from 3.5 percent a year during 2000-10; meanwhile, EMDE potential growth fell to 5.0 percent a year during 2011-21 from 6.0 percent a year during 2000-10 (table A.3).

The weakening of potential growth was highly synchronizous across countries: during 2011-21, potential growth was below its 2000-10 average in almost all advanced economies and nearly 60 percent of EMDEs. Among EMDE regions, the steepest slowdown occurred in MNA, followed by EAP, although potential growth in EAP remained higher than in all other EMDE regions except SAR, where potential growth remained broadly unchanged (chapter 2).

This slowdown in potential growth can be attributed to many factors as all fundamental drivers of growth faded. The period between 2011 and 2021 was marked globally by slower TFP growth, slower labor supply growth, and slower investment growth than in the period 2000-10. In addition, the global economy has been rocked by financial crises, global recessions, bouts of inflation, health crises such as epidemics and a pandemic, climate-related disasters, and wars and conflict of varying severity. Almost all of these shocks, and especially the global recessions, left lasting legacies of damaged drivers of, and slower rates of, potential growth (figure o.3). Utilizing a series of econometric approaches, this book quantifies this damage.

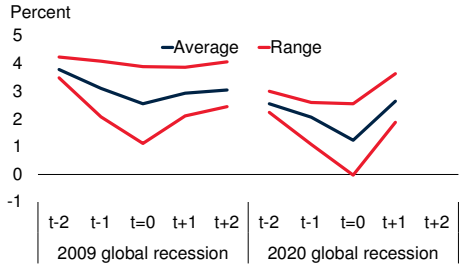
- *Recessions* resulted in lasting damage to the productivity capacity of the global economy. National recessions were associated with 1.4 percentage point slower potential growth, on average, even five years later (chapter 1). Over the medium term, recessions tended to have a somewhat more severe impact than did other adverse events—such as banking crises, epidemics, or other natural disasters. The effect of recessions on potential growth operated through multiple channels. Four to five years after a typical recession, investment growth, employment growth, and TFP growth remained significantly lower than in "normal" years—by 3.0 percentage points for investment, 0.7 percentage point for employment, and 0.7 percentage point for TFP.

- *Banking crises* were associated with initially larger declines in potential growth than recessions, peaking at 1.8 percentage points after two years as a result of collapses in

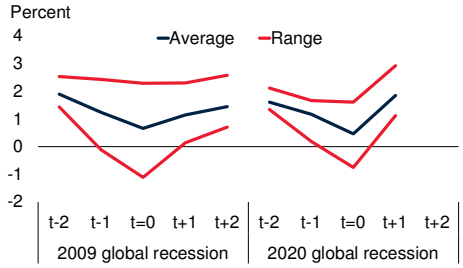
FIGURE o.3 Lasting damage to potential growth of recessions

Potential growth fell during the global recessions of 2009 and 2020, reflecting declines in investment growth, labor force growth, and TFP growth. The decline was particularly steep in the COVID-19-induced global recession of 2020, which was unusual also in the disproportionately large loss in services activity.

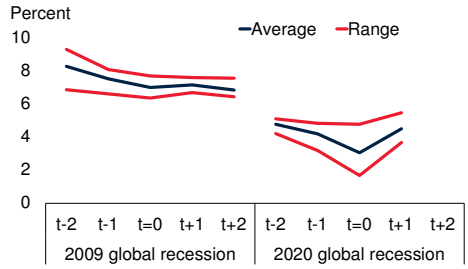
A. World: Potential growth



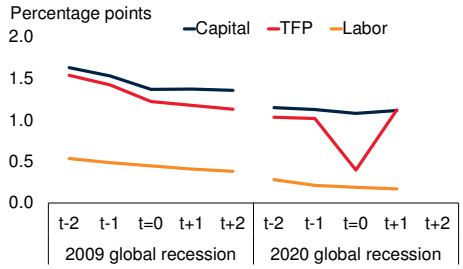
B. Advanced economies: Potential growth



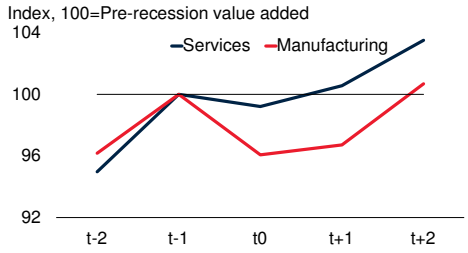
C. EMDEs: Potential growth



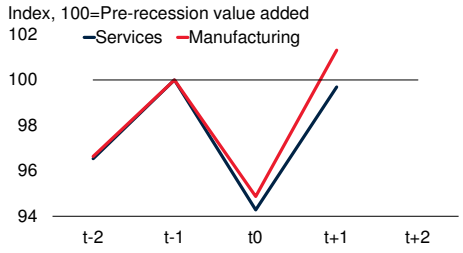
D. World: Contributions to potential growth



E. National recessions before 2020



F. National recession in 2020



Source: World Bank.
Note: EMDEs = emerging market and developing economies. In each panel, the horizontal axis shows years, with t representing the recession year.
A.-C. "Average" is an unweighted average of seven potential growth measures (excluding forecasts). "Range" reflects the maximum and minimum. Figures show potential growth around t = 2009 and t = 2020.
D. Figures show the contributions of growth in capital, TFP, and labor to potential growth around t = 2009 and t = 2020.
E.F. Charts show the unweighted average level of real value added in services (blue) and manufacturing (red) in the years around the recession year t, indexed to 100 for the year preceding the recession.

investment. However, quick recoveries in investment generally followed, such that the damage to potential growth after five years was only 1.2 percentage points—less than after recessions. In contrast to recessions, banking crises tended to be mainly associated with lasting productivity losses.

- *Climate change* has increased the frequency and severity of weather-related natural disasters. Over the past two decades, these natural disasters have caused a significant decline in potential growth (chapter 5). For example, over the medium-term, depending on the magnitude and speed of reconstruction efforts, damage to potential growth varied from nil to 10 percent three years after the disaster. Some countries, especially small states, have suffered much larger damage than is suggested by the average effect—on average 5 percent of GDP per year. These losses did not occur in a predictable pattern. Instead, it was not uncommon for the damages from a single climate-related disaster to cost a substantial portion of a country's GDP, or even multiples of GDP in extreme cases.

A lost decade in the making? Weaker growth prospects

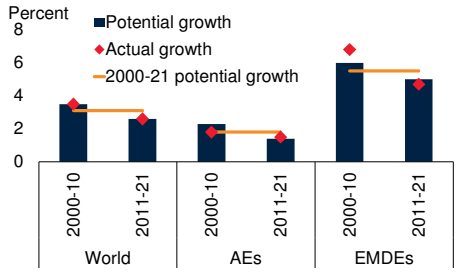
The slowdown in potential growth during 2011-21 is projected to extend into the remainder of the current decade (figure o.4). Projections for its fundamental drivers suggest that global potential growth will slow further, by 0.4 percentage point a year from 2011-21, to an average of 2.2 percent a year in 2022-30, the slowest pace since 2000 (chapter 5). About half of the slowdown is due to demographic factors from an aging population, including slowing growth in the working-age population and declining labor-force participation. EMDE potential growth is projected to slow by 1.0 percentage point a year to an average of 4.0 percent a year in 2022-30. The decline will be internationally widespread: Economies accounting for nearly 80 percent of global GDP, including most EMDEs, are projected to experience a slowdown in potential growth between 2011-21 and 2022-30. All traditional drivers of growth, including trade, are expected to weaken in the remainder of this decade. However, relatively healthier growth is expected in the services sector.

Investment. The slowdown in investment during 2011-21 will likely extend into the remainder of the current decade because of the effects of the COVID-19 pandemic, Russia's invasion of Ukraine, limited policy space, and tight financial conditions (figure o.5; chapter 3). In 2022-24, investment growth in EMDEs is projected to average 3.5 percent per year, about half its average annual growth during 2000-21 (chapter 3). Projected investment growth through 2024 will be insufficient to return aggregate EMDE investment to its pre-pandemic trend from 2010-19 (the period between the highly disruptive 2009 and 2020 global recessions). Annual average investment growth in 2022-30 is now forecast to be 0.3-1.8 percentage points lower, on average, than in 2011-21 in all regions except in LAC and SAR, where adverse shocks that depressed investment growth in the 2010s are not expected to recur. After a gradual decline over the past decade, foreign direct investment (FDI) will also likely remain weak over the remainder of the 2020s.

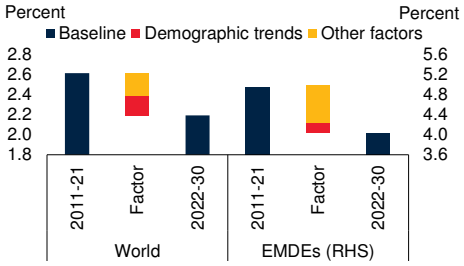
FIGURE o.4 Potential growth

A broad-based weakening of potential growth in the past decade is expected to continue in the remainder of the current decade. In part, this reflects a weakening of investment growth that has been reflected in downgrades to consensus forecasts.

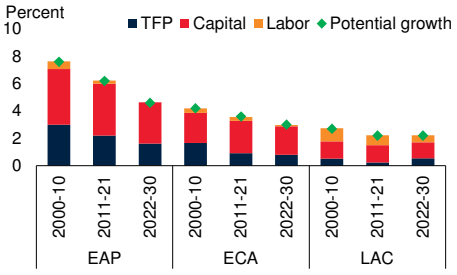
A. Potential growth



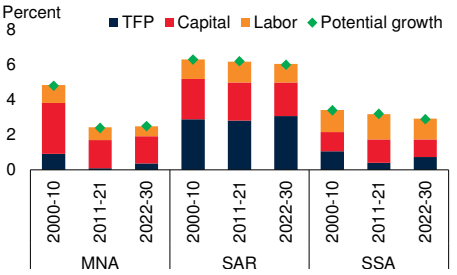
B. Potential growth



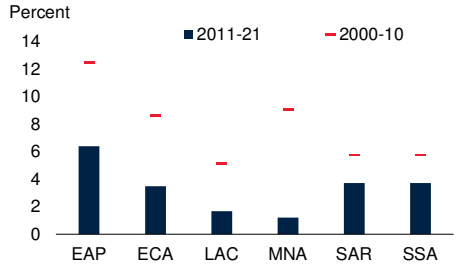
C. Contributions to potential growth



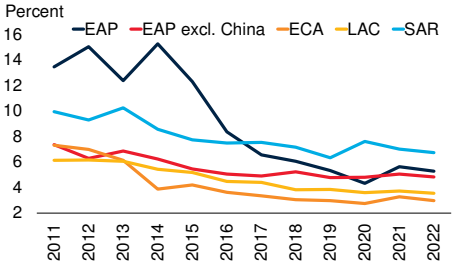
D. Contributions to potential growth



E. Investment growth, by region



F. Five-year-ahead consensus forecasts of investment growth



Source: Consensus Economics; Penn World Tables; World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies. EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A.-E. Arithmetic annual averages.

A.B. Based on production function approach. GDP-weighted averages for a sample of 29 advanced economies and 53 EMDEs.

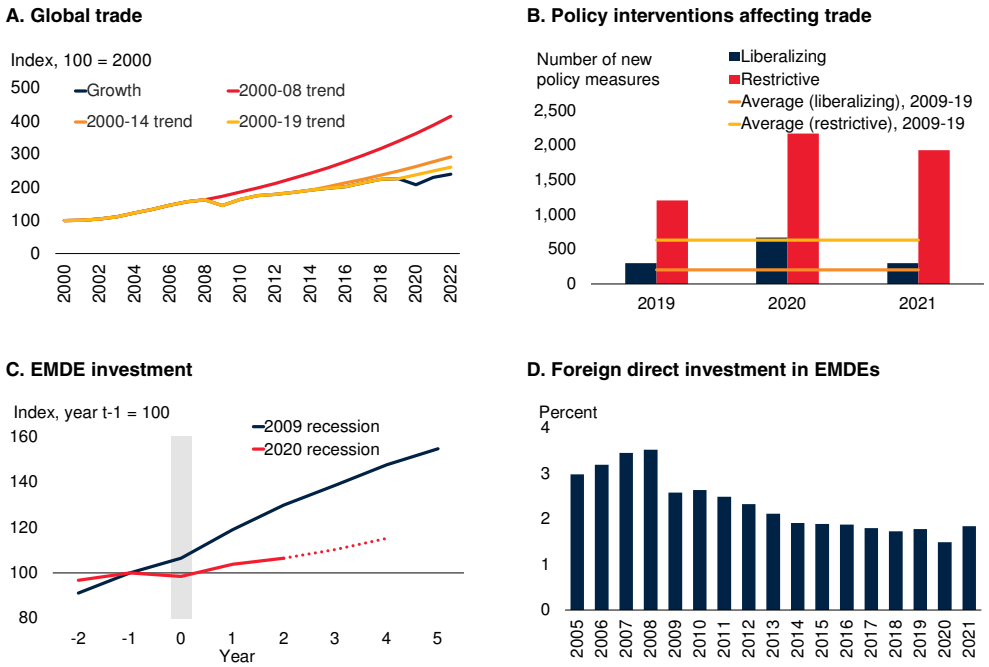
C.D. Based on production function approach. Sample includes 4 countries in EAP, 9 in ECA, 15 in LAC, 7 in MNA, 2 in SAR, and 13 in SSA. Data for 2022-30 are forecasts.

E. Weighted averages by real annual fixed investment in constant U.S. dollars. Sample includes 8 EAP, 12 ECA, 19 LAC, 9 MNA, 3 SAR, and 19 SSA economies.

F. Includes data for six economies in EAP (China, Indonesia, Malaysia, Philippines, Thailand, Vietnam), seven economies in ECA (Bulgaria, Croatia, Hungary, Poland, Romania, Russia, Ukraine), six economies in LAC (Argentina, Brazil, Chile, Colombia, Mexico, Peru) and one economy in SAR (India). Single-year missing data are interpolated.

FIGURE o.5 Global trade and investment

Global trade growth has slowed, in part due to growing use of restrictive trade measures. Foreign direct investment inflows to EMDEs have weakened since the early 2000s. The recovery in EMDE investment from the 2020 global recession is expected to be less robust than after the global recession of 2009.



Sources: Global Trade Alert (database); Haver Analytics; UNCTAD; World Bank.
A. Trade defined as exports and imports of goods and nonfactor services.
B. Data exclude late reports for the respective reporting years (the cut-off date is December 31 of each year).
C. Investment-weighted average (at 2010-19 average exchange rates and prices), indexed to 100 in the year before the global recession. "0" indicates the year of the global recession (2009 or 2020).
D. Last observation in 2021.

Trade. Global trade growth may weaken by another 0.4 percentage point per year, on average, during the remainder of the current decade compared with 2011-21, owing partly to slower global output growth and partly to the further waning of structural factors that supported rapid trade expansion in recent decades (chapter 6). Fragmentation of trade and investment networks loom large over trade prospects amid policies that favor suppliers from allied countries (friend-shoring) or nearby countries (near-shoring). The historical record also shows that persistently weak investment growth tends to be associated with slow trade growth.

Services. A possible bright spot may be the services sector—provided its productivity potential can be unlocked (chapter 7). In particular, the pandemic has ushered in a pronounced shift toward digitalization as firms moved many of their activities online. This promises productivity gains if it can be harnessed for better service delivery. Since the pandemic, there has also been a shift toward high-skilled offshorable service

activities, such as digitally deliverable information and communications technologies (ICTs) and professional services.

From technological innovations to the "roaring 2020s"?

The implications of technological innovations for future growth prospects have been a subject of intense debate. Some claim that the global economy will enjoy a surge in economic growth in the coming decades, driven by improvements in productivity thanks to new technologies (Brynjolfsson and McAfee 2014). Others caution that future growth could stall, or even fall, because new technologies will likely have a declining marginal impact on productivity, and structural challenges associated with aging and sluggish growth of investment will adversely affect prospects (Gordon 2016).

As the world gradually emerges from the pandemic-induced recession of 2020, it is tempting to look back to the 1918 Spanish flu and hope for a decade of rapid global growth reminiscent of the "Roaring Twenties" of that era because of recent technological innovations. Building on technological breakthroughs in earlier decades, North America and Europe enjoyed rapid modernization and strong economic growth in the 1920s. Automobiles replaced horse-drawn transportation and became ubiquitous as improvements in assembly lines cut costs. Newly built electrical grids paved the way for rapid industrial and household electrification. The economies of the United States, Japan, and some European countries became more productive. Global growth that averaged 3.6 percent in the 1920s was double that of the preceding two decades.

There is no question about the potential of recent technological innovations in transforming our lives across the world, in many dimensions. However, in light of the trends of the past two decades and the persistent slowdown in the fundamental sources of growth, our analysis concludes that the 2020s are more likely to be "disappointing" than "roaring" for the global economy, unless a comprehensive set of policies are put in place.

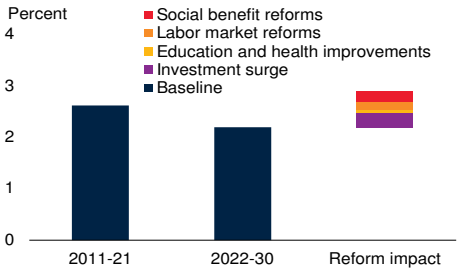
Trends are not destiny: Policies to boost potential growth

It is possible to reverse the slowdown in potential growth through structural policy interventions. Structural policies associated with higher physical capital investment, improved human capital, and faster labor supply growth could raise potential growth by 0.7 percentage point a year in 2022-30—both globally and in EMDEs. This would offset the 0.4 percentage point decline in global potential growth between 2011-21 and 2022-30 projected in the baseline scenario and most of the 1.0 percentage point slowdown projected for EMDEs (figure o.6). Global potential growth would rise to 2.9 percent per year—above its 2011-21 average of 2.6 percent, but still well below its 2000-10 average of 3.5 percent; EMDE potential growth, at 4.7 percent per year would remain below its 2011-21 average of 5.0 percent but by a much-reduced margin. These policies need to be accompanied by robust policy frameworks involving fiscal, monetary, and financial sector policies. They also need to be supported by interventions by the global community.

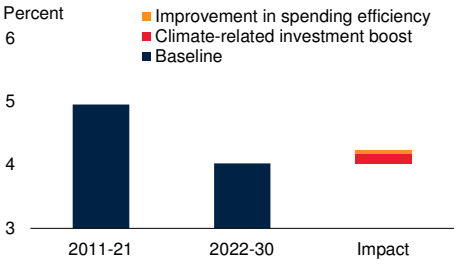
FIGURE o.6 Policy options

Economic reforms comparable with past achievements, or a major investment boost to meet climate change-related goals, could lift potential growth. In EMDEs, there is room for services sector productivity improvements. Broad-based reforms to shipping and logistics as well as border procedures could lower the costs of goods trade.

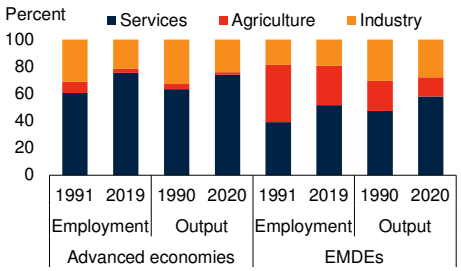
A. Global potential growth under reform scenarios



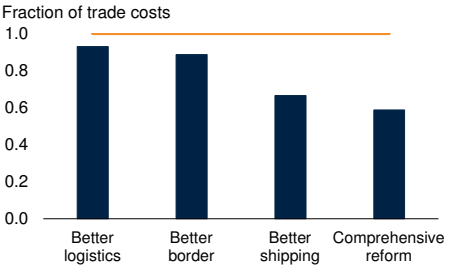
B. EMDEs potential growth in climate-related infrastructure investment scenarios



C. Composition of output and employment



D. Reduction in overall trade costs associated with policy improvements



Sources: Nayyar, Hallward-Driemeier, and Davies (2021); Penn World Tables; World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies. EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. GDP-weighted averages.

A.-C. Arithmetic annual averages.

A. Scenarios assume a repeat, in each country, of each country's best 10-year improvement.

B. Climate-related investment boost assumes an increase in average annual investment over the course of 2022-30 of 2.3 percentage points of GDP in line with the average of 13 countries covered in World Bank *Country Climate and Development Reports* (Argentina, China, Egypt, Ghana, Iraq, Jordan, Kazakhstan, Morocco, Peru, Philippines, South Africa, Türkiye, and Vietnam). The regional differences are in line with Rozenberg and Fay (2019). Improvement in spending efficiency assumes that each EMDE moves up two quartiles in the distribution of spending efficiency.

C. Sample for employment includes 35 advanced economies and 143 EMDEs, with data until 2019. Sample for output includes 31 advanced economies and 140 EMDEs, with data until 2020.

D. Bars show the fraction of goods trade costs that would remain after policy improvements. Policy improvements assume that the average EMDE in the quartile of EMDEs with the poorest scores in the liner shipping connectivity index and logistics performance index improves to match the score of the average EMDE in the quartile of EMDEs with the best scores for the liner shipping connectivity index and logistics performance index. The comprehensive package assumes that all three scores are improved simultaneously. Data refer to 2018. Gray line indicates 1 (that is, unchanged trade costs in 2018) among the sample of EMDEs scoring in the poorest quartile on these indicators.

The book discusses measures to boost human capital, labor supply, and productivity, and explores in depth policies to promote investment, services, and trade. It also explains the importance of strong macroeconomic policy frameworks and the need for support from the global community.

Investment. Policy makers in EMDEs can turn these challenges into opportunities by focusing on interventions that can boost investment. Given the enormous challenges associated with climate change, there is a well-defined need for an ambitious investment push. Climate change is expected to exacerbate extreme poverty by reducing agricultural output, increasing food prices, and worsening food and water insecurity in EMDEs, and increasing the disaster-related damages to the physical environment. As discussed above, climate-related disasters are becoming more common, and they weigh particularly heavily on vulnerable countries such as small states. They can also worsen government fiscal positions through lower tax receipts and lower productivity alongside increased spending on reconstruction and public services.

Addressing gaps between current spending on infrastructure and the level needed to meet development goals can promote investment growth. Prioritizing investment in green infrastructure projects with high economic returns, and fostering the widespread adoption of environmentally sustainable technologies, can support higher growth levels in the long-run while contributing to climate change mitigation. Sound investments aligned with climate goals in key areas—such as transport and energy, climate-smart agriculture and manufacturing, and land and water systems—can all boost long-term growth, while also enhancing resilience to future natural disasters.

Although green transitions need to be carefully managed, sustainable investments—including by the private sector—offer significant opportunities. Besides their broader benefits, green investments may represent an important engine for job creation as they tend to be labor intensive. Addressing climate change and other development challenges also requires structural reforms that encourage the mobilization of private capital and lower barriers of access for the private sector. In many EMDEs, governance and institutional reforms are necessary to improve and unify the often fragmented regulatory and institutional environment. Reforms that improve the business climate can stimulate private investment directly and amplify the positive effects of investment, such as less informality and more job creation. All of these policy interventions also help attract FDI.

All EMDE regions need to invest more heavily in infrastructure (chapter 4). This may be to improve climate resilience, including to protect against floods, storms, and drought and dampen their impact, especially in small states (LAC, EAP) and heavily agriculture-reliant economies (SAR, SSA). It may be to improve chronically low levels of infrastructure development (SAR, SSA); accommodate rising levels of urbanization (EAP, LAC, SAR). Or it may be to support productivity in sectors that employ a large proportion of the population (for example, agriculture in SSA) or rebuild following conflict (ECA, MNA, SSA); or improve trade linkages (LAC, SAR).

The investment needed to achieve climate and development goals exceed many governments' ability to finance them. Hence, successfully leveraging private sector capital to boost investment requires a set of policies to balance the risks, costs, and returns of investment projects, and overcoming common obstacles to private investment, such as poor business conditions, insufficient project pipelines, and underdeveloped domestic capital markets.

Labor supply and human capital. Policies can aim to raise the active share of the working-age population, in particular policies to "activate" discouraged workers or groups with historically low participation rates, such as women and younger or older workers. Globally, average female labor force participation in 2011-21, at 54 percent, was three-quarters that of men, which stood at 72 percent; the gap between male and female participation was even larger in EMDEs, at 25 percentage points. Similarly, in both EMDEs and advanced economies, the average participation rate of workers aged 55 years or older was about half that of 30-45-year-old workers, and labor force participation among those aged 19-29 years was only four-fifths that of their 30-45 year olds.

A set of reforms that gradually raises participation rates in each five-year age group from 55-59 years onwards and that raises female labor force participation rates by their best 10-year improvement on record could increase global potential growth rates by as much as 0.2 percentage point per year on average during 2022-30. Considerably greater boosts to potential growth, in excess of 1 percentage point per year, could be achieved in regions such as SAR and MNA if they raised female labor force participation from about half of the EMDE average to the EMDE average.

Improvements to health and, especially, education could be one prong of such a set of reforms to boost labor force participation, since better-educated workers tend to be more firmly attached to labor markets. In addition, improvements in education and health outcomes on par with the best ten-year improvement on record could boost productivity and lift EMDE potential growth by an additional 0.1 percentage point per year, on average, for the remainder of this decade and more over the longer term,

Trade. Trade has flagged over the past decade. A major effort to rekindle it could yield large growth dividends over the next one. The costs added to internationally traded goods remain high: on average, they are almost equivalent to a 100 percent tariff, roughly doubling the costs of internationally traded goods relative to domestic goods (chapter 6). The bulk of the costs is accounted for by transportation and logistics, non-tariff barriers, and policy-related standards and regulations; tariffs amount to only 5 percent of average goods trade costs. Trade costs for services tend to be even higher than for goods, largely reflecting regulatory restrictions.

To reduce elevated trade costs in EMDEs, comprehensive reform packages are needed. Trade agreements can reduce trade costs and promote trade, especially if they lower non-tariff barriers as well as tariffs and generate momentum for further domestic reforms (Baldwin and Jaimovich 2010; Plummer 2007). However, even if the global environment is not conducive to progress in such agreements, countries can take action

at home to rekindle trade. For example, they can streamline trade processes and customs clearance requirements; enhance domestic trade-supporting infrastructure; increase competition in domestic logistics and in retail and wholesale trade; reduce tariffs; lower the costs of compliance with standards and regulations; and reduce corruption. Empirical analysis suggests that reforms that lift an EMDE in the quartile of countries with the highest shipping and logistics costs to the quartile of those with the lowest costs could cut its trade costs in half. For maximum effect, such reforms need to be embedded in broader improvements such as in human capital and digital connectivity (Devarajan 2019; Okonjo-Iweala and Coulibaly 2019).

Trade can also play a critical role in the climate transition (Devarajan et al. 2022). It has the potential to promote the production of goods and services necessary for transitioning to low-carbon economies. In addition, trade delivers goods and services that are key to help countries recover from extreme weather events. However, evidence indicates that in some countries, entry into global value chains in manufacturing has been accompanied by greater carbon emissions, and that global value chains have contributed to greater waste and increased shipping (World Bank 2020). Shipping accounts for 7 percent of global carbon emissions and 15 percent of global emissions of sulfur and nitrogen (World Bank 2020).

A number of policies can be implemented to reduce trade costs in a climate-friendly way. For example, policies can be designed to remove the current bias in many countries' tariff schedules favoring carbon-intensive goods and eliminate restrictions on access to environmentally friendly goods and services (Brenton and Chemutai 2021; World Bank 2020). In addition, multilateral negotiations can focus not only on tariffs on environmental goods but also on nontariff measures and regulations affecting services—access to which is often vital for implementing the new technologies embodied in environmentally friendly goods.

Services. Policy interventions can also help countries unlock the potential of the services sector to drive economic growth (chapter 7). Supporting the diffusion of digital technologies in EMDEs remains central to deliver better growth outcomes. In this context, investing in ICT infrastructure, updating regulatory frameworks around data, and strengthening management capabilities and worker skills are important. Countries can promote the expansion of productive, high-skilled, offshorable services by enabling greater use of online communications and digital platforms, reducing barriers to services trade, and supporting training in relevant skills. Where education systems are weak, but reliable and widespread internet access exists, it would be possible to increase utilization of higher-quality online schooling and training. Digital technologies may expand access to finance in the poorest countries, enable more effective government service delivery, and accelerate the trend toward the automation of some routine occupations. In addition, regulatory reforms can support investment to revive low-skilled contact services, such as transportation, that employ large numbers of people.

The prospect for services-led growth will also be influenced by climate-change considerations. The services sector can play an important role in climate mitigation and

adaptation. For instance, financial services can play a fundamental role in mobilizing the resources needed for necessary investments (Grippa, Schmittmann, and Suntheim 2019). Similarly, engineering and environmental consulting services will likely be central to enabling energy-efficiency improvements (World Economic Forum 2022).

Macroeconomic policies. Robust macroeconomic policy frameworks play an important role in boosting long-term growth prospects. They can help pro-actively smooth business cycles to avoid the disruptions and distortions associated with adverse shocks. They can ensure that social protection systems are geared toward minimizing long-term damage from such shocks. In addition, they can instill confidence in sound policy making and buttress the credibility of institutions.

Robust fiscal and monetary policy frameworks are founded on transparent and rules-based approaches. Fiscal rules and medium-term budget frameworks can help countries maintain sustainable finances and accumulate reserves when the economy is doing well. These types of disciplined fiscal policy frameworks are especially critical nowadays to support growth prospects amid elevated debt levels and tight global financial conditions. In a deficit-neutral manner, they can guide government spending toward policies with long-term growth benefits, such as in health, education, or transport, or expand revenue bases to increase financing for such priority policies. Better fiscal frameworks also assist monetary policy by restraining procyclical spending that could contribute to demand pressures.

A transparent and independent central bank will be better placed to maintain price stability, thereby helping to create a macroeconomic environment that is conducive to strong growth. In particular, by establishing an environment of low and stable inflation over the medium term, and thus fostering confidence in macroeconomic stability, central banks can support private investment growth (World Bank 2022). Strong monetary policy frameworks are currently particularly important to overcome inflation and stabilize inflation expectations. Monetary policy can also play a countercyclical role through its management of interest rates and credit growth, thereby supporting investment growth when activity is weak and inflation is low but helping to contain investment when the economy is overheating.[8]

To avoid boom-bust cycles that do lasting damage to investment and potential growth, proactive financial-sector supervision and regulation can mitigate risks—especially in countries with financial markets that are developing rapidly and becoming more integrated globally. In EMDEs without a prudential authority or prudential powers, creating or empowering these institutions is a priority. In EMDEs with the appropriate institutions, flexible and well-targeted tools are needed to manage balance-sheet mismatches, foreign-currency and capital-flow-related risk, and asset-price misalignment with economic fundamentals.

[8] Fiscal challenges combined with weak growth prospects complicate monetary policy when inflation is high (Ha, Kose, and Ohnsorge 2022) and increase the risk of recession (Guenette, Kose, and Sugawara 2022).

Global cooperation. Since many of the challenges faced by EMDEs transcend national borders, it is essential to strengthen global cooperation to address them. The increasing frequency and severity of climate-related disasters in recent years highlight the escalating costs of climate change: the global community must therefore work together to accelerate progress toward meeting the goals of the Paris Agreement. In addition, there is a pressing need to reduce the economic, health, and social costs of climate change, many of which are borne disproportionately by vulnerable populations in EMDEs, particularly in LICs. More pressingly, the global community can help to expand the financing and capacity-building needed to promote growth in EMDEs—including by scaling up climate-change adaptation, increasing green investments, and facilitating a green-energy transition (Bhattachariya, Kharas, and Walker 2023). The increase in investment spending needed to achieve the SDGs (relative to GDP) will be much larger for LICs than for the average EMDE. That implies that substantial additional financing from the global community and the private sector will be needed to close investment gaps. For some LICs that are already in—or at high risk of—debt distress, such financing may need to be accompanied by debt relief to allow them to steer spending toward development goals instead of debt service.

Synopsis

The book features three interconnected parts. Part I analyzes the evolution of global and regional potential growth using a new comprehensive database. Part II focuses on global and regional investment dynamics and policies to promote investment growth. Part III presents a detailed analysis of prospects for potential growth and policy measures that can lift it. It turns to the roles of services and trade as engines of long-term economic growth. The book presents a wide menu of policy options for improving growth prospects in each chapter.

The remainder of this introduction presents a summary of each chapter. After presenting the motivation of the chapter, each summary explains the main questions, contributions to the literature, and analytical findings. After these summaries, a brief discussion of future research directions is presented.

Part I. Potential Growth: An Economy's Speed Limit

In Part I of this volume, chapter 1 explores the conceptual framework and measurement of potential growth. Based on a new database introduced in this chapter, it describes the slowdown in potential growth in the past decade and its sources. Chapter 2 delves deeper into regional differences in the evolution of potential growth, describes regional prospects, and offers region-specific policy options.

Chapter 1. Potential Not Realized: An International Database of Potential Growth

In this chapter, Kilic Celik, Kose, Ohnsorge, and Ruch introduce the most comprehensive database of potential growth estimates available to date. Potential growth

is critical to achieve poverty reduction; raise the resources needed to invest in solving global challenges; generate job creation and wage growth, especially in the formal sector; and achieve or sustain debt sustainability.[9]

Based on an extensive analysis of the earlier literature, they present three main approaches to estimating potential output growth—each of which has its advantages and disadvantages.

- *Production function approach.* The first approach measures potential growth based on production function estimates. This makes it possible to study the contributions of what theory suggests are the fundamental drivers of growth—the growth of inputs of the factors of production (labor and capital) and technological progress—but involve assumptions that may be viewed as restrictive.

- *Time-series methods.* The second approach obtains measures of potential growth from statistical filters that generate smoothed versions of the actual output growth data as measures of potential output. This may provide the most consistency between estimates of potential growth and output gaps, on the one hand, and indicators of domestic demand pressures, on the other. However, it provides no links between estimated potential growth and its plausible fundamental drivers.

- *Long-term growth expectations.* A third approach uses long-term (say five years ahead) forecasts of output growth from economic analysts, which may be assumed to incorporate the forecasters' judgments about potential growth but whose drivers are highly uncertain.

Chapter 1 introduces the most comprehensive international database for the nine most common measures of potential growth based on these three approaches. This database and the analysis in this chapter serve as the foundation for chapter 2 and chapter 5—which examine past and prospective potential growth globally, by country group, and by region, and policies that can be implemented to improve it. Specifically, this chapter addresses the following questions.

- How has global potential growth evolved in the past three decades?

- How have recessions and other adverse events affected potential growth?

- Through which channels have such events affected potential growth?

Contributions. Chapter 1 makes the following contributions to the literature. First, it introduces the first comprehensive database for the nine most commonly used measures of potential growth for the largest available country sample of up to 173 economies (37 advanced economies and 136 EMDEs) over 1981-2021. One of the nine measures is

[9] Ohnsorge and Yu (2022) present a broader discussion of the challenges in shifting informal activity into the formal economy. For a discussion of the challenges of low growth for debt sustainability, see Kose, Ohnsorge, and Sugawara (2022), and of government debt reduction, see Kose et al. (2022).

based on the production function approach; five are based on the application of univariate time-series filters (Hodrick-Prescott, Baxter-King, Christiano-Fitzgerald, Butterworth, and Unobserved Components filters); one applies a multivariate Kalman filter; and two are based on analysts' long-term growth forecasts.[10]

By including a measure that builds potential growth from its fundamental drivers, the database allows later chapters to examine the role of policy initiatives such as an investment push to address climate change. Previous studies have limited themselves to a single method of measuring potential growth, such as the production function approach (OECD 2014) or multivariate filters (ADB 2016; IMF 2015). The database updates an earlier version published before the pandemic (Kilic Celik, Kose, and Ohnsorge 2020; World Bank 2018).

Second, chapter 1 documents that all measures of potential growth show a decline in global potential growth in 2011-21, relative to 2000-10, and that this decline was internationally widespread. Earlier studies documented the decline for only a subset of measures (for example, Chalaux and Guillemette 2019; Kilic Celik, Kose, and Ohnsorge 2020).

Third, chapter 1 describes the first systematic study of the long-term damage to potential growth from a range of short-term economic disruptions—such as recessions, banking crises, and epidemics—in a large set of countries and for a wide range of potential growth measures. Only a few earlier studies have estimated the effects of recessions on potential output growth, and they were confined to a smaller sample of countries and the production function approach (Furceri and Mourougane 2012; Mourougane 2017). This chapter broadens the earlier research by estimating the effects of recessions, banking crises, and epidemics in a large sample of advanced economies and EMDEs and for a wide range of potential growth measures.

Fourth, chapter 1 uses a set of local projection models to estimate empirically the channels through which short-term economic disruptions dampen long-term potential growth. Specifically, it estimates the effects of disruptions on the growth of the labor force, the growth of the capital stock (through investment), and the growth of TFP in a consistent framework. Previous studies have typically examined overall effects on output growth or effects through individual channels only.[11]

[10] Univariate filters are applied only to actual output; multivariate filters are applied to multiple series including actual output. Both types of filters generate smoothed output series that are considered estimates of potential output.

[11] The theoretical literature has modelled several mechanisms through which output disruptions may cause lasting damage: lower expected profitability of productivity-increasing research and development (Fatás 2000) or of the adoption of new, productivity-increasing technology (Anzoategui et al. 2017); lower asset prices (Caballero and Simsek 2017); restricted firm access to credit and start-up capital (Queralto 2013; Wilms, Swank and de Haan 2018); resource misallocation (Furceri et al. 2021); or human capital losses (Blanchard and Summers 1987; Lockwood 1991). Empirical estimates have shown some of these mechanism at work during past recessions (Nguyen and Qian 2014; Oulton and Sebastia-Barriel 2016). None of these studies, however, systematically estimates and compares the various channels through which short-term disruptions reduce potential growth.

Findings. Chapter 1 reports several novel findings. First, an internationally widespread decline in potential growth occurred in 2011-21 relative to 2000-10 (figure o.7). This is shown by all estimates of potential growth, globally and for both advanced economies and EMDEs. Global potential growth, as estimated using the production function approach, fell to 2.6 percent a year during 2011-21 from 3.5 percent a year during 2000-10; advanced-economy potential growth fell to 1.4 percent a year during 2011-21 from 2.2 percent a year during 2000-10; and EMDE potential growth fell to 5.0 percent a year during 2011-21 from 6.0 percent a year during 2000-10. The weakening of potential growth was highly synchronized across countries: during 2011-21, potential growth was below its 2000-10 average in 96 percent of advanced economies and 57 percent of EMDEs. This widespread decline reflected a multitude of factors. In terms of the production function framework, all the fundamental drivers of growth faded in 2011-21: TFP growth slowed, investment growth weakened, and labor force growth declined.

Second, recessions were associated, on average, with a decline of about 1.4 percentage points in potential growth even after five years. This refers to potential growth estimated using the production function approach; other measures yielded different estimates (with a range of 0.2-1.4 percentage points) but all were statistically significant. The effect was somewhat stronger in EMDEs—with potential growth 1.6 percentage points lower five years after the average recession—than in advanced economies, where potential growth was, on average, 1.3 percentage points lower.

Third, the medium-term impact of recessions on potential growth tended to be more severe than the effects of other adverse events. Banking crises were associated with initially larger falls in potential growth, peaking at 1.8 percentage points after two years, as a result of collapses in investment. However, these tended to be followed by rapid recoveries in investment, such that the fall in potential growth after five years was only 1.2 percentage points. Epidemics were associated with more modest, but still statistically significant, short- and medium-term declines in potential growth. These effects were more severe in EMDEs than in advanced economies, possibly reflecting the greater ability of advanced economies to limit the economic damage with fiscal and monetary policy support as well as their better developed healthcare systems.

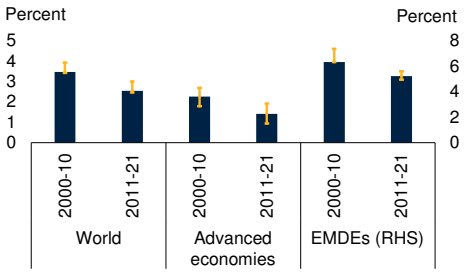
Fourth, the chapter provides evidence that recessions affected potential growth through multiple channels. Five years after an average recession, the growth rate of investment was 3 percentage points lower than in "normal" years, and those of employment and TFP were both 0.7 percentage point lower. This contrasts with banking crises, which tended to be associated with lasting losses of TFP growth, and epidemics, which were often associated only with lasting employment losses. These possibly reflected prolonged effects on the health of the labor force and behavioral responses to epidemics.

Fifth, different estimates of potential growth are found to display different features. Estimates based on forecasts tended to be the highest and those based on univariate filtering techniques the lowest. Estimates based on filtering techniques tended to be the most volatile and to track actual growth most closely, as expected. Estimates based on

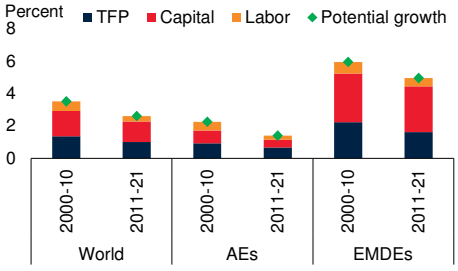
FIGURE o.7 Evolution of potential growth

Potential growth slowed in 2011-21 from 2000-10 across country groups, with all major drivers of growth weakening. Adverse events—such as banking crises, recessions, and epidemics—have damaged potential growth by persistently lowering total factor productivity growth, investment growth (recessions and epidemics), and employment growth (epidemics).

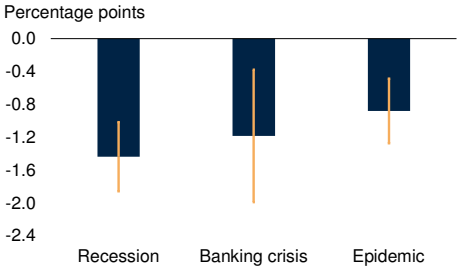
A. Potential growth estimates (range across methodologies)



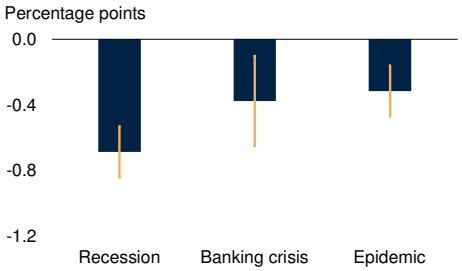
B. Contributions to potential growth



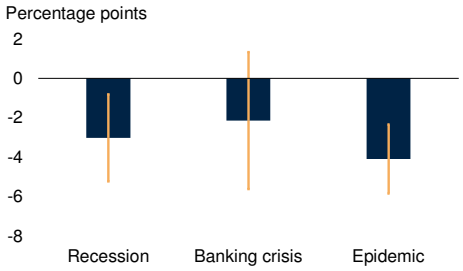
C. Response of potential output growth five years after events



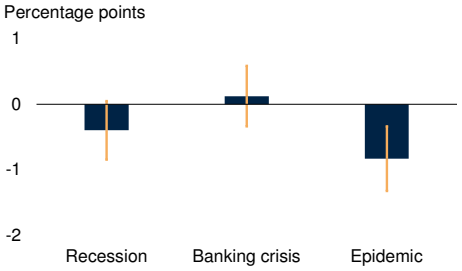
D. Response of potential TFP growth five years after events



E. Response of investment growth five years after events



F. Response of employment growth five years after events



Source: Penn World Tables; World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies.
A. Blue bars denote production function-based estimates. Vertical lines indicate range of eight estimates. Decade-averages of GDP-weighted average potential growth estimates of varying samples.
B. Based on production function approach.
C.-F. Blue bars are coefficient estimates from local projections model. Vertical lines indicate 90 percent confidence interval. Sample and methodology are described in chapter 1.

the production function approach tended to be the most stable and the least correlated in the short term with actual growth.

Chapter 2. Regional Dimensions of Potential Growth: Hopes and Realities

In this chapter, Kasyanenko, Kenworthy, Kilic Celik, Ruch, Vashakmadze, and Wheeler build on chapter 1 to explore regional dimensions of potential growth. Their starting point is the finding that potential growth slowed in 2011-21 relative to the preceding decade in almost all of the World Bank's six EMDE regions. Yet, wide differences are apparent in recent developments and prospects across the regions, and these have implications for regional policy priorities. Chapter 2 explores these regional differences by considering the following questions.

- How have potential growth and its drivers evolved in each region since the turn of the century?
- What are the prospects for regional potential growth?
- What policies would lift regional potential growth?

Contributions. Chapter 2 adds regional detail to the analysis of global potential growth in chapter 1 and chapter 5 and does so in a consistent manner across the EMDE regions. Drawing on a rich body of regional studies and using the new database introduced in chapter 1, this chapter provides the first systematic analysis of potential growth in all six EMDE regions. Other major cross-country studies of potential growth have largely focused on advanced economies (Dabla-Norris et al. 2015; IMF 2015; OECD 2014) or Asian economies (ADB 2016). Chapter 2 examines data for up to 53 EMDEs—6 in EAP, 9 in ECA, 16 in LAC, 5 in MNA, 3 in SAR, and 14 in SSA—over the past two decades (2000-2021) and considers prospects for the remainder of this decade (2022-30).

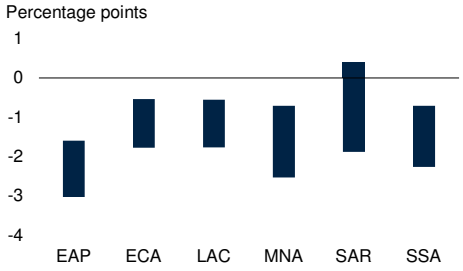
Findings. Chapter 2 documents an array of regional differences (figure o.8). First, the slowdown in potential growth between 2000-10 and 2011-21 was steepest in MNA, followed by EAP, although potential growth in EAP remained higher than in all other regions except SAR. ECA and LAC experienced less pronounced slowdowns but potential growth in LAC remained the lowest among all EMDE regions. In SAR, potential growth was almost unchanged, at the highest rate among EMDE regions, while in SSA, potential growth weakened only moderately but remained one of the lowest among EMDE regions, at around half the average for SAR.

Second, EAP is expected to be the EMDE region with the sharpest decline in the growth of both aggregate and per capita potential output during 2022-30. The decline is expected to amount to about 1.6 percentage points a year, on average, and mainly reflected slower capital accumulation and TFP growth in China as the country implements policies to shift from an investment-led to an increasingly consumption-led growth model. The second largest decline in potential growth in 2022-30 is projected for ECA, resulting in part from the fallout of the war in Ukraine but also from

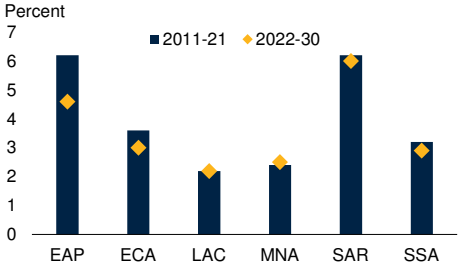
FIGURE o.8 Potential growth in EMDE regions

The potential growth slowdown between 2000-10 and 2011-21 was steepest in the Middle East and North Africa (MNA), followed by East Asia and the Pacific (EAP), although potential growth in EAP remained higher than in all other regions except South Asia (SAR). In 2022-30, EAP is expected to be the region with the sharpest declines in growth of aggregate and per capita GDP, mainly reflecting slower capital accumulation in China. Potential growth is projected to be broadly unchanged in LAC, SAR, SSA, and to rise in MNA; stronger TFP growth and, in SAR and SSA, stronger investment growth are expected to offset demographic headwinds.

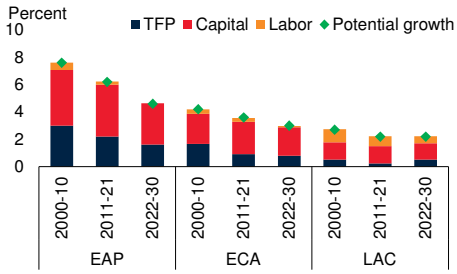
A. Changes in potential growth between 2000-10 and 2011-21 (across methodologies)



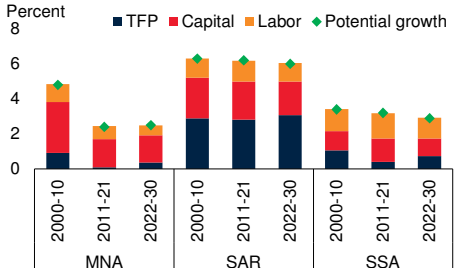
B. Potential growth



C. Contributions to potential growth



D. Contributions to potential growth



Source: Penn World Tables; World Bank.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Period averages of annual GDP-weighted averages.

A. Samples differ across measures, depending on data availability. PF = production function approach. MVF = multivariate filter-based. UVF = univariate filter-based (specifically, the Hodrick-Prescott filter). "Exp." = estimates based on five-year-ahead *World Economic Outlook* growth forecasts. For SAR, insufficient data available for filter-based estimates until 2010. The sample includes three countries in EAP (China, Philippines, and Thailand), six countries in ECA (Bulgaria, Croatia, Hungary, Kazakhstan, Poland, and Romania), ten countries in LAC (Bolivia, Brazil, Chile, Colombia, Costa Rica, Honduras, Mexico, Paraguay, Peru, and Uruguay), three countries in MNA (Jordan, Morocco, and Tunisia), four countries in SAR (Bangladesh, India, Pakistan, and Sri Lanka), and three countries in SSA (Cameroon, Namibia, and South Africa). Due to the limited sample, other measures are excluded from the SAR region.

B. C.D. Based on production function approach. Sample includes 4 countries in EAP, 9 in ECA, 15 in LAC, 7 in MNA, 2 in SAR, and 13 in SSA. Note that quantitative estimates may differ from those presented in panels A and B because of sample differences. Panels A and B ensures sample consistency across measures; panels C and D ensure sample consistency across time. 2022-30 are forecasts.

continued weakness in labor force growth. In SSA, potential growth is expected to decline moderately as strengthening TFP growth is expected to partially offset slowing investment and population growth. Elsewhere, potential growth is projected to be broadly unchanged in LAC and SAR and rise in MNA in 2022-30 as strengthening TFP growth offsets demographic headwinds to potential growth.

Third, persistently weak TFP growth in LAC, MNA, and SSA makes policy action to raise productivity growth especially important for these regions. There is also considerable room to boost labor force growth in MNA and SAR by encouraging female labor force participation and, in EAP and ECA, by raising participation among older workers. SAR and MNA lag especially far behind other EMDE regions in female labor-force participation (Klasen 2019). Prospects for investment growth in LAC and SSA are particularly weak and a wide range of measures is likely to be required to reignite it. Such measures are discussed in chapter 4. A climate-related investment push could catalyze a boost to potential growth in all EMDE regions.

Part II. Investment: Time for a Big Push

Part II of this volume describes the weakening of investment growth in EMDEs in the past decade, examines its causes, and considers policy options to help lift investment growth. Chapter 3 examines trends in the broad group of EMDEs and chapter 4 delves deeper into regional characteristics and identifies region-specific policy priorities to lift investment growth.

Chapter 3. The Global Investment Slowdown: Challenges and Policies

In this chapter, Stamm and Vorisek draw attention to the weakening of investment growth in EMDEs even before the onset of the COVID-19 pandemic (figure o.9).[12] By the time the pandemic began in early 2020, EMDEs had already experienced a slowdown in investment growth over the previous decade, from nearly 11 percent in 2010 to less than 4 percent in 2019. In EMDEs, excluding China, investment growth had fallen more sharply: from about 9 percent in 2010 to just under 1 percent in 2019. The slowdown in investment growth in EMDEs during the 2010s occurred in all regions, in both commodity-importing and commodity-exporting country groups, and in a large portion of individual economies. In advanced economies, by contrast, investment growth was more sluggish but also more stable, hovering around its long-term average of 2 percent per year.

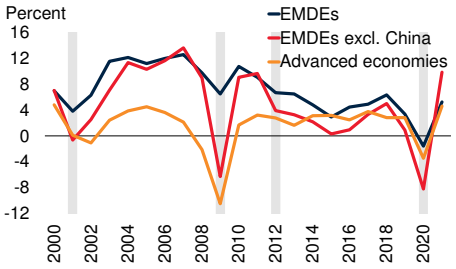
In 2020, the pandemic triggered a severe investment contraction in EMDEs, excluding China—a far deeper decline than in the 2009 global recession triggered by the global financial crisis. Even when China is included, EMDEs did not avoid an investment

[12] Throughout the book, investment refers to real gross fixed capital formation (public and private combined). Investment growth is measured as the annual percent change in real investment. In international averages, investment growth rates are weighted by average 2010-19 investment levels. For a discussion of factor reallocation across firms and sectors, see Dieppe (2020).

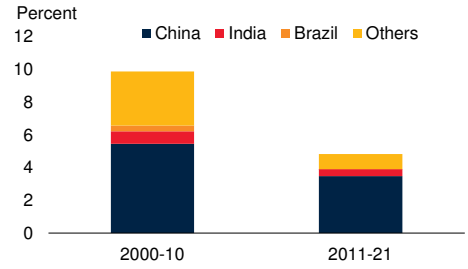
FIGURE o.9 Global investment

The pandemic-induced 2020 global recession was associated with steep investment contractions and more muted subsequent recoveries than was the 2009 global recession. The weakening of investment growth in the 2010s reflected a range of factors, including slower credit growth, deteriorating terms of trade for commodity exporters, slowing reform momentum, and the shift in China's growth strategy from reliance on fixed investment.

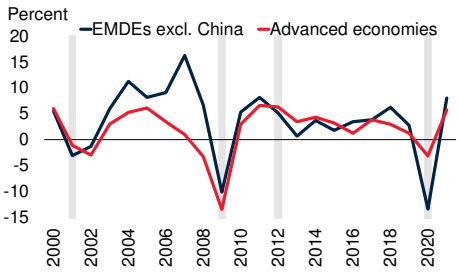
A. Investment growth



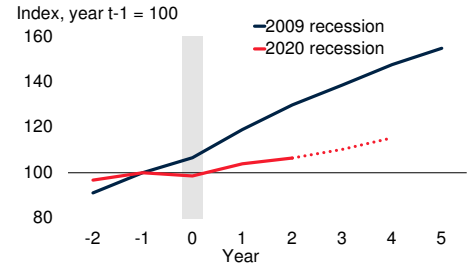
B. Contributions to EMDE investment growth, by country



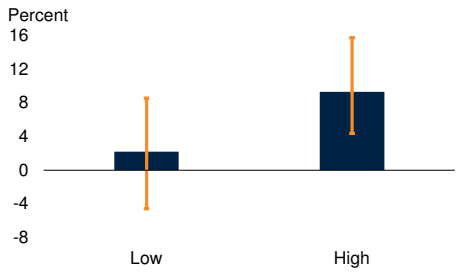
C. Private investment growth



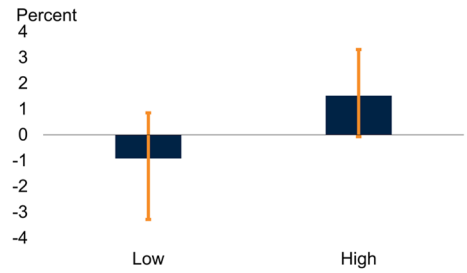
D. Investment in EMDEs around global recessions



E. Investment growth in EMDEs with high and low credit growth, 2000-21



F. Total factor productivity growth in EMDEs with high and low investment growth, 2000-20



Sources: World Bank; Haver Analytics.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Period averages of annual GDP-weighted averages. EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation.

A.C. Investment-weighted averages. Shaded areas indicate global recessions (in 2009 and 2020) and slowdowns (in 2001 and 2012). Sample for aggregate investment (A) includes 69 EMDEs and 35 advanced economies. Sample for private investment (C) includes 32 EMDEs (China is excluded) and 11 advanced economies.

B. Bars show the percentage point contribution of each country or country group to EMDE investment growth during the indicated years. Height of the bars is average EMDE investment growth during the indicated years. Sample includes 69 EMDEs.

D. On the x-axis, year zero refers to the year of global recessions in 2009 and 2020. Dotted portions of lines are forecasts. Sample includes 69 EMDEs.

E.F. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate years when real private sector credit growth (E) or investment growth (F) were in the bottom and top third of the distribution, respectively, during 2000-21. Difference in medians between "low" and "high" and subsamples is significant at the 1 percent level. Sample includes 69 EMDEs.

contraction in 2020, as they had in 2009. In advanced economies, however, because investment was buttressed by large-scale fiscal support packages and expansionary monetary policies, it shrank less in 2020 than in 2009. After a sharp rebound in 2021, investment growth in EMDEs is projected to slow back to rates that are about half the average of the previous two decades.

Slowing investment growth is a concern because it is critical to sustaining growth of potential output and per capita income. Capital accumulation raises labor productivity, the key determinant of real wages and household incomes, both through capital deepening—equipping workers with more capital—and by embodying productivity-enhancing technological advances.

Slowing investment growth has held back progress toward meeting the SDGs and fulfilling commitments made under the Paris Agreement on climate change. Meeting these goals and commitments will require filling substantial unmet infrastructure needs, including growing needs for climate-resilient infrastructure and infrastructure that reduces net greenhouse gas emissions. Given limited fiscal space in EMDEs, such scaling-up of investment will require additional financing from the private sector and the international community.

Against this backdrop, chapter 3 addresses four questions:

- How has investment growth evolved over the past decade, and how does the performance of investment during the 2020 global recession compare with previous recessions?
- What are the key factors associated with investment growth?
- What are the implications of weak investment growth for development prospects?
- Which policies can help promote investment growth?

Contributions. Chapter 3 makes several contributions to the literature on investment. It provides the first analysis of investment growth in a large sample of EMDEs since the pandemic and Russia's invasion of Ukraine. Moreover, because FDI is a potentially critical source of technology spillovers and financing, this chapter reviews a large set of studies on the link between FDI and output or aggregate domestic investment.

In addition, the chapter examines the likely medium- and long-term consequences of the damage to investment in EMDEs from the pandemic and from Russia's invasion of Ukraine, focusing on the effects on productivity, potential output growth, trade, and the ability to achieve the SDGs and climate-related goals. Finally, the chapter describes policies to revive investment growth, including identifying opportunities created by the pandemic.

Previous studies of investment in EMDEs have tended to be based on pre-global financial crisis data, confined to analysis of the behavior of investment around the global

financial crisis, or focused on specific regions.[13] Investment weakness in advanced economies has been explored in a number of studies. This study updates and extends two previous studies of investment trends and correlates in a large sample of EMDEs (World Bank 2017a; 2019a).

Findings. Chapter 3 presents four main findings. First, the recovery of investment in EMDEs from the trough of the COVID-19 pandemic in 2020 has been slower than the recovery from the 2009 recession that followed the global financial crisis. In EMDEs excluding China, investment shrank by about 2 percentage points more in 2020 than during the 2009 global recession, despite easier financial conditions and the provision of sizeable fiscal stimulus in many large EMDEs. This partly reflects the more widespread impact of the pandemic on investment: investment shrank in nearly three-quarters of EMDEs in 2020, compared with just over 50 percent of EMDEs in 2009. The effects of the pandemic, the war in Ukraine, and monetary policy tightening by major central banks have extended the prolonged and broad-based slowdown in investment growth in EMDEs in the 2010s. The slowdown during the 2010s occurred in all regions, and in commodity-exporting and commodity-importing economies. Both private and public investment growth were more sluggish during the 2010s than in the previous decade.

Second, the weakening of investment growth in EMDEs over the past decade reflected a wide range of headwinds. It was correlated with weaker output growth, declining net capital inflows relative to GDP, slower real private sector credit growth, and a deterioration of the terms of trade faced by energy exporters. Conversely, investment climate reform spurts tended to be associated with stronger real investment growth.

Third, after a robust rebound in 2021, investment growth is projected to average 3.5 percent per year in 2022-24 in EMDEs, about half its 2000-21 average, and 4.1 percent a year in EMDEs excluding China—one fifth below the 2000-21 average. For all EMDEs, projected investment growth through 2024 will be insufficient to return investment to its pre-pandemic (2010-19) trend. This investment outlook dampens long-term prospects for the growth of output and productivity as well as global trade, and makes meeting the development and climate goals even more challenging.

Fourth, a sustained improvement in investment growth in EMDEs will require both the use of domestic policy tools and, for some of them, international financial support—with appropriate prescriptions dependent on country circumstances. Macroeconomic policies can support investment in a number of ways, but particularly by encouraging private investment through establishing confidence in macroeconomic stability and improving business climates. Public investment can be boosted by reducing

[13] See, for example, the analysis of the drivers of investment in Anand and Tulin (2014); Bahal, Raissi, and Tulin (2018); Caselli, Pagano, and Schivardi (2003); Cerra et al. (2017); Qureshi, Diaz-Sanchez, and Varoudakis (2015). Firm-level studies include Li, Magud, and Valencia (2015) and Magud and Sosa (2015). On investment weakness, see Banerjee, Kearns, and Lombardi (2015); IMF (2015); Leboeuf and Fay (2016); and Ollivaud, Guillemette, and Turner (2016).

unproductive expenditures and subsidies and strengthening spending efficiency and revenue collection. To boost private investment, institutional reforms could address a range of impediments and inefficiencies, such as high business startup costs, weak property rights, inefficient labor and product market policies, weak corporate governance, costly trade regulation, and small financial sectors. Setting appropriate, predictable rules governing investment, including for public-private partnerships, is also important.

Fifth, a review of the literature since 1990 finds mixed evidence on the relationship between FDI and output growth but a mostly positive relationship between FDI and domestic investment. That said, several country characteristics, time period specifics, and features of FDI have influenced the relationship between FDI, output growth, and investment. Greenfield investment in upstream and export-intensive, non-primary sectors has tended to be more conducive to growth and aggregate investment. FDI also tended to raise growth and investment more in countries with better institutions, more skilled labor forces, greater financial development, and trade openness.

Chapter 4. Regional Dimensions of Investment: Moving in the Right Direction?

In chapter 4, Kasyanenko, Kenworthy, Ruch, Vashakmadze, Vorisek, and Wheeler note that slowdowns in investment growth between the periods 2000-10 and 2011-21 occurred in all six EMDE regions. In several regions, the outlook for investment growth is mediocre, with 2021's strong rebound from the 2020 investment collapse having subsided. Given the importance of investment growth for potential output growth, this puts a premium on policies that can help meet the large and diverse investment needs of countries across all six EMDE regions.

Chapter 4 explores cross-regional differences in investment growth by addressing the following questions:

- How has investment growth evolved in each of the six EMDE regions?
- What are the current and prospective investment needs of each EMDE region?
- Which policies can help address investment needs in each EMDE region?

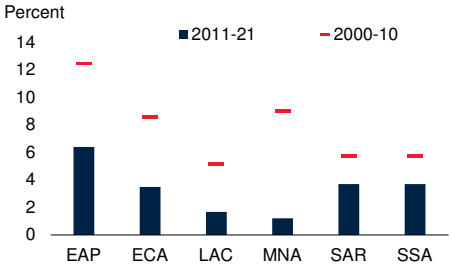
Contributions. Chapter 4 adds regional detail to the analysis of global investment growth in the previous chapter, applying a consistent framework across all EMDE regions. It draws on a rich body of regional studies that have examined the constraints on investment and possible policy solutions.

Findings. Chapter 4 identifies several regional patterns. First, investment growth slowed in the past decade in all EMDE regions, but most sharply in EAP and MNA (figure o.10). In EAP, a policy shift in China aimed at reducing reliance on credit-fueled investment for economic growth and mitigating financial stability risks was largely responsible for the slowdown. In MNA, an oil price slide in 2014-16, armed conflicts, and persistent policy uncertainty in several countries contributed to the slowdown.

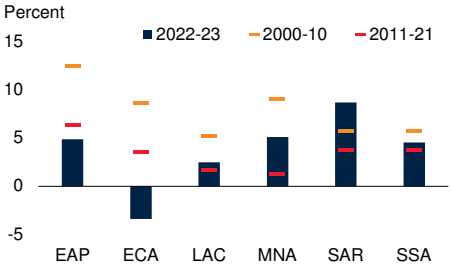
FIGURE o.10 Investment in EMDE regions

Investment growth slowed sharply in all EMDE regions in 2011-21 but most sharply in East Asia and the Pacific (EAP) and the Middle East and North Africa (MNA). It is expected to remain below its 2011-2021 average in 2022-30 except in LAC and SAR, where the adverse shocks that depressed investment growth in the 2010s are assumed not to be repeated.

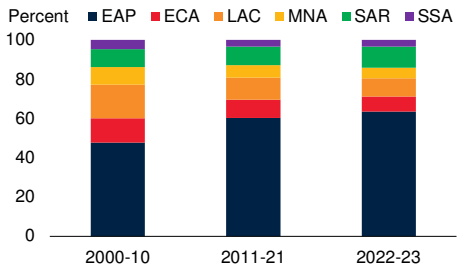
A. Investment growth, by region



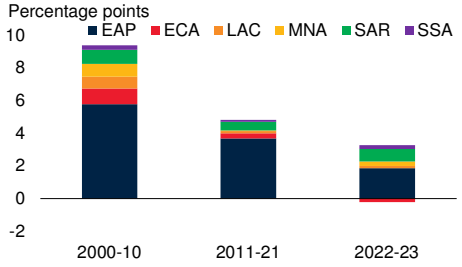
B. Investment growth by region



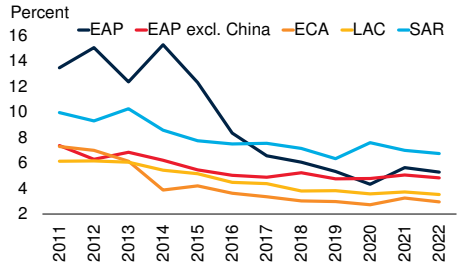
C. Regional shares of EMDE investment



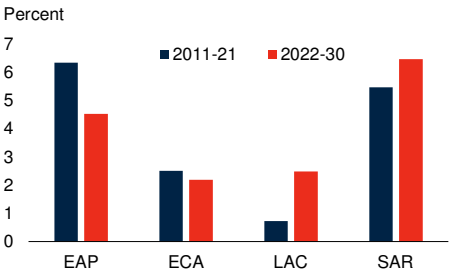
D. Contribution to EMDE investment growth



E. Five-year ahead investment growth forecasts



F. Actual and forecast investment growth



Source: Consensus Economics; World Bank.

Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Geometric means over indicated time spans of investment-weighted averages (at real fixed investment in constant U.S. dollars).

A.B. Long-term average stands for 2000-21. Sample includes 8 EAP, 12 ECA, 19 LAC, 9 MNA, 3 SAR, and 19 SSA economies.

C.D. Shares for 2000-10, 2011-21, and 2022-23 are simple averages of weighted real investment growth. Sample includes 8 EAP, 12 ECA, 19 LAC, 9 MNA, 3 SAR, and 19 SSA economies.

E.F. Includes data for six economies in EAP (China, Indonesia, Malaysia, Philippines, Thailand, Vietnam), seven economies in ECA (Bulgaria, Croatia, Hungary, Poland, Romania, Russia, Ukraine), six economies in LAC (Argentina, Brazil, Chile, Colombia, Mexico, Peru) and one economy in SAR (India). Single-year missing data are interpolated.

F. Geometric mean of actual investment growth in 2011-21 and of current-year to eight-year-ahead consensus forecasts for investment growth for 2022-30, as of September 2022. Includes six economies each in EAP, ECA, and LAC, and one economy in SAR.

Second, investment growth is projected to remain well below its 2000-21 average in the near term in EAP, ECA, LAC, and SAR but to be close to its two-decade average in MNA and SSA. Consensus long-term (five-years ahead) investment growth forecasts have been downgraded repeatedly. Annual average investment growth in 2022-30 is now forecast to be 0.3-1.8 percentage points lower, on average, than in 2011-21 in all regions except in LAC and SAR, where adverse shocks that depressed investment growth in the 2010s are not expected to recur.

Third, all regions have large needs for physical and human capital investment, whether it is to mitigate and adapt to climate change and reverse pandemic-related learning losses (all regions); improve very low levels of infrastructure development (SAR, SSA); accommodate rising levels of urbanization (EAP, LAC, SAR); support productivity growth, particularly in sectors that employ large proportions of the population (for example, agriculture in SSA); rebuild following conflicts (ECA, MNA, SSA); improve trade linkages (LAC, SAR); or prepare for future public health crises (EAP, SSA).

Fourth, a range of policies is required to lift investment. Priorities include strengthening the efficiency of public investment (especially in SAR and SSA), boosting private investment (especially in LAC and MNA), and expanding the availability of financing for investment, which is a significant need in all regions.

Part III. Policies: Recognition, Formulation, and Implementation

Part III of this volume examines policy options to improve long-term growth prospects. Using the conceptual framework provided by the production function, chapter 5 develops scenarios which allow the benefits to potential growth from a range of possible policy actions to be quantified. Chapter 6 and chapter 7 focus on two areas where there may be considerable untapped growth potential that could be unlocked with the right policies—international trade (chapter 6) and the services sector (chapter 7).

Chapter 5. Potential Growth Prospects: Risks, Rewards and Policies

In this chapter, Kilic Celik, Kose, and Ohnsorge start from the observation in chapter 1 that global potential growth in 2011-21 was significantly lower than in 2000-10. This weakening of growth was widespread globally, across country groups, and in the majority of countries.

This trend decline raises concerns about the underlying strength of economic growth over the next several years, following the recovery from the pandemic-related recession of 2020. The chapter sets out a baseline projection that shows a further slowing of global potential growth in 2022-30. This baseline projection is subject to downside risks from a number of adverse events, including climate-related disasters. In some EMDEs, especially the commodity-exporting economies in ECA and MNA, a further slowing of potential growth could set back per capita income convergence with the advanced economies by more than a decade. The projected slowdown in potential growth is therefore a major concern for future growth and convergence prospects in EMDEs and a

formidable challenge to the international community's ability to meet its development goals.

Chapter 5 explores these issues by addressing the following questions:

- What are the prospects for potential output growth?
- What are the main risks that could lower future potential growth?
- What policy options are available to lift potential output growth?

Contributions. Chapter 5 makes three key contributions to the literature on potential growth. It presents the first comprehensive set of projections of potential output growth for the largest sample of countries for which data are available—83 countries (30 advanced economies and 53 EMDEs) that account for 95 percent of global GDP. The chapter's estimates and projections of potential output growth are based on the production function approach presented in chapter 1.

Second, the chapter analyzes the possible effects of weather-related disasters, which are expected to become even more frequent because of climate change. It also examines the possible effects on potential growth of investment to alleviate the effects of climate change. Several studies—reviewed in Shabnam (2014), Klomp and Valckx (2014), and Botzen, Deschenes, and Sanders (2019)—have found mixed evidence for both short-term and long-term effects of natural disasters on incomes and output growth, with possibly larger and more lasting effects in low-income countries. Broadly consistent with this literature, this chapter documents small, but statistically significant, damage to growth in the short term, which dissipates quickly. The chapter goes on to estimate the impact on potential growth of investment to mitigate, or reduce the damage from, climate change, drawing on the investment needs estimated in chapter 3.

Third, chapter 5 explores, in a consistent framework, policy options to lift potential output growth. A large literature has considered the impact of different policies and other factors on growth, including human capital improvements (World Bank 2018), governance improvements (World Bank 2017b), increased international trade and global value chain integration (World Bank 2020), new technologies (World Bank 2016, 2019b), and labor market changes (World Bank 2013). In contrast to these and other earlier studies, the discussion of growth-enhancing policy options in this chapter is based on the framework provided by the production function approach.[14]

Findings. Chapter 5 presents several findings. First, the slowdown in potential growth in the past two decades, described in chapter 1, is projected to extend into the remainder

[14] Several studies have investigated the link between the growth of output or productivity and structural reforms, focusing on the near-term benefits (Prati, Onorato, and Papageorgiou 2013) or productivity effects (Adler et al. 2017; Dabla-Norris, Ho, and Kyobe 2016). In some of these studies, the sample has consisted mostly of advanced economies (Banerji et al. 2017; de Haan and Wiese 2022; IMF 2015, 2016).

of this decade. Trends in the fundamental drivers of growth suggest that global potential output growth will slow further, by 0.4 percentage point a year on average, to 2.2 percent a year during 2022-30 (figure o.11). About half of this slowdown is due to demographic factors from an aging population, including slowing growth in the working-age population and declining labor force participation.

EMDE potential growth is projected to weaken considerably more, by about 1.0 percentage point a year, to 4.0 percent a year during 2022-30. In advanced economies, potential growth is expected to slow by 0.2 percentage point a year, to 1.2 percent a year, on average, during 2022-30. The slowdown will be internationally widespread: Economies accounting for nearly 80 percent of global GDP, including most EMDEs, are projected to experience a slowdown in potential growth between 2011-21 and 2022-30. Global potential growth over the remainder of this decade could be even slower than projected in this baseline scenario by another 0.2-0.9 percentage point a year, if investment growth, improvements in health and education outcomes, or developments in labor markets disappoint or if unforeseen adverse events materialize.

Second, climate change is likely to have a sizable adverse effect on potential output growth over the remainder of this decade, given that the frequency and intensity of weather-related disasters is expected to increase. Over the past two decades, the average natural disaster has lowered potential growth in the affected country by 0.1 percentage point in the year of the disaster. Over the medium term, however, the damage has varied widely depending on the speed and magnitude of reconstruction efforts. For example, three years after a climate disaster, TFP growth was anywhere between nil and 10 percent lower than in countries and years without disasters (Dieppe, Kilic Celik, and Okou 2020). The average small state has suffered losses and damages from climate-related disasters of about 5 percent of GDP per year, on average (World Bank 2023). However, increased infrastructure investment to alleviate the effects of climate change could more than offset this damage. For example, the literature review of chapter 3 summarizes estimates of climate-related investment needs averaging 2.3 percentage points of GDP per year; for EMDEs, this is equivalent to about one-third of the investment boost that would occur if they repeated their best 10-year investment growth performance.[15] Such additional investment over the remainder of this decade could raise global potential growth by 0.1 percentage point and EMDE potential growth by 0.3 percentage point a year.

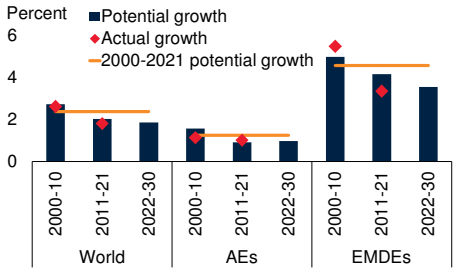
Third, a number of policies could help reverse the projected further weakening of global potential growth and return it to its 2011-21 average rate. Reforms associated with higher physical capital investment, enhanced human capital, and faster labor-supply growth could raise potential growth by 0.7 percentage point a year in 2022-30, both globally and in EMDEs. This would offset the 0.4 percentage point decline in global potential growth between 2011-21 and 2022-30 projected in the baseline scenario and most of the 1.0 percentage point slowdown projected for EMDEs. The policy options

[15] Climate-related investment needs globally have also been put at 2-3 percent of GDP by Stern et al. (2023).

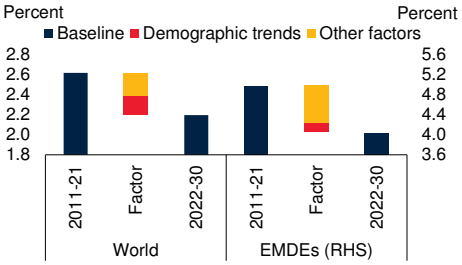
FIGURE o.11 Prospects for potential growth and policies to lift it

Forces similar to those that slowed global potential growth in the past decade are expected to depress it further in the remainder of the current decade. The slowing could be steeper than projected in the baseline if adverse shocks recur or if, for other reasons, current expectations again turn out to be overly optimistic. A menu of policy options is available to help reverse the slowing trend, including initiatives to lift the growth of physical and human capital—such as an investment boost to mitigate and adapt to climate change—and encourage labor force participation by women and older workers.

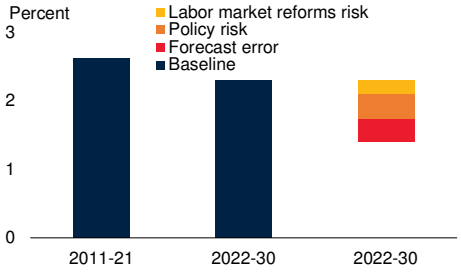
A. Potential growth



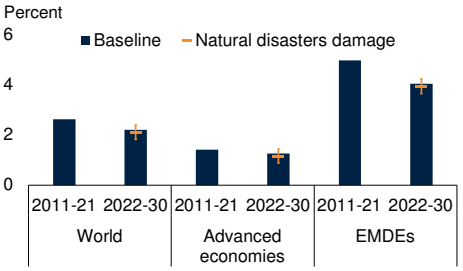
B. Potential growth



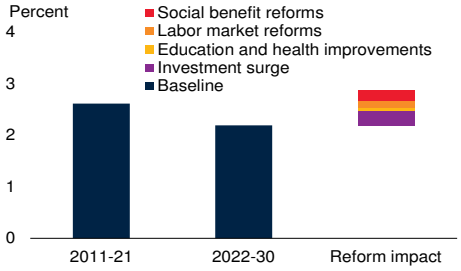
C. Global potential growth, correcting for potential forecast disappointments



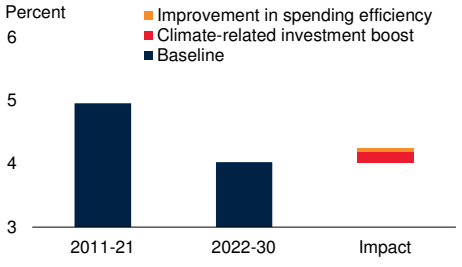
D. Potential growth with more frequent natural disasters



E. Global potential growth under reform scenarios



F. EMDE potential growth under climate-related infrastructure investment scenarios



Sources: Penn World Tables; World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; LICs = low-income countries; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Period averages of annual GDP-weighted averages.

A. Based on production function approach. Sample includes 29 advanced economies and 53 EMDEs.

B. Derived using production function-based potential growth. "Other factors" reflects declining population growth, convergence-related productivity growth, policy changes, cohort effects, and a slowdown in investment growth relative to output growth. "Factor" reflects the percentage-point changes between the averages of 2011-21 and 2022-30.

C. Baseline and corrections as defined in chapter 5.

D. Impact of natural disasters assumes that the number of climate disasters in 2022-30 will increase as much as it rose between 2011-21 and 2000-10 for each country, that is, from once every two years to twice every three years, on average. Orange whiskers display one standard deviation of the impact of climate disasters.

E. Scenarios assume a repeat, in each country, of each country's best ten-year improvement.

F. Climate-related investment boost and improvement in spending efficiency as described in chapter 5.

considered here could raise potential growth even more in EAP, ECA, and SSA, where large investment needs remain, or where countries have strong track records of boosting investment.

Chapter 6. Trade as an Engine of Growth: Sputtering But Fixable

In chapter 6, Ohnsorge and Quaglietti note that the growth of international trade, powered by trade liberalization and falling transport costs, has historically been an important engine of output and productivity growth. In recent decades, it has helped about a billion people to escape poverty and many EMDEs to integrate into the world economy. Empirical studies indicate that a 1 percentage point of GDP increase in an economy's trade openness has tended to lift per capita income by 0.2 percent (World Bank 2020).

A large part of the gains from trade in recent decades can be attributed to the expansion of global value chains (World Bank 2020). Participation in global value chains generates efficiency gains and supports the transfer of knowledge, capital, and other inputs across countries—which boosts productivity. Global value chain integration has also been associated with reduced vulnerability of economic activity to domestic shocks, although it has come with increased sensitivity to external shocks (Constantinescu, Mattoo, and Ruta 2020; Espitia et al. 2021).

In the past decade and a half, global trade growth has slowed as global value chains have matured, weaker investment growth has weighed on goods trade, political support for trade liberalization has waned, and trade tensions have emerged between major economies (World Bank 2015, 2017a). As a result, instead of growing twice as fast as global output growth, as it did during 1970-2008, the growth of global trade in goods and services in 2011-19 was less than one-half as fast as global output growth.

During the COVID-19 pandemic, global trade was hit particularly hard, falling by nearly 16 percent in the second quarter of 2020. The subsequent rebound was swift, however, especially for goods trade, and much faster than after the 2007-09 global financial crisis. That said, since 2021, global trade growth has slowed again, amid COVID-19 outbreaks, supply chain strains, and Russia's invasion of Ukraine in February 2022.

Unless there is a major policy push, trade growth is likely to weaken further in the remainder of the current decade, not only because of the prospect of slower output growth, but also because some of the key structural factors that supported rapid trade expansion in the past seem, at least for now, to have run their course. Supply chains have been remarkably resilient given the magnitude of recent shocks. However, the COVID-19 pandemic and Russia's invasion of Ukraine could accelerate the erosion of globally integrated supply chains that was already underway—including by leading to further in-sourcing and regionalization of production networks and by increasing digitalization. Multinational corporations operating in EMDEs have already increased the use of digital technologies and diversified suppliers and production sites to increase their resilience to

supply-chain shocks (Saurav et al. 2020). As multinationals seek to diversify, EMDEs with the prerequisite quality of business environments, institutions, and governance may have new opportunities to integrate into global supply chains.

As discussed in chapter 1, potential output growth is expected to slow in many EMDEs in the remainder of the current decade amid unfavorable demographics and weak investment and TFP growth. One way in which policy makers in EMDEs can boost the long-term growth of output and productivity is by promoting trade integration through measures to reduce trade costs.

Chapter 6 examines the following questions:

- What is the link between trade growth and long-term output growth?
- What are the prospects for trade growth in the coming decade?
- How large are trade costs?
- What are the correlates of trade costs?
- Which policies can help to reduce trade costs?

Contributions. Chapter 6 contributes to the literature in several ways. First, the chapter expands on an earlier study with a new, comprehensive review of the theoretical and empirical literature on the links between trade and output growth (World Bank 2021). Second, it shows the evolution of trade in goods and services through global recessions, including the pandemic-induced global recession of 2020.

Third, the chapter revisits estimates of trade costs and their correlates in some earlier studies (Arvis et al. 2016; Novy 2013; World Bank 2021). The chapter uses estimates of the costs of goods trade for up to 180 countries (29 advanced economies and 151 EMDEs) from the World Bank/UNESCAP database for 1995-2019. The determinants of the costs of goods trade, which accounts for about 75 percent of world and EMDE trade in goods and services, are estimated econometrically. The chapter also quantifies the costs of one type of services trade—logistics and shipping services—relative to the costs of goods trade. In addition, the chapter goes beyond previous research in assessing the role of trade policy—tariffs, participation in trade agreements, and non-tariff barriers—in trade costs.

Fourth, the chapter discusses policy options for lowering trade costs. In particular, it offers scenarios that indicate the potential effects of various policy measures on trade costs.

Findings. Chapter 6 offers several findings. First, the theoretical literature indicates that international trade boosts long-term growth of output and productivity by promoting a more efficient allocation of resources, technological spillovers, and human capital

accumulation. The empirical literature supports the theory by finding statistically significant positive relationships between trade openness and output growth, although they may be conditional on the presence of sound institutions and a supportive business environment in exporting countries. Overwhelmingly, empirical studies find that international trade enhances productivity growth.

Second, the COVID-19-induced global recession of 2020 triggered a collapse of global trade in goods and services that was followed by a rapid rebound (figure o.12). Before the end of 2020, global goods trade had recovered to pre-pandemic levels, and, by September 2021, global services trade had reached pre-pandemic levels, even though travel and tourism services trade was still 40 percent lower than before the pandemic. The decline in services trade was considerably more pronounced and its recovery more subdued than in past global recessions, whereas movements in goods trade were broadly comparable to those in past global recessions.

Third, global trade growth is likely to weaken by another 0.4 percentage point per year in the remainder of the current decade due to slower global output growth as well as to the further waning of structural factors that supported rapid trade expansion in the past, such as the expansion of global value chains. The disruptions caused by the pandemic and the war in Ukraine may also continue to dampen trade growth over the medium term. A major policy effort to reduce trade costs could help reverse the trade slowdown.

Fourth, trade costs for goods are high: on average, they are almost equivalent to a 100 percent tariff—making internationally traded goods cost roughly twice as much as domestic goods. Tariffs amount to only one-twentieth of average trade costs; the bulk of trade costs are incurred by transportation and logistics, non-tariff barriers and policy-related standards and regulations. Despite a one-third decline since 1995, trade costs in EMDEs remain about one-half higher than in advanced economies. About two-fifths of the explained difference in trade costs between EMDEs and advanced economies can be explained by higher shipping and logistics costs, and a further two-fifths by trade policy (including trade policy uncertainty). Services trade costs tend to be considerably higher than goods trade costs; they can, to a large extent, be attributed to regulatory restrictions.[16]

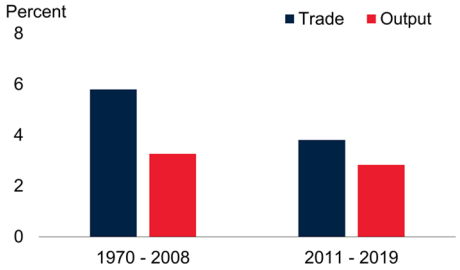
Fifth, to reduce elevated trade costs in EMDEs, comprehensive reform packages are needed, including to streamline trade processes and customs clearance requirements; enhance domestic trade-supporting infrastructure; increase competition in domestic logistics and in retail and wholesale trade; lower tariffs; lower the costs of compliance with standards and regulations; and reduce corruption. Trade agreements can also reduce trade costs and promote trade, especially if they lower nontariff barriers as well as tariffs. The chapter's empirical analysis suggests that an EMDE in the 25 percent of EMDEs with the highest shipping and logistics costs could cut its trade costs in half if it

[16] That said, there is some evidence that professional services now have trade costs comparable to those in manufacturing industries (Gervais and Jensen 2019).

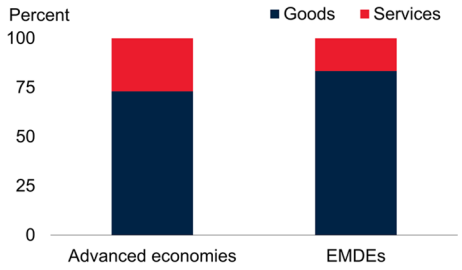
FIGURE o.12 Reducing trade costs to boost growth prospects

World trade growth has slowed sharply since the early 2000s. The pandemic hit services trade particularly hard. Trade costs, on average, roughly double the cost of internationally traded goods relative to domestically traded goods. Tariffs amount to only one-twentieth of average trade costs. Comprehensive reform packages to lower trade costs could yield large dividends: EMDEs with the most challenging business climates could halve their trade costs by implementing reforms that improve logistics performance and maritime connectivity to the standards of EMDEs with the least challenging business climates.

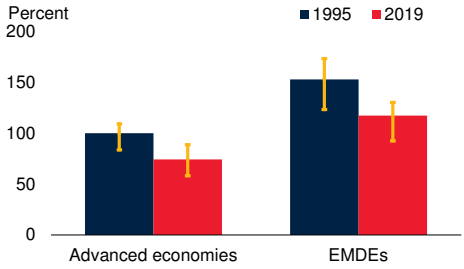
A. Global trade and output growth



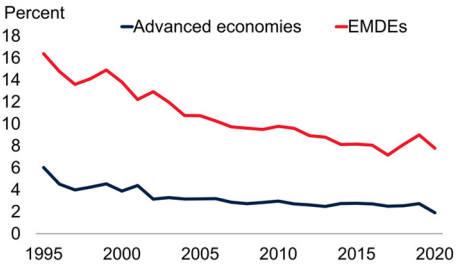
B. Composition of global trade, 2010-19



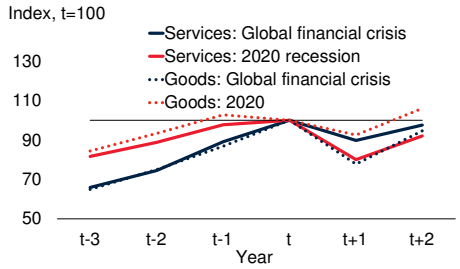
C. Trade costs



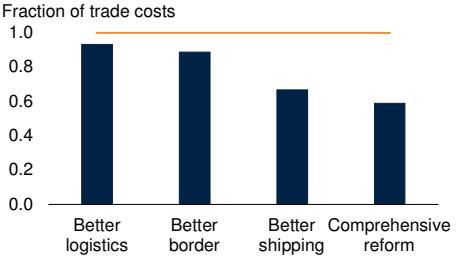
D. Tariff rates



E. Good and services trade around global recessions



F. Reduction in overall trade cost associated with policy improvements



Sources: Comtrade (database); ESCAP-World Bank Trade Costs Database; World Bank; World Trade Organization.
Note: EMDEs = emerging market and developing economies.
Trade growth refers to the average growth of import and export volumes of goods and services.
A. Annual average growth. Trade growth refers to the average growth of import and export volumes of goods and services.
C. Bilateral trade costs are aggregated into individual country measures using 2018 bilateral country exports shares from the Comtrade database. Bars show unweighted cross-country averages; whiskers show interquartile ranges. Sample in 1995 includes 33 advanced economies and 46 EMDEs. Sample in 2019 includes 23 advanced economies and 53 EMDEs.
D. Unweighted cross-country averages of applied weighted tariff rates. Sample includes up to 35 advanced economies and 123 EMDEs. Primary tariffs are used as a proxy for agriculture tariffs.
E. Levels of goods and services trade around past recessions and in 2020. t refers to the year before the recession.
F. Fraction of trade costs that would remain after policy improvements, as described in chapter 6. Data refer to 2018. Orange line indicates 1 (that is, unchanged trade costs in 2018) among the sample of EMDEs scoring in the poorest quartile on these indicators.

improved these conditions to match the 25 percent of EMDEs with the lowest costs of shipping and logistics.

Chapter 7. Services-Led Growth: Better Prospects after the Pandemic?

In chapter 7, Nayyar and Davies document that services, generally the largest sector of economic activity, has also been the main source of growth over the past three decades. In 2019, services accounted for 63 percent of global output and 57 percent of global employment. Between 1995 and 2019, services accounted for two-thirds of global output growth and almost three-quarters of global employment growth. Although the services sector accounts for a smaller part of economic activity in EMDEs than in advanced economies, the difference is not large: even in EMDEs, services accounted for 60 percent of output and 52 percent of employment in 2019.

The services sector is diverse. It includes high-skilled offshorable services (such as information and communications technologies, finance, and professional services) that have been internationally traded much like goods since the ICT revolution in the 1990s. It also includes low-skilled contact services (transportation, hospitality, retail, personal services, arts, entertainment and recreation, and administrative and support) that have typically required physical proximity between providers and consumers. Many services in both of these categories provide important inputs for non-service sector activity. For example, transportation and logistics services are essential for international trade in agricultural commodities and manufactured goods, while ICT services are central to increasingly data-intensive production processes, including manufacturing.[17]

Chapter 7 shows the uneven blows that the pandemic dealt to different service activities. Low-skilled contact services, such as transportation and hospitality, were hit particularly hard by social distancing regulations and precautions against the spread of the virus. But high-skilled offshorable services, such as ICT and professional services, were much less affected because they were amenable to home-based work. The resulting productivity benefits can boost economic growth more broadly through the important linkages between services and other sectors of the economy.

To explore these issues, chapter 7 addresses the following questions:

- How has the services sector shaped global economic growth over the past three decades?
- How has the services sector been affected by the pandemic?
- How can digitalization enhance the services sector's growth as countries recover from the pandemic?
- Which policies can help harness the services sector's growth potential?

[17] Social services (education and healthcare), which are largely publicly provided, are not a focus of chapter 7.

Contributions. Chapter 7 makes several contributions to the literature. First, it establishes a set of stylized facts that describe the role of the services sector in the global economy over the past three decades. These stylized facts complement a growing literature on structural change and productivity growth in EMDEs that highlights the shifting contributions of the manufacturing and services sectors.[18] In particular, a set of decompositions by services subsector compares the contributions of growth in different categories of demand—private domestic demand, exports, and government consumption—and, on the supply side, the contributions of growth in factor inputs and TFP growth.

Second, the chapter analyzes how the pandemic has affected prospects for services-led growth by tracing patterns of recovery and assessing growth opportunities linked to the acceleration in digitalization. This builds on recent studies that examine the effects of the pandemic on growth and income distribution (Apedo-Amah et al. 2020; Chetty et al. 2020; Narayan et al. 2022).

Third, the chapter discusses policies to leverage the services sector's potential growth after the pandemic. This adds to the policy discussion in Nayyar, Hallward-Driemeier, and Davies (2021a,b) by focusing on what has changed since the pandemic. Policies discussed include reducing regulatory barriers and improving skill development, not only for the high-skilled offshorable services that have best withstood the pandemic but also for the low-skilled services such as transportation that have important linkages with other sectors.

Findings. Chapter 7 presents several novel findings. First, the services sector has led economic growth over the past three decades, accounting for more than half of the growth in GDP and employment in both advanced economies and EMDEs between 1995 and 2018-19 (figure o.13). However, there are differences between advanced economies and EMDEs in the composition of services sector growth. While the contribution of low-skilled contact services to growth has been similar in EMDEs and advanced economies, that of high-skilled offshorable services was about twice as high in advanced economies as in EMDEs. High-skilled offshorable services accounted for about one-third of GDP growth in advanced economies, but only one-sixth of GDP growth in EMDEs, and for about one-half of employment growth in advanced economies compared with one-ninth in EMDEs. The difference will matter for productivity growth going forward, because low-skilled contact services have been associated with slower export growth than domestic demand growth and with slower TFP growth than growth of labor and capital inputs.

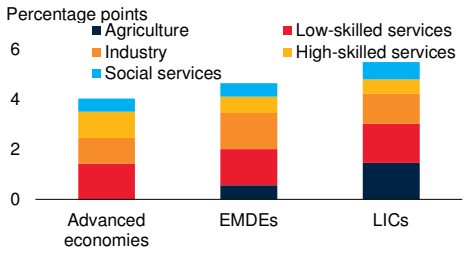
Second, although overall services activity collapsed during the pandemic, the impact on low-skilled contact services reliant on face-to-face interactions with consumers was far more severe than on high-skilled offshorable services, which are more amenable to

[18] On the contributions of manufacturing and services sectors to economic growth, see, for example, Fan, Peters, and Zilibotti (2021); Kinfemichael and Morshed (2019); McMillan and Rodrik (2011); Nayyar, Hallward-Driemeier, and Davies (2021a, 2021b); Nayyar et al. (2021); and Rodrik (2016) .

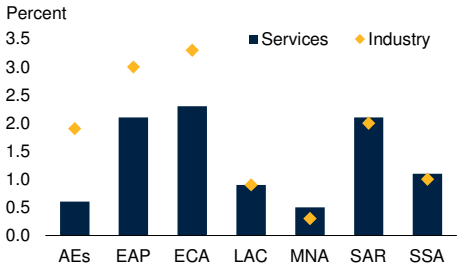
FIGURE o.13 The role of services in the global economy

The services sector accounted for more than half of the growth in GDP and employment in both advanced economies and EMDEs in 1995-2018. Services include both high-skilled offshorable services, such as information and communications technology, and low-skilled contact services, such as retail and hospitality. Most labor productivity growth in EMDEs during 1995-2018 was due to within-sector improvements rather than inter-sectoral shifts. The pandemic-induced recession of 2020 was unusual in the disruptions it caused to services activity.

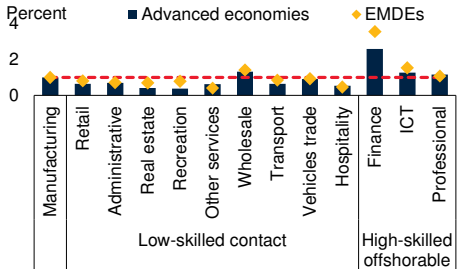
A. Sectoral contributions to value added growth, 1990-2019/20



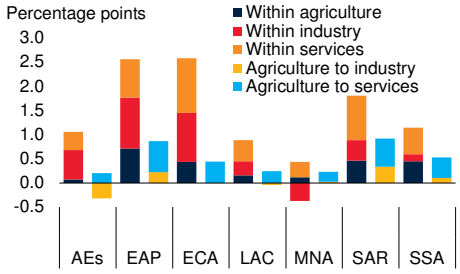
B. Productivity growth, 1995-2018



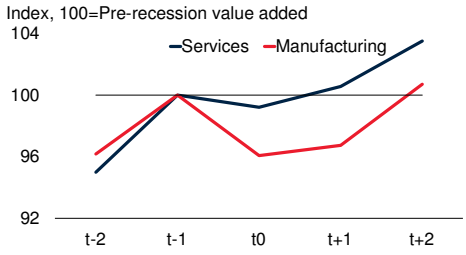
C. Total factor productivity in services relative to manufacturing



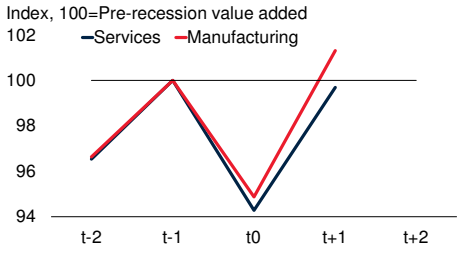
D. Contributions to labor productivity growth, 1995-2018



E. Recessions before 2020



F. Recessions in 2020



Sources: Groningen Growth and Development Center (GGDC); Nayyar, Hallward-Driemeier, and Davies 2021a, b; World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; ICT = information and communications technology; LICs = low-income countries; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A. Bars represent the average contribution of individual sectors to value added growth between 1990-2018. Sample from GGDC's Economic Transformation Database includes 6 advanced economies, 39 EMDEs, and 6 LICs.

B. Average compounded annual growth rates in labor productivity (value added per worker) across each region between 1995-2018. Unweighted average across country groups.

C. Total factor productivity (TFP) relative to manufacturing sector in the same country, estimated as in chapter 7. Data are from 56 countries, including 35 EMDEs across all regions. Data are for the latest available year between 2010-17.

D. Bars represent labor productivity growth attributed to each sector and movement between sectors for the period 1995-2018.

E.F. Recessions are defined as in chapter 7. Charts show the unweighted average level of real value added in services (blue) and manufacturing (red) in the years around the recession year t, indexed to 100 for the year preceding the recession.

remote communication through digital delivery—such as ICT and professional services. The latter were among the activities least adversely impacted by the pandemic; indeed in some cases, especially ICT services, output and investment expanded.

Third, the increased digitalization that occurred during the pandemic augurs well for growth prospects in the services sector. Among high-skilled offshorable services, digitally deliverable ICT and professional-services exports by EMDEs have increased sharply, to more than 50 percent of their total services exports in 2021 from 40 percent in 2019. Even where physical proximity remains important, digitalization has expanded opportunities, including for scale economies. For example, e-commerce platforms have enabled retailers and restaurants to reach beyond their local neighborhoods, while ICT and management practices have enabled the standardization of production over many establishments. Greater reliance on services sectors for growth may also help mitigate the adverse impacts of climate change on agricultural production.

Fourth, policy interventions can help countries leverage the potential of the services sector to drive economic growth as they continue to recover from the pandemic. Policy support for the diffusion of digital technologies in EMDEs remains central, given that the share of firms using email to communicate with clients was less than one-third as recently as 2018. Investing in ICT infrastructure, updating regulatory frameworks around data, and strengthening management capabilities and worker skills all matter. Countries can target the expansion of productive high-skilled offshorable services by reducing barriers to market access and promoting the improvement of skills. They can also support investments and regulatory reforms to revive low-skilled contact services, such as transportation, that employ large numbers of people.

Future research directions

The book suggests several directions for future research. These directions range from improvements in estimates of potential growth to more granular estimates of the effects of climate change and various structural policy measures.

Improvements in measurement

Estimates of potential growth could be improved in a number of ways. In particular, several refinements would be useful in applications of the production function approach (chapter 1):

- Especially for countries that rely heavily on natural resources, the estimation of production function-based potential growth could take into account natural resources as a factor of production.

- TFP growth estimates should take into account the role of new drivers of productivity, such as digital technologies, foreign direct investment, or global value chain integration.

- Application of the production function approach could be improved by estimating a broader measure of human capital, beyond the enrolment and completion metrics and life expectancy used in the analysis in this book. The World Bank's *Human Capital Index* offers one such measure, but currently only covers a few, recent years (World Bank 2020).

Other estimates of potential growth could also be refined. For example, potential growth estimates based on multivariate filters could be extended to calculate output gaps and their relationship with inflation and other measures of demand pressures. External drivers of business cycles—such as global tourism for tourism-reliant countries or global liquidity for financial centers—could also be included.

Data improvements could also benefit the analysis of the role of services in the global economy (chapter 7). Addressing several methodological challenges in measuring services outputs, inputs, and trade flows could improve estimates of the contribution of the services sector to economic growth.

International trade in services has particularly poor data availability (chapter 6). Measures of services trade costs remain scant, which makes it difficult to assess and quantify their determinants. Since trade costs in services are largely associated with regulatory barriers, further analysis of the implications for trade costs of variations in regulations across sectors, countries, and regions is warranted. This would allow a more in-depth analysis of patterns and correlates of services trade costs.

Effects of climate change

Chapter 5 outlines one approach to quantify the effects of various factors related to climate change on long-term output growth. Such estimates could be refined to identify how country characteristics, circumstances, and policy responses are related to the extent of damage to growth from extreme weather events. In addition, the channels through which climate change affects economic growth could be explored in greater detail. This is particularly important for understanding longstanding growth weakness in small states (World Bank 2023).

Spillovers from natural disasters in one country to its trading partners could be examined. For example, natural disasters may cause the largest domestic damage in small island states, but international spillovers may be limited in these cases, whereas disasters that disrupt production of an internationally traded commodity in a major producer could have substantial global repercussions.

The transportation associated with international trade is one of the largest contributors to global greenhouse gas emissions (chapter 6). Depending on their impact on global patterns of trade, reforms to reduce trade costs may therefore increase or reduce emissions. Further research could aim to better understand the climate-related effects of reducing trade costs.

Effects of other structural policies

Several structural policy changes not considered in this book could be explored, drawing on longer-term data. In the 1970s, 1980s, and 1990s there were major structural

changes and widespread reforms in labor markets, product markets, financial sectors, and fiscal and monetary policy frameworks. These could not be explored with the large cross-country sample used in this study because it extends only as far back as 2000. However, at least for a subset of countries, data may be available that go further back in time. This could facilitate the analysis of the longer-term effects of the structural changes that occurred in the 1970s and 1980s. A longer time period may also allow a better assessment of the "cleansing" effects of adverse shocks in raising overall productivity.

Many EMDEs host large state-owned and private enterprises in which activity is excessively concentrated, with associated market power. Reforms of state-owned enterprises and measures to break up, where appropriate, or otherwise reform the regulation of monopolies could trigger higher productivity growth because capital and labor would be reallocated toward more productive uses. A better understanding of the quantitative impact on potential growth in EMDEs as well as the identification of conducive preconditions and complementary reforms would be helpful.

Many EMDEs have weak governance and business climates. An assessment of the effects of improvements in various dimensions of governance and business climates on potential growth, including on firm productivity and household employment decisions, would be helpful.

The pandemic has triggered a sharp increase in digitalization. Several countries have launched policy initiatives to encourage further digitalization. Future research could analyze the effects of such digitalization efforts on trade and innovation, and how digitalization has changed growth patterns in the services sector.

Finally, the pandemic has highlighted the challenges that can be presented by global value chain disruptions. Through complex global value chains, with multiple border crossings, trade costs and disruptions can snowball. Future research could investigate which policy measures can be most effective in reducing trade costs in the context of global value chains.

Finally, the pandemic has highlighted the challenges that can be presented by global value chain disruptions. Through complex global value chains, with multiple border crossings, trade costs and disruptions can snowball. Future research could investigate which policy measures can be most effective in reducing trade costs in the context of global value chains.

ANNEX A Tables

TABLE A.1 Actual GDP growth (percent)

Country group	Period	Growth	Country group	Period	Growth	Country group	Period	Growth
EMDEs	2000-10	6.0	**EMDEs**	2000-09	5.9	**EMDEs**	2000-08	6.3
	2011-21	4.4		2010-19	5.1		2011-19	4.9
	2022-24	3.6		2022-24	3.6		2022-24	3.6
MICs	2000-10	6.3	**MICs**	2000-09	6.1	**MICs**	2000-08	6.5
	2011-21	4.6		2010-19	5.3		2011-19	5.0
	2022-24	3.6		2022-24	3.6		2022-24	3.6
LICs	2000-10	6.0	**LICs**	2000-09	5.9	**LICs**	2000-08	6.0
	2011-21	4.8		2010-19	5.4		2011-19	5.2
	2022-24	4.9		2022-24	4.9		2022-24	4.9

Source: World Bank.

TABLE A.2 Per capita growth (percent)

Country group	Period	Growth	Country group	Period	Growth	Country group	Period	Growth
EMDEs	2000-10	4.6	**EMDEs**	2000-09	4.4	**EMDEs**	2000-08	4.8
	2011-21	3.2		2010-19	3.5		2011-19	3.5
	2022-24	2.7		2022-24	2.7		2022-24	2.7
MICs	2000-10	4.9	**MICs**	2000-09	4.7	**MICs**	2000-08	5.1
	2011-21	3.5		2010-19	4.1		2011-19	3.8
	2022-24	2.8		2022-24	2.8		2022-24	2.8
LICs	2000-10	2.9	**LICs**	2000-09	2.8	**LICs**	2000-08	2.9
	2011-21	1.7		2010-19	2.3		2011-19	2.1
	2022-24	2.1		2022-24	2.1		2022-24	2.1

Source: World Bank.

TABLE A.3 Potential GDP growth (percent)

Country group	Period	Growth	Country group	Period	Growth	Country group	Period	Growth
World	2000-10	3.5	**Advanced economies**	2000-10	2.2	**EMDEs**	2000-10	6.0
	2011-21	2.6		2011-21	1.4		2011-21	5.0
	2022-30	2.2		2022-24	1.2		2022-24	4.0

Source: World Bank.

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PART I

Potential Growth: An Economy's Speed Limit

With hindsight, it has become clear that there was in fact no coherent growth story for most emerging markets. Scratch the surface, and you found high growth rates driven not by productive transformation but by domestic demand, in turn fueled by temporary commodity booms and unsustainable levels of public or, more often, private borrowing.

Dani Rodrik, 2015
Ford Foundation Professor of International Political Economy,
Harvard Kennedy School

After enjoying years of enviable economic performance, emerging markets are coming under strain, with a marked divergence in growth among them. As some of these economies slow down, the goal of eradicating extreme poverty will become harder as it burrows in and becomes more concentrated in regions most affected by conflict.

Kaushik Basu, 2015
Carl Marks Professor of International Studies and Professor of Economics,
Cornell University,
and Former Chief Economist of the World Bank

If developing economies are to continue to converge with their advanced counterparts, they will need to deploy new technologies relatively efficiently, taking into account the role of labor-market skills and regulations. This will not be easy, but it is possible—and, indeed, necessary.

Kemal Derviş, 2018
Nonresident Distinguished Fellow,
Brookings Institution,
and Former Head of the United Nations Development Programme

CHAPTER 1

Potential Not Realized: An International Database of Potential Growth

Potential growth—the rate of expansion an economy can sustain at full capacity and employment—is a critical driver of a wide range of macroeconomic and development outcomes. To assess the evolution of potential growth in recent decades, this study compiles the most comprehensive database used to date in such research, covering the nine most commonly used measures of potential growth for up to 173 countries over 1981-2021. This chapter describes the database and some of the findings from it. All measures of global potential growth consistently show steady declines over the past decade, with all the fundamental drivers of growth gradually losing momentum. The weakening of potential growth was highly synchronous across countries: in 2011-21, potential growth was below its 2000-10 average in 96 percent of advanced economies and 57 percent of emerging market and developing economies. Adverse events, such as the global financial crisis and the COVID-19 pandemic, with their ensuing global recessions, contributed to the trend decline. At the country-level also, national recessions left legacies of lower potential growth even five years after their onset, by about 1.4 percentage points on average. The persistent effect of recessions on potential growth operated through weaker growth of investment, employment, and productivity.

Introduction

The global economy headed into the COVID-19 pandemic and the Russian invasion of Ukraine after a decade of slowing growth. The pandemic-induced global recession of 2020 further deepened this slowdown and Russia's invasion of Ukraine in February 2022 has already left additional scars. These adverse shocks have reduced not just actual global output growth but have also dampened potential growth—the rate of increase of potential output, defined as the level of output an economy would sustain at full capacity utilization and full employment. Potential growth is a critical determinant of a wide range of macroeconomic and development outcomes, including sustained improvement in living standards and poverty reduction.

Potential growth is of fundamental importance to short- and long-run macroeconomic analysis and policy but it is not directly observable. In an extensive literature, three main methods of estimating potential output growth have been employed, each of which has its advantages and disadvantages. Thus, measures of potential growth based on production function estimates make it possible to study the contributions of the fundamental drivers of growth—namely, the growth of the factors of production and technical progress—but involve assumptions that may be viewed as far-fetched. A second

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Note: This chapter was prepared by Sinem Kilic Celik, M. Ayhan Kose, Franziska Ohnsorge, and Franz Ulrich Ruch.

method uses economic analysts' long-term (five-year-ahead) output growth forecasts, which may be assumed to incorporate their judgments. The third method obtains measures of potential growth from statistical filters of actual growth data; it may be best at ensuring consistency between estimates of potential growth and output gaps, on the one hand, and indicators of domestic demand pressures, on the other.

This chapter introduces the most comprehensive international database for the nine most commonly used measures of potential growth, based on these three methods, for the largest available sample of countries over the period 1981-2021. This database and the analysis in this chapter also serve as the foundation for chapters 2 and 5, which examine past and prospective potential growth, globally and regionally, and policies to improve them. In addition, this chapter addresses the following questions.

- How has potential growth evolved in recent decades?
- How have recessions and other adverse developments affected potential growth?
- Through which channels have such developments affected potential growth?

The chapter makes the following major contributions to the literature.

- *Largest database of potential growth.* The chapter introduces the first comprehensive database of the nine most commonly used measures of potential growth for the largest available country sample—of up to 173 economies (37 advanced economies and 136 emerging market and developing economies [EMDEs])—over 1981-2021. These measures comprise one based on the production function approach; five based on the application of univariate filters (Hodrick-Prescott, Baxter-King, Christiano-Fitzgerald, Butterworth, and Unobserved Components filters); one based on a multivariate Kalman filter; and two based on long-term growth forecasts. Previous studies have limited themselves to a single method of measuring potential growth, such as the production function approach (OECD 2014), or multivariate filters (ADB 2016; IMF 2015). This study builds on earlier work published before the pandemic that utilized several measures of potential growth (Kilic Celik, Kose, and Ohnsorge 2020; World Bank 2018).

- *Broader assessment of the evolution of potential growth over time and across countries.* The chapter documents that all measures of potential growth show a decline in global potential growth in the decade before the pandemic and that it was internationally widespread. Earlier studies documented the decline for only a subset of measures (for example, Chalaux and Guillemette 2019; Kilic Celik, Kose, and Ohnsorge 2020).

- *Comprehensive analysis of the impact of recessions and other adverse events.* The chapter describes the first study to systematically compare the long-term damage to potential growth of short-term economic disruptions—such as recessions, banking crises, and epidemics—in a large set of countries. Thus far, only a few studies have

estimated the effects of recessions on potential output growth, and they were confined to an OECD sample and the production function approach (Furceri and Mourougane 2012; Mourougane 2017). This chapter broadens the earlier research by estimating the effects of recessions, banking crises, and epidemics in a large sample of advanced economies and EMDEs and for a wide range of potential growth measures.

- *Study of channels through which potential growth is affected by adverse events.* The chapter estimates empirically, using a set of local projection models, the channels through which short-term economic disruptions have dampened potential growth. Specifically, it estimates the effects of disruptions on the growth of the labor supply, the growth of investment, and the growth of total factor productivity (TFP) in a consistent framework. Previous studies have typically examined overall effects on growth or effects through individual channels.

The theoretical literature has analyzed, typically using DSGE models, several mechanisms through which short-term output disruptions (associated with recessions and other adverse events) may have longer-term effects. Weak aggregate demand during such disruptions may reduce the expected profitability of, and thus discourage, productivity-increasing research and development (Fatás 2000). It may similarly discourage investment in productivity-raising new technologies that would otherwise have improved productivity (Anzoategui et al. 2019). Investors who expect weak aggregate demand to persist will be reluctant, more broadly, to invest; reduced investment will tend to lower asset prices which, through wealth effects, will further depress consumption (Caballero and Simsek 2017). If aggregate demand weakness is accompanied by a financial crisis, financial market frictions can restrict firms' access to credit and start-up capital, further reducing investment and productivity growth.[1]

Damage to potential output from short-term disruptions can also result from productivity losses due to resource misallocation (Dieppe, Kilic Celik, and Okou 2021; Furceri et al. 2021); these may be partially offset by productivity gains stemming from the exit of low-productivity firms (Bloom et al. 2020). Finally, high unemployment that accompanies weak aggregate demand tends to lead to human capital losses and reduced job search activity among the long-term unemployed (Blanchard and Summers 1987; Lockwood 1991).

Empirical estimates have documented that some of these mechanisms were indeed at work during past recessions. An analysis of data for a large sample of countries during 1960-2018 found that financial crises, especially when accompanied by a rapid buildup of debt, were associated with persistent productivity losses (Dieppe, Kilic Celik, and Okou 2021). Among a large sample of firms in six EMDEs in Europe, firms in sectors that faced the largest adverse demand shocks during the 2009 global recession reduced

[1] For details of these empirical findings involving financial markets see Claessens and Kose (2017), Queralto (2013), and Wilms, Swank, and de Haan (2018).

capacity most (Nguyen and Qian 2014). In a sample of 61 countries during 1954-2010, banking crises were followed by lower labor productivity growth, consistent with a loss of human capital during these crises (Oulton and Sebastia-Barriel 2016). Other studies found that the return of actual output growth or levels to pre-recession trends was non-linear and dependent on the persistence, depth, and source of the recession and on whether it was accompanied by financial crises.[2] None of these studies, however, systematically examines the various channels through which short-term disruptions reduce potential growth.

The chapter reports the following key findings.

- *Trend decline in potential growth.* An internationally widespread decline in potential growth occurred in 2011-21, relative to 2000-10. This is shown by all estimates of potential growth, globally and for the main country groups—advanced economies and EMDEs. Global potential growth, as estimated using the production function approach, fell to 2.6 percent a year during 2011-21 from 3.5 percent a year during 2000-10; advanced-economy potential growth fell to 1.4 percent a year during 2011-21, 0.8 percentage point below its 2000-10 average; and EMDE potential growth fell to 5.0 percent a year during 2011-21 from 6.0 percent a year during 2000-10. The weakening of potential growth was highly synchronized across countries: during 2011-21, potential growth was below its 2000-10 average in 96 percent of advanced economies and 57 percent of EMDEs. This widespread decline reflected a multitude of factors. All the fundamental drivers of growth faded in 2011-21: TFP growth slowed, investment weakened, and labor force growth declined.

- *Persistent impact of recessions on potential growth.* Recessions, even five years later, were associated, on average, with a decline of about 1.4 percentage points in potential growth. While the magnitude of the estimated decline in potential growth five years after a recession depended on the measure (with a range of 0.2-1.4 percentage points), it was always statistically significantly negative. The effect was somewhat stronger in EMDEs than in advanced economies: in EMDEs, potential growth was still, on average, 1.6 percentage points lower five years after the recession, whereas in advanced economies, it was only 1.3 percentage points lower.

- *Larger impact of recessions than other adverse events on potential growth.* The medium-term effect of recessions on potential growth tended to be somewhat more severe than the effects of other adverse events. Banking crises were associated with initially larger falls in potential growth (peaking at 1.8 percentage point after two years) as a result of a collapse in investment. However, this tended to unwind quickly such that the fall in potential growth after five years was only 1.2 percentage point. Epidemics were associated with more modest, but still statistically significant, short- and

[2] For a discussion of the impact of financial crises on growth, see Ball (2014); Claessens, Kose, and Terrones (2009, 2012); Furceri and Mourougane (2012); and Haltmeier (2012).

medium-term declines in potential growth. These were more severe in EMDEs than in advanced economies, which may have been better able to limit the economic damage with fiscal and monetary stimulus.

- *Adverse effects through multiple channels.* Recessions affected potential growth through multiple channels. Four to five years after an average recession, the annual growth of investment, employment, and productivity remained significantly lower than in "normal" years (by 3 percentage points, 0.7 percentage point and 0.7 percentage point, respectively). This contrasts with banking crises, which tended to be associated mostly with lasting losses of productivity growth, and epidemics, which were mainly associated with lasting employment losses, possibly reflecting economic shifts caused by behavioral responses to epidemics.

- *Different features of potential growth estimates.* The comprehensive database also allows a comparisons across potential growth measures. Forecast-based estimates tend to be systematically higher than other estimates, and estimates based on univariate filtering techniques systematically lower. Estimates based on filtering techniques tend to be the most volatile and to track actual growth most closely, as expected. Estimates based on the production function approach tend to be the most stable and the least correlated with actual growth as they capture slow-moving drivers of potential growth.

The chapter proceeds as follows. The next section presents the database. This is followed by a section that describes movements in potential growth around the world in recent decades and a section that estimates the effects on potential growth of recessions. The penultimate section documents the channels through which these operates. The final section concludes.

Database

Three main methods of estimating potential growth estimates have been used in the literature, and several different measures can be derived using variants of them. The comprehensive database developed here allows a comparison of the behaviors of such measures.

The database includes nine measures of potential growth for up to 173 countries over periods as long as 1981-2021. The baseline measure of annual potential growth, estimated using the production function approach, is available for up to 30 advanced economies and 64 EMDEs for 1998-2021 (table 1F.1, annex 1A). Six univariate and multivariate filter-based estimates of potential growth, which require quarterly data, are available for up to 37 advanced economies and 52 EMDEs for 1980Q1-2022Q1, with projections to 2024Q4 (table 1F.1, annexes 1B and 1C). IMF *World Economic Outlook*-based estimates of potential growth are available for up to 37 advanced economies and 136 EMDEs for 1990-2022 (annex 1D). Consensus forecast-based estimates of potential growth are available for up to 34 advanced economies and 44 EMDEs for 1990-2022.

The database also includes projections for a subset of measures. For the production function approach, projections are available for 2022-32. These projections and the methodology on which they are based are presented and analyzed in chapter 5. For the filter-based estimates, forecasts are available up to 2024Q4.

This chapter, chapter 2, and chapter 5 discuss aggregates for the global economy and for particular country groups. These aggregates are real GDP-weighted averages (at 2010-19 prices and market exchange rates) for a balanced sample of 30 advanced economies and 53 EMDEs for 2000-21, unless specified otherwise. The 53 EMDEs comprise 6 economies in East Asia and the Pacific (EAP), 9 economies in Europe and Central Asia (ECA), 16 economies in Latin America and the Caribbean (LAC), 5 economies in the Middle East and North Africa (MNA), 3 economies in South Asia (SAR) and 14 economies in Sub-Saharan Africa (SSA). Data for about half of EMDEs (mainly in ECA and SSA) are not available before 1998. Hence, to ensure broad country coverage, the sample period is restricted to 2000-21 (and 2022-30 in chapter 5) when discussing international averages. However, when discussing the robustness of trends among different measures, the sample is restricted to those countries for which data are available for all measures.

Basic concepts

Three main methods of estimating potential growth have been employed in the literature, sometimes with different objectives. Some have been used to analyze short-term movements in potential growth, while others have focused on long-term developments (Basu and Fernald 2009). Estimates of movements in potential growth in the short term may be computed using time-series filtering techniques, including univariate or multivariate filters, while estimates of potential output growth over longer periods are usually based on structural models that include a production function or on long-term growth forecasts.

In the short term, when factors of production cannot be reallocated in response to shocks, potential growth may be viewed as the growth of output that can be sustained without putting pressure on given productive capacity and inflation (Okun 1962). Potential output growth can be buffeted in the short term by temporary disruptions and boosts to supply that may dissipate over the longer term. For example, a shift in the composition of demand may render part of the existing capital stock obsolete, effectively reducing potential output and its growth in the short-term. However, over the longer term, firms would be expected to adjust to the new structure of demand, returning potential output growth toward its previous path. The short-term measure is particularly relevant for demand management and monetary policy, since temporary supply constraints or upward demand shocks tend to reduce the effective slack in the economy, with implications for macroeconomic policy and the monetary policy interest rate. Central banks, in particular, need to focus on movements in potential growth in the short term as they gauge deviations of actual from potential output levels over the horizon of monetary policy transmission, around one to two years.

In the production function framework, potential output growth is a function of growth in the factors of production—the capital stock and the labor force, along with current technological progress (Solow 1962). Potential output growth in the long term thus depends on these fundamental drivers, an implicit assumption being that the factors of production are allocated to their most productive uses, regardless of temporary supply shocks. Finance and economy ministries often focus on potential growth over longer periods, aware that boosting it will promote fiscal sustainability over longer time horizons.

Measures of potential output growth

The literature has largely focused on three methods of estimating potential growth: a production function method, time-series filters, and analysts' growth forecasts.

- *Production function method.* The production function approach represents potential output as a function of the fully utilized capital stock, fully employed labor force, and technology as measured by TFP. For analytical convenience, the production function is often assumed to have a particular form, known as Cobb-Douglas.[3] Potential TFP growth is estimated as the predicted value of a parsimonious panel regression of five-year averages of trend TFP growth on lagged per capita income relative to the advanced-economy average (to proxy convergence-related productivity catchup), education and demographic indicators, and trend investment (annex 1A). Potential labor supply is estimated as the population-weighted aggregate of predicted values of age- and gender-specific labor force participation rates from regressions on policy outcomes and cohort characteristics, business cycles, and country effects. The potential capital stock is assumed to match the actual capital stock.

- *Time-series filtering methods.* These methods employ univariate or multivariate filters. Univariate filters involve estimates of trend output using only GDP data series (annex 1B). Multivariate filters use the empirical relationship between GDP and other variables (such as inflation, unemployment rates, commodity prices or financial variables) to help distinguish short-run deviations of output from trends (annex 1C). The database in this chapter employs the following five univariate filters: the Hodrick-Prescott filter, the Baxter-King filter, the Christiano-Fitzgerald filter, the Butterworth filter, and a filter based on an unobserved components model. An additional multivariate filter uses financial variables and commodity prices, a Phillips curve relationship, a Taylor rule, and Okun's law.

- *Growth forecasts.* This method is applied using two sets of long-term (five-years-ahead) growth forecasts, from Consensus Economics and the IMF's *World Economic Outlook* database (annex 1D). These forecasts are based partly on models used by the analysts and partly on the analysts' judgement. Judgment can play an important

[3] The Cobb-Douglas production function is characterized by constant returns to scale and a constant elasticity of substitution between capital and labor.

role during periods of major structural change, which models may not be well-equipped to capture.

Each approach comes with advantages and disadvantages (table 1F.2). Even in data-poor environments, univariate filters are straightforward to implement. Multivariate filters utilize additional information that can ensure that the measure of potential output is better aligned with its determinants, as suggested by economic theory. In particular, the multivariate filter-based estimates can ensure that estimated output gaps in the short term are consistent with indicators of domestic demand pressures (such as inflation, unemployment, current account balances, and capacity utilization). All statistical filters, however, have drawbacks: in particular, they suffer from well-known "end-point" problems that tend to lead to large revisions as new data become available. The approach employed here includes forecasts of real GDP growth to minimize this problem. Since they capture high-frequency movements, measures of potential growth based on filtering techniques correlate strongly with actual output growth and with each other.

The production function approach has the advantage of taking into account the fundamental drivers of output on the supply side—factor inputs and technology—that dominate in the long run. While estimates of potential growth based on this approach are often consistent with long-term growth averages, they correlate less closely with actual growth in the short term. Potential growth measured by the production function approach is also only weakly correlated with potential growth estimates obtained from filtering techniques. The production function approach has a number of drawbacks, however. It assumes a particular functional form of the relationship between factor inputs, technology, and output. Its application relies on imperfect measures of, or proxies for, the growth of potential TFP, labor supply, and the capital stock. And it is unable to capture cyclical shocks to capacity and supply that may cause short-term fluctuations in potential output. Finally, the approach provides measures of potential output *growth*, but derivation of potential output *levels* would require additional steps to identify an "anchor level" in which the output gap is closed.

Long-term growth forecasts generally incorporate analysts' judgment and, thus, capture factors that cannot be econometrically modelled. As a result, similar to estimates based on the production function approach, these forecasts are only weakly correlated with filter-based estimates of potential growth. However, in practice, forecasts can be sticky and, at times, difficult to interpret.

Comparison of different potential growth measures

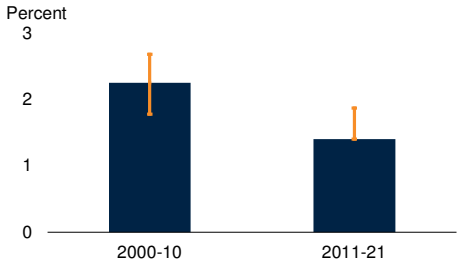
The estimated potential growth rates resulting from the application of these methods differ in their levels and evolutions over time. This section briefly explores these differences.

First, differences among potential growth estimates were wider for advanced economies than EMDEs (figures 1.1.A and B). During 2000-21, potential growth estimated from forecasts was the highest among the nine measures in more than half the country-year

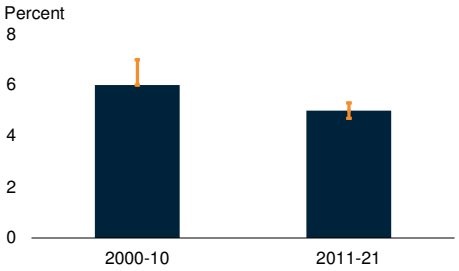
FIGURE 1.1 Estimates of potential growth

By all measures, potential output growth slowed in 2011-21 relative to 2000-10 in the global economy, in EMDEs, and in advanced economies. Filter-based measures are more volatile and less persistent. Forecasts are most often the highest estimates of potential growth.

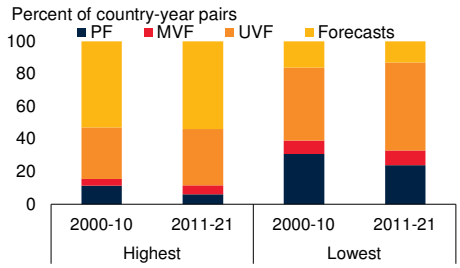
A. Advanced-economy average annual potential growth (range across methodologies)



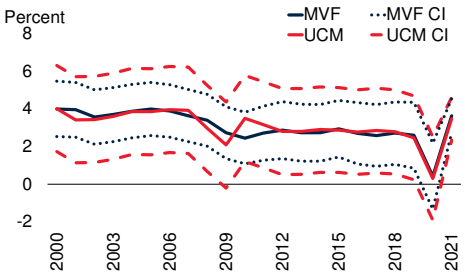
B. EMDE average annual potential growth (range across methodologies)



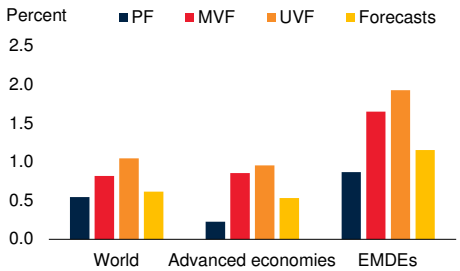
C. Methodologies generating highest and lowest estimates of potential growth



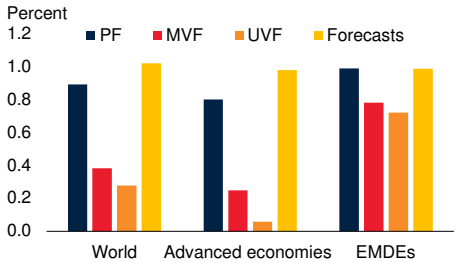
D. Uncertainty in global potential growth



E. Standard deviation of potential growth estimates, 2000-19



F. Persistence in potential growth estimates, 2000-19



Source: World Bank.

Note: "PF" stands for production function approach, "MVF" for multivariate filter, "UVF" for univariate filter, and "Forecasts" for five-year-ahead growth forecasts from the IMF *World Economic Outlook*. "EMDE" = emerging market and developing economies. Aggregates refer to weighted averages (constant real GDP weights at average 2010-19 prices and exchange rates).

A.B. Blue bars denote production function-based estimates. Orange whiskers indicate the range of eight estimates.

C. Graph shows the share of country year pairs during each period in which each methodology generates the highest or the lowest estimate of potential growth. Only country-year pairs are considered for which at least two methodologies are available. "UVF" stands for any of four univariate filters (Christiano-Fitzgerald filter, Baxter-King, Hodrick-Prescott, or Butterworth). Unbalanced sample of 30 advanced economies and 25 EMDEs for 1998-21.

D. "UCM CI" and "MVF CI" are 95 percent confidence bands of each methodology. Unbalanced sample of 30 advanced economies and 25 EMDEs for 2000-21.

E. Standard deviation of potential growth estimates over 2000-19. "UVF" is the maximum among the univariate filters. Unbalanced sample of 30 advanced economies and 40 EMDEs.

F. Coefficient estimates on lagged potential growth from an AR1 regression of global, advanced-economy, and EMDE potential growth for 2000-2019. "UVF" is the minimum among the univariate filters. Unbalanced sample of 30 advanced economies and 25 EMDEs for 2000-21.

pairs (figure 1.1.C). The lowest estimates were generally produced by the univariate filters. At the country level, the same pattern was found: forecast-based measures of potential growth tended to be the highest and measures from univariate filters the lowest, especially over the past decade.

Second, multivariate filter-based estimates of potential growth had narrower confidence bands than those based on univariate filters (figure 1.1.D). This likely reflects the use of additional demand pressure indicators in the multivariate filter that help identify the output gap more accurately. Confidence intervals cannot be computed for estimates based on the production function approach or analysts' forecasts.

Third, global, advanced-economy, and EMDE potential growth estimates based on univariate and multivariate filters typically have the highest variances, while those based on the production function approach have the lowest (figure 1.1.E). At the country level, univariate filter estimates have the largest variance (in about 75 percent of cases).

Fourth, univariate filter-based estimates have the least persistence, especially in advanced economies, while estimates from forecasts and the production function approach have the most persistence across all groups of countries (figure 1.1.F).[4] These findings are intuitively appealing, as filter-based estimates are designed to capture time-series variation, whereas the others rely on more persistent drivers of potential growth.

Fifth, estimates from different multivariate and univariate filters tend to be highly correlated, with a median within-country correlation coefficient above 85 percent (figure 1.2.A). However, they correlate only moderately with estimates from the production function approach and analysts' forecasts. Similarly, production function-based and forecast-based estimates correlate only moderately with each other, whereas estimates from the two sources of growth forecasts are highly correlated with each other.

Finally, as expected, estimates of potential growth based on filters derived from the unobserved components model most closely track actual growth, with an average correlation coefficient of 0.95 across the country sample, followed by estimates based on the multivariate filter and other univariate filters (figure 1.2.B). As expected given its construction from slow-moving variables, the production function approach deviates more from actual growth (with a correlation of 0.45 with actual growth). The correlation is even lower for forecast-based measures of potential growth, which tend to change only when forecasters modify their views about long-term growth drivers.

Evolution of potential growth

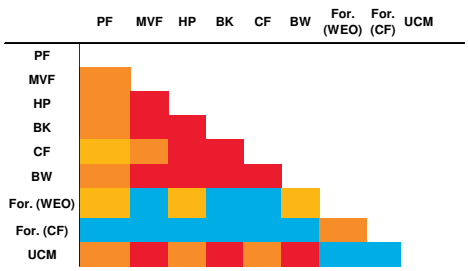
This section first reviews the evolution of potential growth over the past two decades. It then focuses on potential growth during the last two global recessions, of 2009 and 2020. While both sub-sections rely mostly on the production function-based measures

[4] The coefficient on lagged potential growth from a regression with one autoregressive term is taken to capture the degree of persistence here.

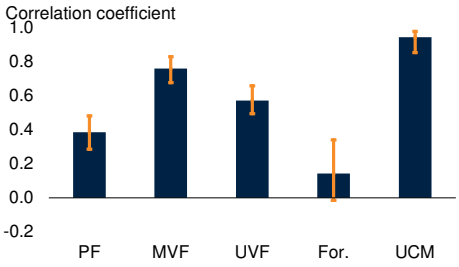
FIGURE 1.2 Comparison of potential growth estimates

Filter-based estimates of potential growth are highly correlated with each other and with actual output growth. Forecast-based estimates tend to be less correlated with other estimates of potential growth and the least correlated with actual growth.

A. Correlation of potential growth, 2000-21



B. Correlation of potential growth estimates with actual growth, 2000-20



Source: World Bank.
Notes: "PF" stands for production function approach; "HP" for Hodrick-Prescott filter; "BK" for Baxter-King filter; "MVF" for multivariate filter; "CF" for Christiano-Fitzgerald filter; BW" for The Butterworth (BW); "For. (WEO)" for five-year-ahead growth forecasts from the IMF *World Economic Outlook* database; "For. (CF)" for five-year-ahead growth forecasts from the Consensus Economics; "UCM" for Unobserved Components Model; "UVF" for univariate filter.
A. Figure shows the within-country correlation during 2000-20 between different measures of potential growth. Red represents greater than 80 percent, orange represents 60-80 percent, yellow represents 40-60 percent, and light blue represents 20-40 percent. Unbalanced sample of 37 advanced economies and 63 EMDEs for 2000-21.
B. Blue bars show the median of within-country correlation during 2000-20 between different measures of potential growth and actual growth. Orange whiskers represent the 25th and 75th percentiles of within-country correlation during the same period. Unbalanced sample of 37 advanced economies and 95 EMDEs for 2000-20.

of potential growth, the findings are consistent with those from the other measures of potential growth.

Potential growth over time

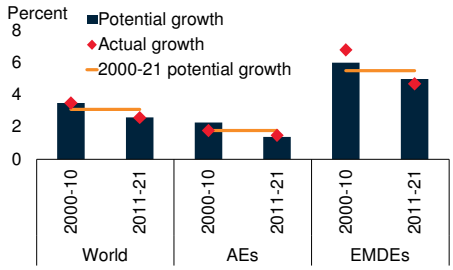
Global potential growth, as estimated using the production function approach, fell to 2.6 percent a year over 2011-21 from 3.5 percent a year during 2000-10 (figure 1.3.A).[5] The weakening of potential growth was internationally widespread. Thus, during 2011-21, potential growth was below its 2000-10 average in 96 percent of advanced economies and 57 percent of EMDEs. Economies with potential growth below its 2000-10 average accounted for about 80 percent of global GDP in 2022 (figure 1.3.B). Per capita potential growth estimates also show a trend decline over time, to 2.0 percent a year in 2011-21 from 2.7 percent a year during 2000-10 (figure 1.3.C). These estimates suggest a trend slowdown in global potential growth around the cyclical shocks that depressed actual growth below its elevated average in the early 2000s.

[5] Data for half the EMDEs (mainly in ECA and SSA) are not available before 1998. Hence, to ensure broad country coverage, the sample period is restricted to 2000-2021 for discussing country groups. However, when robustness of trends among different measures is discussed, the sample is restricted to those countries for which data are available for all measures.

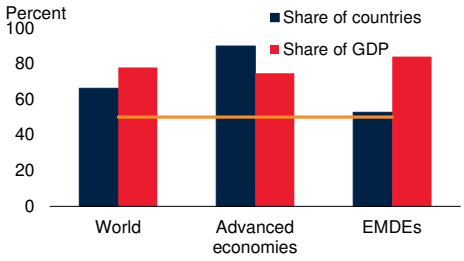
FIGURE 1.3 Evolution of potential growth

By all measures, potential growth slowed between 2000-10 and 2011-21 globally, in EMDEs, in advanced economies, and in most countries. It also slowed in per capita terms.

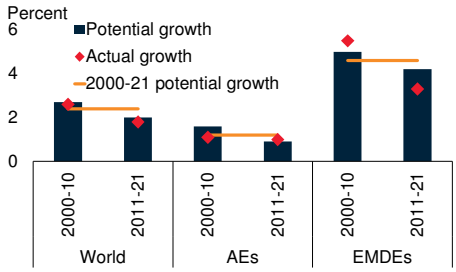
A. Potential growth



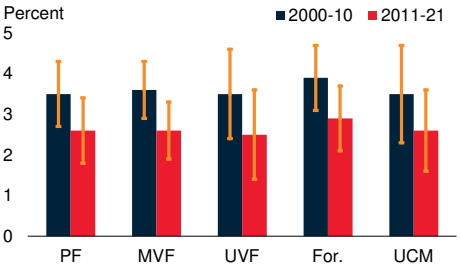
B. Share of economies and GDP with potential growth below 2000-10 average, 2011-21



C. Per capita potential growth



D. Global potential growth



Sources: UN population statistics; World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; "PF" = production function approach,; "MVF" = multivariate filter, "UVF" = univariate filter; "For." = five-year-ahead growth forecasts from the IMF World Economic Outlook, "UCM" = Unobserved Components Model.

A.B.C. Based on potential growth derived using production function approach. GDP-weighted average. Sample includes 30 advanced and 53 emerging market and developing economies.

B. Number of economies and their share of global or group GDP with potential growth in each period below its 2000-10 average. Horizontal line indicates 50 percent. Unbalanced sample of 30 advanced economies and 53 EMDEs for 2000-21.

D. Based on common sample of 30 advanced economies and 25 EMDEs for 2000-21 to ensure consistency in samples across methodologies. Orange whiskers indicate range implied by GDP-weighted average of country-specific standard deviations of potential growth estimates for each approach.

The finding of a decline in potential growth is robust with respect to the measure used, although the magnitude of the slowdown differs across the measures. To ensure comparability, a smaller sample of 30 advanced economies and 25 EMDEs is used for which all nine measures are available. By all these measures, global potential growth slowed by 0.9-1 percentage point a year from its average in 2000-10, to 2.5-2.9 percent a year in 2011-21 (figure 1.3.D).

In advanced economies, the potential growth slowdown set in before the global financial crisis. After a sharp decline during 2008-10—the period of the global financial crisis and the start of the euro area sovereign debt crisis—potential growth stabilized in 2011-21 as investment growth recovered. However, at 1.4 percent a year over 2011-21, potential growth in advanced economies was 0.8 percentage point below its 2000-10 average

(figure 1.4.A). As in the broader set of advanced economies, potential growth in the G7 economies (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) was 1.5 percent a year on average in 2011-21, 0.5 percentage points below its 2000-10 average.

EMDEs, by contrast, enjoyed a short-lived pre-global recession surge in potential growth in the 2000s that subsequently faded. In the wake of the global financial crisis and associated global recession, a surge in public investment underpinned EMDE potential growth, offsetting softening growth of both TFP and labor supply. As EMDE policy stimulus was unwound and as investment growth plummeted in commodity-exporting EMDEs amid the oil price slide in 2014-2016, EMDE potential growth slowed sharply in 2015-19. A sharp investment growth slowdown during the 2010-19 also depressed potential growth in China whereas the slowdown was milder in other EMDEs where investment growth remained more robust and demographics were more favorable (chapter 2). Overall, at 5.0 percent a year, EMDE potential growth during 2011-21 fell 1.0 percentage point a year short of its average during 2000-10 (figure 1.4.B).

Chapter 2 presents a detailed assessment of the evolution of potential growth across various *EMDE regions*. In brief, potential growth fell furthest in those regions that had benefited from rapid per capita income convergence in the early 2000s or included many commodity-exporting EMDEs (figures 1.4.C and D). The slowdown in potential growth in 2011-21 relative to its 2000-10 average was sharpest in MNA, where investment growth plunged amid the oil price drop of 2014-16 and conflict and policy uncertainty persisted in parts of the region.

In EAP, potential growth in 2011-21 was 1.4 percentage points a year lower than in 2000-10. This decline mostly reflected a slowdown in potential growth in China, partly as a result of policy efforts aimed at rebalancing growth away from investment towards more sustainable growth engines; adding to this was slower growth of both TFP and the working-age population.

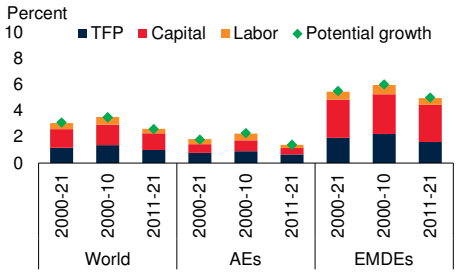
In ECA and LCA, potential growth in 2011-21 was 0.5-0.6 percentage point a year lower than in 2000-10. The ECA region's previous two decades of rapid integration into European Union production networks, beginning in the 1990s, gradually diminished its potential for further catchup productivity growth. The region also hosts several energy-exporting countries (including Russia) which suffered recessions or slowdowns in the wake of the 2014-16 slump in oil prices. In LAC, potential growth suffered from weakened productivity growth, partly as a result of adverse terms-of-trade shocks and bouts of policy uncertainty, as well as less favorable demographics.

Potential growth in SSA also declined somewhat (by 0.2 percentage points a year in 2011-21 relative to 2000-10). A sharp slowdown in TFP growth was only partially offset by favorable demographics and rapid capital accumulation, which accelerated as resource discoveries were developed into operating mines and oil fields and governments undertook large-scale public infrastructure investments.

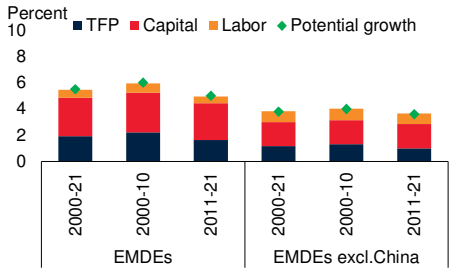
FIGURE 1.4 Drivers of potential growth

The decline in potential growth between 2000-10 and 2011-21 reflected reduced contributions from TFP growth, investment growth, and labor force growth, and occurred in all EMDE regions.

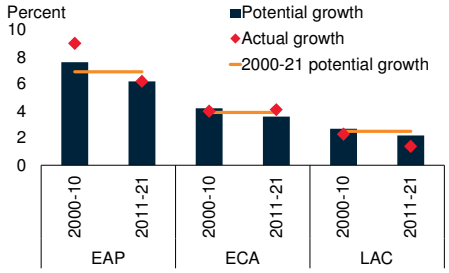
A. Contributions to potential growth



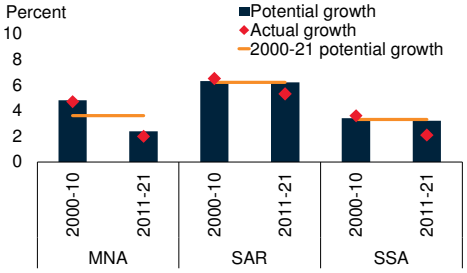
B. Contributions to potential growth



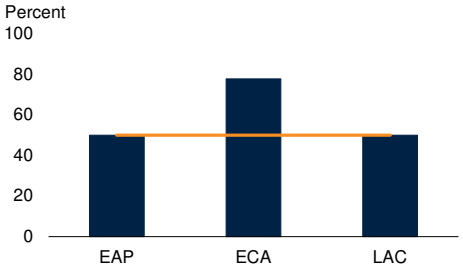
C. Potential growth in EMDE regions



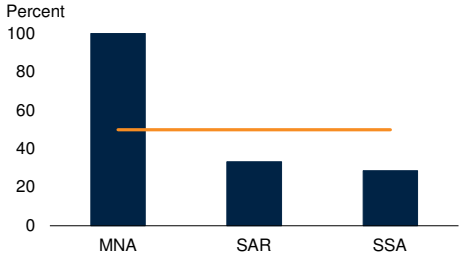
D. Potential growth in EMDE regions



E. Share of economies with potential growth below 2000-10 average, 2011-21



F. Share of economies with potential growth below 2000-10 average, 2011-21



Source: World Bank.

Note: GDP-weighted averages of production function-based potential growth estimates. TFP growth = total factor productivity growth. AEs = advanced economies; EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A.B. Sample of 30 advanced economies and 53 EMDEs.

E.F. Number of economies and their share of GDP in a region among 53 EMDEs with potential growth in each period below its 2000-10 average. Horizontal line indicates 50 percent. Regional samples include the largest available coverage for each region. Sample includes 6 countries in EAP region, 9 in ECA, 16 in LAC, 5 in MNA, 3 in SAE and 14 in SSA. In all MNA countries, potential growth was higher in 2000-10 than in 2011-21 (and higher than the full-period average) because of a commodities boom in the first decade of the 2000s that was followed by a commodity price plunge, political tensions, and conflict in the second decade of the 2000s.

In 2011-21, potential growth in SAR remained broadly unchanged from 2000-10. Growth of the labor force benefited from a demographic dividend. The share of the population of working age rose by more than one-tenth between 2000 and 2021, reaching 67 percent in 2021. Capital and TFP also maintained their growth momentum in 2011-21. Growth in investment remained broadly robust over this period—growing faster than in the EMDE average—and the investment-GDP ratio rose by 5 percentage points of GDP between 2000 and 2021, to more than 28 percent of GDP in 2021.

Potential growth during global recessions

The 2000-21 period spans two global recessions—the 2009 recession that was triggered by the global financial crisis and the 2020 recession that was caused by the COVID-19 pandemic. These recessions disrupted fixed capital investment and caused widespread employment and output losses. In the case of the 2020 recession, disruptions of education systems caused by pandemic-induced reductions in social interaction also slowed down human capital accumulation.

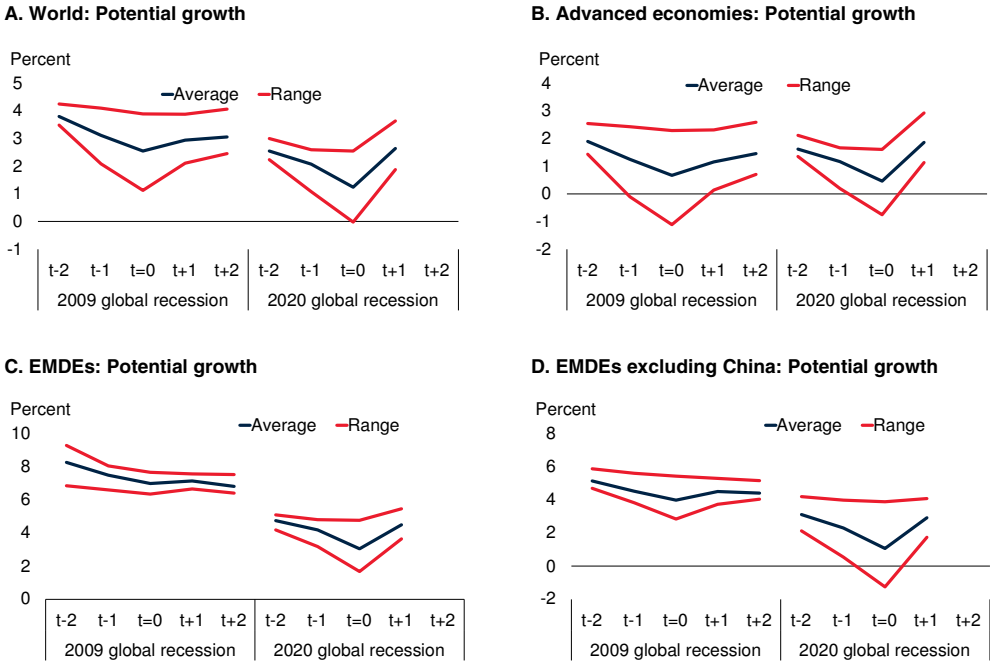
By the production function-based measure of potential growth, global potential growth slowed by 1.2 and 1.3 percentage point from two years before the global recessions of 2009 and 2020, respectively, to the recession year itself (figure 1.5.A). The slowdowns in potential growth in EMDEs differed more between the two recessions (1.3 percentage points in 2007-09 and 1.7 percentage points in 2018-20) than the slowdowns in advanced economies (1.2 percentage points in 2007-09 and 1.1 percentage points in 2018-20; figures 1.5.B and C). The considerably smaller slowdown in EMDEs in the 2009 global recession largely reflected the investment-driven support for potential growth in China during the global financial crisis. In EMDEs excluding China, potential growth declined by 1.2 and 2.0 percentage points in the 2009 and 2020 recessions, respectively (figure 1.5.D).

In advanced economies, the slowdown in potential growth in the two global recessions reflected steep declines in investment and TFP growth, whereas in EMDEs it reflected mostly a decline in TFP growth (figures 1.6.A-D). In both country groups, slowing labor force growth also contributed. The steeper slowdown in potential growth in EMDEs in 2020 than in 2009 reflected the deeper collapse in investment but also the pandemic-induced fall in potential labor force participation.

Although both global recessions resulted in a slowdown in potential growth, they differed in the behavior of potential growth in the subsequent recoveries. The global financial crisis was followed by a decade of investment weakness and reduced productivity growth, leading to a failure of potential growth to return to pre-recession rates. In contrast, the 2020 global recession was followed by the swiftest first-year output rebound of any global recession over the past eight decades (World Bank 2021). This was accompanied by strong growth in investment, especially in advanced economies, and a productivity rebound, which together lifted potential growth to pre-recession rates globally, in advanced economies, and in EMDEs. However, the impact of this initial rebound in potential growth is likely to be temporary because of the persistent headwinds faced by the fundamental drivers of potential growth (see chapter 5).

FIGURE 1.5 Potential growth around the global recessions of 2009 and 2020

Potential growth fell in the global recessions of 2009 and 2020 in both advanced economies and EMDEs. The declines were particularly steep during the COVID-19-induced global recession of 2020.



Sources: World Bank; World Economic Outlook.
Note: EMDEs = emerging market and developing economies. "Average" is an unweighted average of seven potential growth measures (excluding expectations). "Range" reflects the maximum and minimum. Figures show potential growth around global recessions in t = 2009 and t = 2020. Unbalanced sample of 30 advanced economies and 25 EMDEs for 2007-21.

These estimated movements in potential growth around global recessions were similar for almost all measures of potential growth, except those based on forecasts. Potential growth declined in the two recession years globally, in advanced economies, in EMDEs, and in EMDEs excluding China.[6] On average across the eight measures that showed declines in the two recessions, global potential growth slowed by about 1.3 percentage points from two years before the recession to the year of the recession.[7] The slowdown was larger in EMDEs (1.5 percentage points) than in advanced economies (1.2 percentage points). The recession year in both episodes generally saw the trough in potential growth for all measures. The estimated decline in potential growth was smallest for production function-based measures and largest for measures obtained using univariate filters.

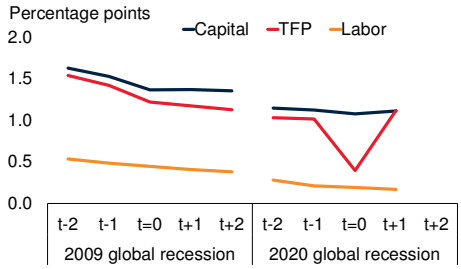
[6] For the COVID-19-induced global recession of 2020, this is broadly consistent with the findings of persistently lower potential output levels by Bodnár et al. (2020) for the euro area and Fernald and Li (2021) for the United States.

[7] Measures based on consensus forecasts for long-term growth are not covered here because they have a much smaller country sample.

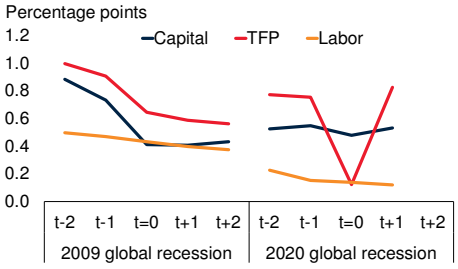
FIGURE 1.6 Drivers of potential growth around the global recessions of 2009 and 2020

The decline in potential growth in the global recessions of 2009 and 2020 reflected falls in the contributions of TFP growth, labor supply growth, and, except in China in 2009, capital accumulation.

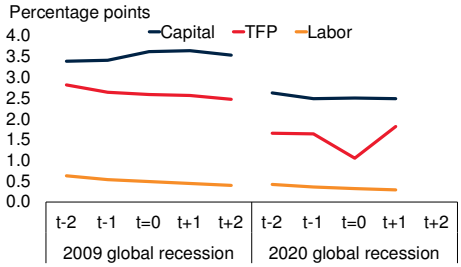
A. World: Contributions to potential growth



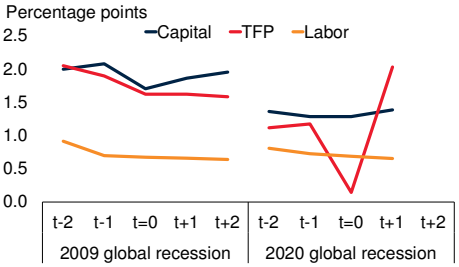
B. Advanced economies: Contributions to potential growth



C. EMDEs: Contributions to potential growth



D. EMDEs excluding China: Contributions to potential growth



Sources: World Bank; World Economic Outlook.
Note: EMDEs = emerging market and developing economies. Figures show the contributions of capital, total factor productivity (TFP), and labor to potential growth around t = 2009 and t = 2020. Unbalanced sample of 30 advanced economies and 25 EMDEs for 2007-21.

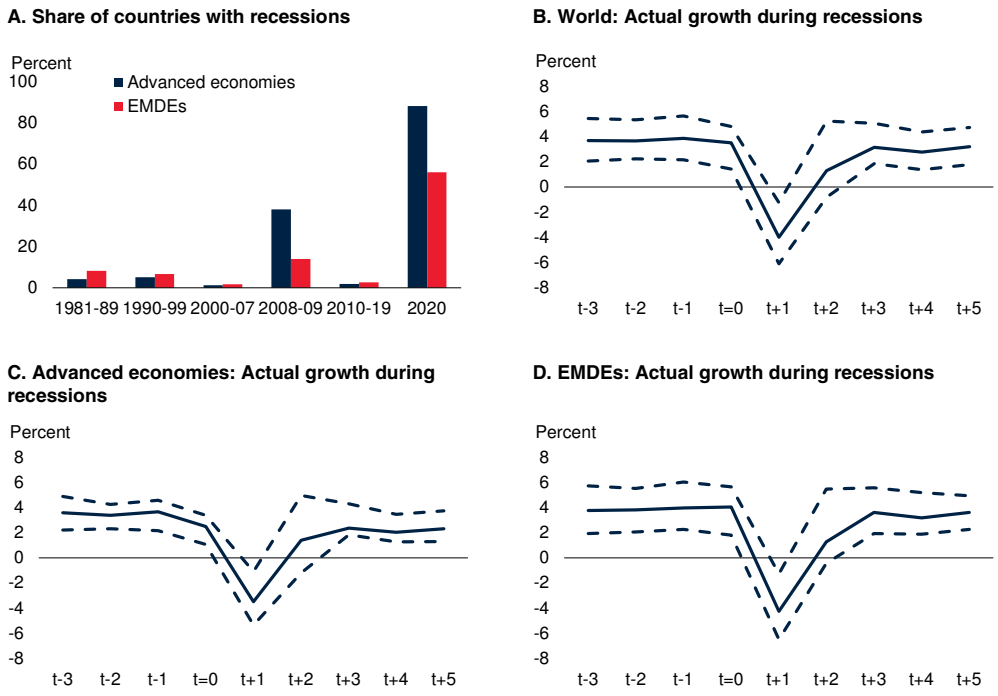
The long-term effects of short-term shocks on potential growth

The COVID-19-induced output collapse of 2020 renewed concerns about the impact of recessions on the level and growth of potential output. A number of studies have documented the lasting effects of country-specific recessions and financial crises on the level or growth of actual or potential output (Cerra and Saxena 2008; Furceri and Mourougane 2012; Mourougane 2017). However, these studies have mostly focused on OECD countries using only production function-based estimates of potential growth.

This section broadens the scope of the earlier literature in three dimensions. First, it examines the effect of country-specific recessions on potential growth in a much larger sample of countries, including both advanced economies and EMDEs. Second, it employs all the measures of potential growth described above to obtain a better understanding of the linkages between recessions and potential growth. Third, in addition to recessions, it considers other adverse events, such as banking crises and epidemics, and compares their effects on potential growth.

FIGURE 1.7 Characteristics of recessions

Most recessions at the country level occurred during global recessions. Growth slowed by about 8 percentage points between the year before the recession and its trough.



Source: World Bank.

Note: Recessions are defined as the period from the peak preceding a business cycle trough to the trough, with a trough defined as a year in which output growth is both negative and at least one standard deviation below its long-term average. Sample includes 91 recession events in 33 advanced economies and 190 recession events in 77 EMDEs during 1981-2020. EMDEs = emerging market and developing economies.

B. Unweighted averages of actual growth during recessions as defined in annex 1E denotes the peak year preceding the recession.

Definition. A (country-specific) recession is defined as a period from a peak in output preceding a business cycle trough to the trough, with a trough defined as a year in which output growth is both negative and at least one standard deviation below its long-term (1995-2020) average (as in Huidrom, Kose, and Ohnsorge 2016). This definition yields up to 124 recessions in 37 advanced economies and up to 351 recessions in 101 EMDEs during 1980-2020.

Duration and amplitude of recessions. Almost half of such recessions at the country level occurred during global recession years (1975, 1982, 1991, 2009, 2020; figure 1.7.A). Recessions at the country level, on average, lasted 1.5 years and were associated with a contraction in actual output of 4.0 percent, on average (figure 1.7.B). In advanced economies, recessions were, on average, somewhat less severe than in EMDEs (with drops of 3.5 percent and 4.3 percent, respectively; figures 1.7.C and D). The duration of recessions was similar, at 1.5 years, in the two country groups.

Effects on potential growth: Methodology. A local projection method (LPM) is employed to estimate the evolution of potential growth following recessions (annex 1E). The model estimates the cumulative effect of recessions on potential growth, following Jordà (2005) and Teulings and Zubanov (2014). In impulse responses, the model estimates the effect of short-term shocks (the recession, banking crisis, or epidemic event) over a horizon h on potential growth while controlling for other determinants:

$$y_{i,t+h} - y_{i,t} = \alpha_h + \beta_h shock_{i,t} + \gamma_h \Delta y_{i,t-1} + fixed\ effects_i + \varepsilon_{i,t},$$

where $y_{i,t}$ is potential growth. The model controls for country-fixed effects to capture time-invariant cross-country differences. The variable $shock_{i,t}$ is a dummy variable for a recession event (or banking crisis or epidemic), the main variable of interest. Lagged potential growth $y_{i,t-1}$ controls for the history of potential growth.

Long-term effect of recessions. Even five years after recessions, potential growth as measured by the production function approach is estimated, on average, to have been 1.4 percentage points lower than if a recession had not occurred (figure 1.8.A). Coefficient estimates for the recession dummy are statistically significantly negative for the first five years after a recession. The effect was somewhat stronger and more persistent for EMDEs, with 1.6 percentage points lower potential growth five years after a recession compared to 1.3 percentage points for advanced economies (figures 1.8.B and C).

These results are broadly robust to the choice of potential growth measure and the definition of recessions. Four to five years after recessions, potential growth as measured by most methods other than the production function approach is estimated to have been 0.2-1.3 percentage points lower than if a recession had not occurred (annex 1E).[8]

Recessions could alternatively be defined as years of negative output growth, regardless of the depth of the output decline. This alternative definition of events would yield 541 recessions events (151 events in 37 advanced economies and 390 events in 101 EMDEs), around 14 percent more than the baseline sample of 475 events.[9] Potential growth slowed statistically significantly following recessions defined in this way also.

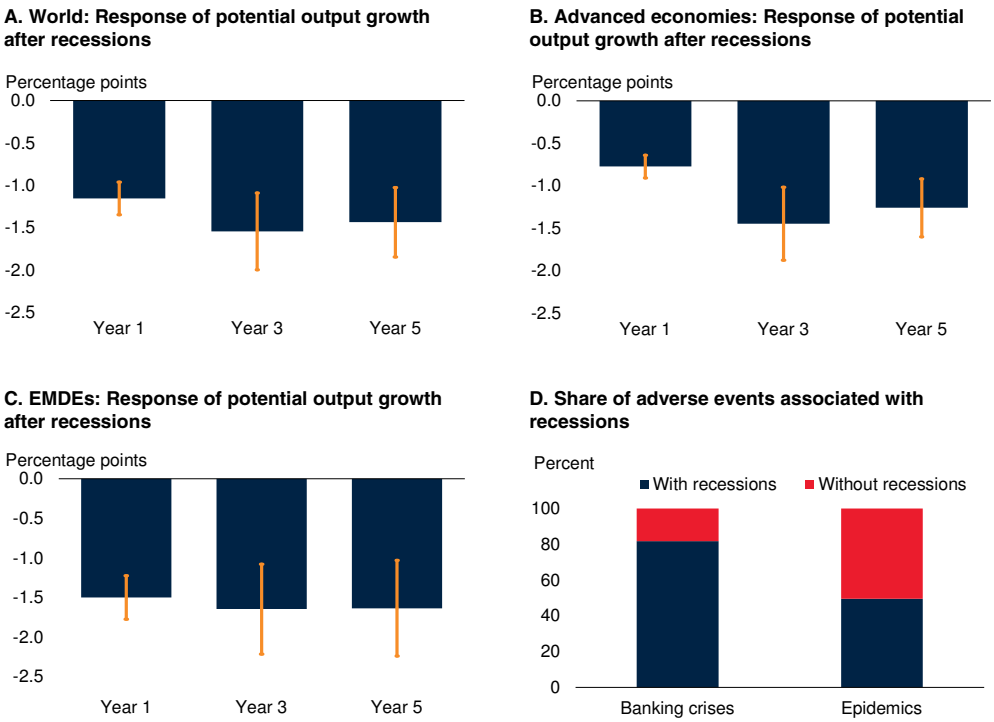
Long-term effect of other adverse events. The effects of banking crises and epidemics on potential growth are also examined and compared with those of recessions (annex 1E). The banking crises examined are those identified in Laeven and Valencia (2020). This yields a sample of 25 banking crises in 32 advanced economies and 41 banking crises in 91 EMDEs during the period 1990-2021. During the year of an average banking crisis globally, actual output rose by 0.7 percent—well below the average annual global output

[8] The only exceptions are, for advanced economies, forecast-based estimates from the IMF World Economic Outlook database and, for EMDEs, multivariate filters and Hodrick-Prescott-filtered estimates. One possible reason for the unresponsiveness of some forecast-based measures might be that forecasters' perception of long-term growth is stickier for advanced economies than for EMDEs.

[9] By this alternative definition, the average recession is associated with an actual output contraction of 3.7 percent and lasts 1.6 years.

FIGURE 1.8 Effects of recessions on potential growth

The negative effect of recessions on potential growth was significant and long-lasting, especially in EMDEs. Recessions accompanied most banking crises and roughly half of epidemics.



Source: World Bank.

Note: Recessions are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years in which output growth is both negative and one standard deviation below the long-term average. Banking crises are identified as in Laeven and Valencia (2020). Epidemics include SARS (2003), swine flu (2009), MERS (2012), Ebola (2014), and Zika (2016). EMDEs = emerging market and developing economies.

A.-C. Blue bars are coefficient estimates from local projections model. Orange whiskers indicate 90 percent confidence interval. Methodological details are in annex 1E. Sample includes unbalanced panel of 28 advanced economies 50 EMDEs for 1998-2020.

D. Share of events associated with recessions is the share of events that coincide with a recession in a 3-year window, out of the total number of events. Sample includes unbalanced panel of 33 advanced economies and 98 EMDEs for 1981-2020.

growth during the sample period of 1990-2021 (3.5 percent) and even further below average annual EMDEs output growth over this period (4.1 percent). The average crisis lasted less than 1 year.

The five recent epidemics examined are: SARS (2002-03), swine flu (2009), MERS (2012), Ebola (2014-15), and Zika (2015-16). They affected 96 countries—32 advanced economies and 64 EMDEs. On average, they were accompanied by close-to-zero output growth, compared to the average growth of 4.0 percent in these countries during the sample period outside these episodes.

Like recessions, both banking crises and epidemics have reduced potential growth, but the time profiles of their effects differed from those of recessions. Banking crises tended

to have stronger short-term impacts than recessions but somewhat smaller long-term effects on potential growth.[10] Overall, 81 percent of banking crises were associated with recessions within three years (figure 1.8.D). Using estimates based on the production function approach, potential growth slowed more steeply in the first 1-2 years after banking crises than after recessions, but the initial decline in potential growth after banking crises was subsequently partly reversed, whereas the slowing effect of recessions strengthened over time (figures 1.8.A and 1.9.A). The long-term effects of banking crises on other potential growth measures are estimated to have been even weaker than the effect on measures based on the production function approach (annex 1E).[11] The effect of banking crises was stronger but shorter-lived in EMDEs than in advanced economies; five years after a banking crisis, the effect was no longer statistically significant in EMDEs but still significant in advanced economies (figures 1.9.B and C). The fading effect of banking crises on potential growth may in part reflect the lack of a lasting impact on the growth of employment and investment, especially in EMDEs, as the disruptions of banking crises were often followed by economic rebounds.

The strong initial impact of banking crises on potential growth, as well as their declining and highly heterogeneous longer-term effects, are in line with estimates of actual output losses reported in the literature. Candelon, Carare, and Miao (2016) document significant growth slowdowns in the first year following banking crises which become more muted in subsequent years. Similarly, Dwyer, Devereux, and Baie (2013) document wide heterogeneity in growth impacts five years after banking crises.[12] In a comprehensive review of the literature, Claessens and Kose (2018) also find that the duration of a recession depends on the features of the financial stress that accompanies it. In particular, house price busts, especially when combined with credit crunches, can prolong recessions, whereas a rapid recovery in housing and asset markets can accelerate the broader economic recovery from financial stress.

Epidemics, too, had somewhat more modest, but still statistically significant, negative long-term effects on potential growth than did recessions—larger in EMDEs than in advanced economies (figures 1.8.A and 1.9.D). Based on the production function measure, potential growth five years after an epidemics was 0.9 percentage point lower than it would otherwise have been (compared with declines of 1.2 and 1.4 percentage points after banking crises and recessions, respectively). One reason for the more muted effect of epidemics than of recessions is their more muted effect on productivity over the

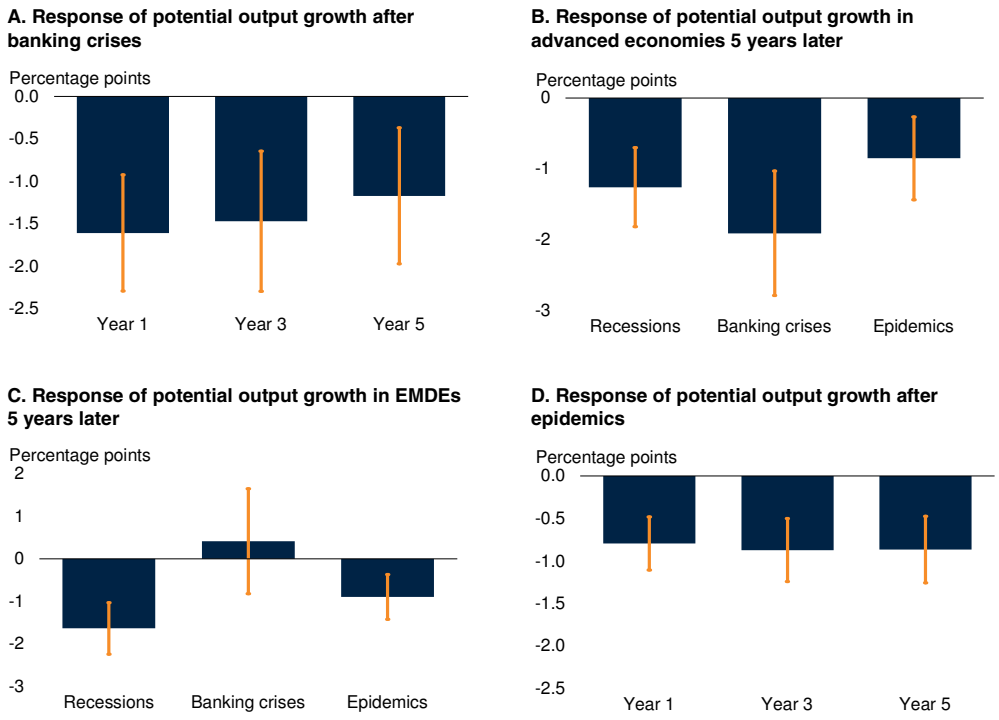
[10] Results for currency crises and debt crises suggest limited and short-lived impacts that are statistically significant only in the year of the event (currency crises) or up to two years after the event (debt crises).

[11] The exercise is repeated for banking crises that were followed by recessions within a three-year window. There were 20 such cases events in the sample used here. The results indicate statistically significant impacts of recessions combined with banking crises, with somewhat larger short-term effects but similar long-term effects to banking crises, but the difference between the responses of potential growth to banking crises with and without recessions is not statistically significant.

[12] Even if the effect of banking crises on output growth has been short-lived, their effect on output levels has been persistent. Cerra and Saxena (2008) showed this for actual output levels five to ten years after financial crises; Ollivaud and Turner (2014) showed this for potential output levels three to seven years after the global financial crisis.

FIGURE 1.9 Effects of banking crises and epidemics on potential growth

Although banking crises and epidemics, like recessions, lowered potential growth significantly, their longer-term effect in EMDEs was somewhat more modest than that of recessions.



Source: World Bank.
Note: EMDEs = emerging market and developing economies. Blue bars are coefficient estimates from local projections model. Orange whiskers indicate 90 percent confidence interval. Methodological details can be found in annex 1E. Recessions are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years in which output growth is both negative and one standard deviation below the long-term average. Banking crises are identified as in Laeven and Valencia (2012, 2018, 2020). Epidemics include SARS (2003), swine flu (2009), MERS (2012), Ebola (2014), and Zika (2016). Sample includes unbalanced panel of 32 advanced economies and 97 EMDEs for 1981-2020.

medium term. Experience since 2020, when the COVID-19 pandemic erupted, has shown how rapidly productivity can rebound when pandemic restrictions are lifted and disruptions are resolved.

How do short-term shocks affect potential growth?

The previous section established that recessions have been associated with significantly slower potential growth for several subsequent years. This section assesses three possible channels through which this process unfolded: employment, investment, and TFP growth. The literature provides ample evidence that all three channels suggested by the production function approach are likely to have been important in weakening potential growth following recessions and other adverse events.

Effects of recessions

- *Employment and labor supply.* In a recession, unemployment generally rises significantly and remains elevated for a prolonged period. For example, in the sample of recessions examined here, unemployment remained 1.8 percentage points higher, on average, three years after the recession than would have been the case otherwise (annex 1E). Such a lasting effect is in line with other findings in the literature. In the United States, for example, a 1 percentage point increase in state-level unemployment during the 2007-09 recession was associated with 0.3 percentage point lower employment rates in 2015 (Yagan 2019). Following recessions, lingering uncertainty about future sales prospects may discourage firms from hiring (Baker, Bloom, and Davis 2016; Bloom 2009, 2014). Financial constraints may force the more indebted firms into greater job cuts in the event of demand drops (Giroud and Mueller 2017). Long spells of unemployment may discourage workers and erode the skills of the long-term unemployed (Ball 2009; Blanchard 1991; Blanchard and Summers 1987). Thus, the decrease in employment over a prolonged period after a recession tends to have adverse consequences for labor supply and potential output.

- *Investment and capital accumulation.* Gross fixed investment typically falls more sharply in response to economic downturns than other components of GDP (Kydland and Prescott 1982). A recession can cause investors to reassess long-term growth prospects. A downgrade in growth forecasts could erode prospects of long-term returns on investment or risks around expected returns and, thus, discourage investment. Access to finance for investment may also become more restricted and discourage investment, especially for younger, more innovative, and riskier firms (Fort et al. 2013).[13] Reduced capital accumulation in a recession will directly reduce potential growth.

- *Total factor productivity.* A collapse in investment growth not only directly reduces potential growth but also indirectly by slowing the adoption of productivity-enhancing embodied technologies and the reallocation of resources towards more productive uses (Dieppe, Kilic Celik, and Okou 2021; Syverson 2011). Workers losing their jobs during recessions may enter permanently lower-skilled career paths (Huckfeldt 2022). Skills mismatches between job market entrants and job requirements are larger during recessions than expansions and tend to be long-lasting, suggesting persistent productivity losses from such mismatches (Liu, Salvanes, and Sørensen 2016). Recessions are also likely to be associated with reduced spending on research and development, with negative consequences for the growth of TFP.

All three channels were at work during the recessions considered in this study (annex 1E). Five years after the average recession, TFP growth is estimated to have been 0.7

[13] Similar lasting impacts of investment weakness have been shown for banking crises (Wilms, Swank, and de Haan 2018).

percentage point lower than it would have been without a recession and, in EMDEs, 0.9 percentage point lower (figures 1.10.A and 1.11.A). Investment growth declined steeply in the first year of the average recession and remained significantly lower five years later—3 percentage points below what it would have been without a recession, both globally and in EMDEs (figures 1.10.B and 1.11.B).

The effect was somewhat shorter-lived for employment. Four years after the average recession, employment growth was about 0.7 percentage point lower than what it would have been otherwise. However, for EMDEs, this effect was no longer statistically significant by the fifth year (figures 1.10.C and 1.11.C). The absence of a longer-lasting employment response in EMDEs is, in part likely to reflect the large, flexible informal economies that help these countries absorb shocks to labor markets.

Effects of banking crises and epidemics

The effects of banking crises on the growth of TFP, investment, and employment tended to be short-lived (figures 1.10.D-F and 1.11.A-F). Five years after the average banking crisis, neither investment growth nor employment growth were statistically significantly lower than otherwise; only TFP growth was still significantly lower. Epidemics were associated, even five years later, with statistically significantly lower TFP growth, investment growth, and—in contrast to recessions and banking crises—potential labor supply growth. The effect of epidemics on investment growth after five years was somewhat stronger, and the effect on TFP growth weaker, than the effects of recessions (figures 1.10.D-F).

Banking crises had larger long-term adverse effects on TFP growth, investment growth, and employment growth in advanced economies than EMDEs, possibly reflecting the larger role of finance in, and greater financial development of, advanced economies. Conversely, epidemics had larger long-term adverse effects on these variables in EMDEs than in advanced economies, in part perhaps because EMDE governments and central banks had less policy room to dampen the economic effects of epidemic disruptions (figures 1.11.A-F).

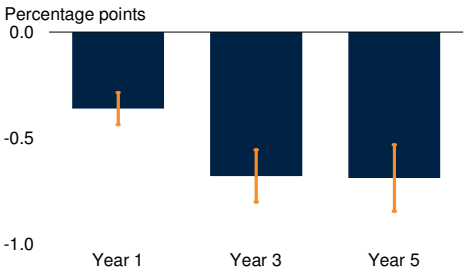
Conclusions

Potential growth, the growth an economy can generate at full employment and full capacity, is critical for a sustained increase in living standards. This chapter introduced the most comprehensive international database of potential growth, including the nine most widely used measures of potential growth for 173 countries over 1981-2021. At the global level, all measures point to a steady decline in potential growth in the past decade. This decline was internationally widespread, with potential growth in 2011-21 falling below its 2000-10 average in 70 percent of countries. The decline in potential growth between 2000-10 and 2011-21 was almost as large in advanced economies (0.8 percentage point per year) as in EMDEs (1.0 percentage point per year).

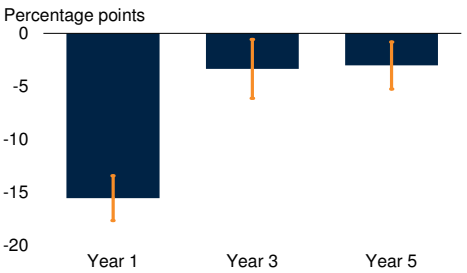
FIGURE 1.10 Effects of adverse events on growth of employment, TFP, and investment

Recessions were associated with immediate declines in the growth of both investment and employment, which were gradually reversed over time. In contrast, declines in TFP growth increased over time. Banking crises were associated with particularly lasting losses in TFP growth and epidemics with losses in employment growth.

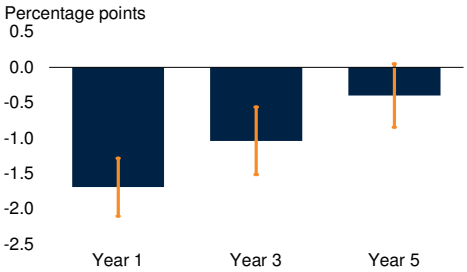
A. Response of potential TFP growth after recessions



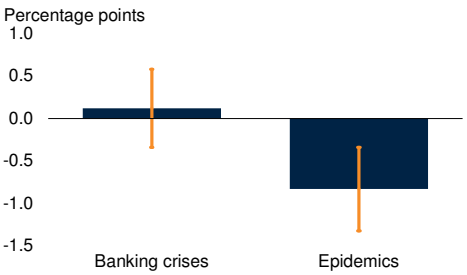
B. Response of investment growth after recessions



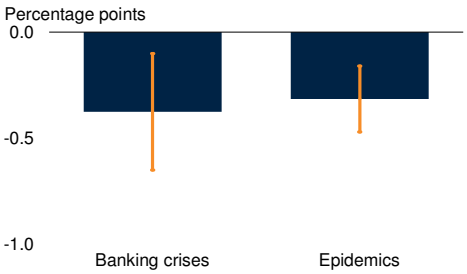
C. Response of employment growth after recessions



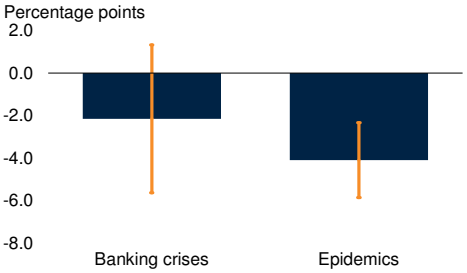
D. Response of employment growth 5 years later



E. Response of potential TFP growth 5 years later



F. Response of investment growth 5 years later



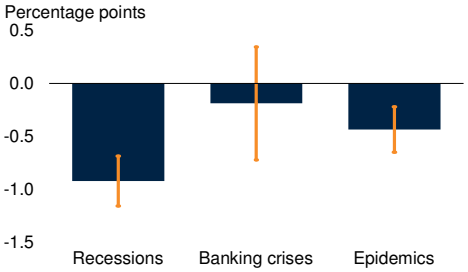
Source: World Bank.

Note: EMDEs = emerging market and developing economies; TFP = total factor productivity. Blue bars are coefficient estimates from local projections model. Orange whiskers indicate 90 percent confidence interval. Recessions are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years in which output growth is both negative and one standard deviation below the long-term average. Banking crises are identified as in Laeven and Valencia (2020). Epidemics include SARS (2003), swine flu (2009), MERS (2012), Ebola (2014), and Zika (2016). Sample includes unbalanced panel of 32 advanced economies and 97 EMDEs for 1981-2020.

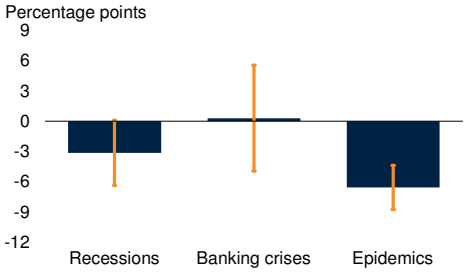
FIGURE 1.11 Effects of adverse events on growth of employment, TFP, and investment in advanced economies and EMDEs

Recessions had similar long-term effects on TFP growth and investment growth in advanced economies and EMDEs but larger effects on employment growth in advanced economies. Banking crises had larger long-term adverse effects on TFP, investment, and employment growth in advanced economies than EMDEs. Conversely, epidemics had larger long-term adverse effects on TFP, investment, and employment growth in EMDEs than in advanced economies.

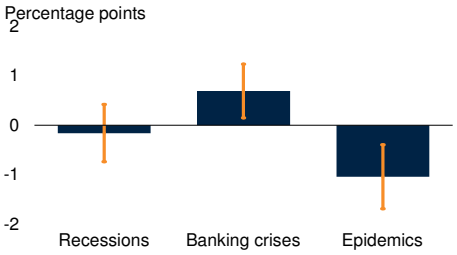
A. EMDEs: Response of potential TFP growth 5 years later



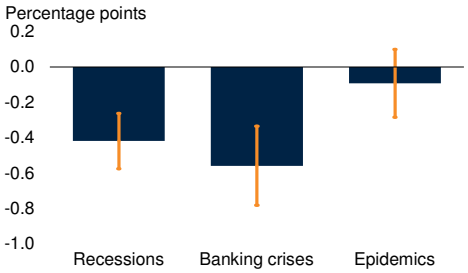
B. EMDEs: Response of investment growth 5 years later



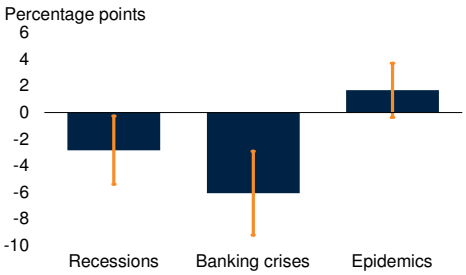
C. EMDEs: Response of employment growth 5 years later



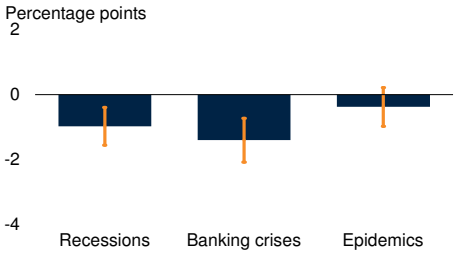
D. Advanced economies: Response of potential TFP growth 5 years later



E. Advanced economies: Response of investment growth 5 years later



F. Advanced economies: Response of employment growth 5 years later



Source: World Bank.
Note: EMDEs = emerging market and developing economies; TFP = total factor productivity. Blue bars are coefficient estimates from local projections model. Orange whiskers indicate 90 percent confidence interval. Recessions are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years in which output growth is both negative and one standard deviation below the long-term average. Banking crises are identified as in Laeven and Valencia (2012, 2018, 2020). Epidemics include SARS (2003), swine flu (2009), MERS (2012), Ebola (2014), and Zika (2016). Sample includes unbalanced panel of 32 advanced economies and 97 EMDEs for 1981-2020.

The chapter also presented an application of the new database by studying the effects of recessions and other adverse events on potential growth. Recessions, on average, have been followed, even five years later, by a drop of 1.4 percentage points in potential growth. The magnitude of this estimated decline varies somewhat among the possible measures of potential growth, but it is virtually always statistically significant. This lasting effect of recessions operates through the channels of reductions in investment growth, employment growth, and productivity growth. Four to five years after recessions, investment growth, productivity growth, and employment growth remained statistically significantly lower. In addition, this chapter compared the effects of recessions with those of other adverse events, such as banking crises and epidemics. The long-term effect of recessions was somewhat deeper than that of banking crises and more broad-based than that of epidemics.

Understanding the behavior of potential growth is of fundamental importance to short- and long-run macroeconomic analyses and policy formulation. The new database will facilitate future research on a number of topics related to potential growth.

- *Role of human capital accumulation in driving potential growth.* To improve estimates of potential growth based on the production function approach, broader measures of human capital could be constructed, using information beyond the education enrollment and completion metrics and life expectancy data used in this chapter. The COVID-19 pandemic demonstrated the critical importance of a broader measures of human capital that takes into account such factors as morbidity and the quality of schooling (Angrist et al. 2021; World Bank 2018). The World Bank's *Human Capital Index* offers one such measure but is thus far available only for very few countries and years (World Bank 2021). In addition, there is some evidence that increased human capital is more growth-enhancing in the presence of better institutions (Ali, Egbetokun, and Memon 2018). Future specifications could take into account such interaction effects.

- *Effects of climate change-related weather events on potential growth.* There is growing evidence that climate change-related weather events are causing increasingly frequent and severe damage to output and that they have consequences for potential growth. Some of these are associated with increased migration (Missirian and Schlenker 2017); shorter working hours in industries with widespread outdoor labor due to excessive heat (ILO 2019); falls in total factor productivity (Economides and Xepapadeas 2018); and increased economic volatility (Panton 2020). Overall, climate change has been shown to be associated with significant output losses (Cantelmo, Melina, and Papageorgiou 2019; Colacito, Hoffman, and Phan 2018; Kahn et al. 2019). Conversely, increased investment designed either to increase resilience to adverse climate events or to mitigate climate change could provide a boost to potential growth (IMF 2019). Some of these diverging forces are explored in chapter 5. In any event, it will be essential to analyze the implications of climate change for potential growth.

- *Role of natural resources in the measurement of potential growth.* Particularly for countries that rely heavily on natural resources, production function-based estimates of potential growth could be improved by taking into account natural resources as a factor of production whose depletion can reduce potential growth. In addition, research could take into account the adverse implications of natural resources for other factors of production and productivity. For example, natural resources affect the growth benefits of foreign direct investment (Hayat 2018) and of aggregate investment in general (Gylfason and Zoega 2006). They can also have adverse consequences for productivity through productivity-reducing rent-seeking behaveiour (Torvik 2002) and productivity-reducing sectoral shifts (Stokke 2008).

- *Implications of emerging trends in drivers of growth.* Measures of TFP based on the production function approach could be refined to capture new developments. For example, the energy transition could generate large sectoral shifts, with consequences for TFP growth, and major investments (IMF 2021). The broadening use of digital technologies, the shift from trade in goods to trade in equipment services ("servitization"), and shifts in global value chains could change the patterns of cross-country technology transfers and hence affect productivity growth and foreign direct investment flows (chapters 6 and 7). Servitization and digitalization have been associated with productivity gains in the affected firms and industries (Cette, Nevous, and Py 2022; Gal et al. 2019). Conversely, concerns have been raised that friendshoring or nearshoring of global value chains may be associated with productivity losses (Moran and Oldenski 2016; Quian, Liu, and Steenbergen 2022).

- *Better measures of output gaps.* Output gap estimates are important inputs into macroeconomic policy decisions, especially monetary ones. Hence, multivariate filter-based potential growth estimates could be tailored to capture more closely the relationship between domestic inflation and domestic monetary policy by controlling for additional external factors. These include global output gaps, global commodity price cycles, and global financial cycles. Especially for EMDEs, estimates could also be extended backwards in time and systematically tested, and adjusted, for major structural breaks.

ANNEX 1A Production function approach

The production function approach assumes that potential output can be captured by a Cobb-Douglas production function with constant returns to scale (Solow 1957):[14]

$$Y_t = A_t K_t^{\alpha} L_t^{(1-\alpha)},$$

where Y_t is potential output, A_t is potential total factor productivity (TFP), K_t is the potential capital stock, and L_t is potential employment. To extend the sample beyond 2019—the latest available data from Penn World Tables—TFP was recalculated as the Solow residual of output, employment (extended using data from *Haver Analytics*) and capital (extended using investment data from *Haver Analytics* and the perpetual inventory method; table 1F.3). Labor and capital shares are the within-country averages of those reported in *Penn World Tables*. Human capital is not separately accounted for in the production function approach but affects TFP growth and labor supply growth, as described below.

Two of the three components of potential output—potential TFP and potential employment—are proxied by the fitted values from panel regression estimates. The third component, the contribution of capital to potential growth, is assumed to be the same as the contribution of capital to actual growth, as shown in the *Penn World Tables* (and extended using data from *Haver Analytics*). This approach yields an unbalanced panel dataset for 30 advanced economies and 64 EMDEs for 1998-2021 (table 1F.4). The same approach, using appropriate assumptions, can be used to project potential growth into the future. These assumptions and the approach for projections for 2022-32 are detailed in chapter 5.

Capital stock data from Penn World Tables 10.0 is used until the latest available year in the dataset (2019 for most countries in the sample). For 2020-21, investment data are compiled from national statistical agencies and Haver Analytics, while the capital stock is estimated from investment data by the perpetual inventory method using historical average depreciation rates.[15]

Potential TFP growth is defined as the fitted value of a panel fixed effects regression for 33 advanced economies and 92 EMDEs for 1983-2020 of Hodrick Prescott-filtered trend of actual TFP growth (the Solow residual) on determinants of productivity. These include GDP per capita relative to advanced economies, education (secondary school completion rate), the working-age share of the population, and the five-year moving average real investment growth (as in Abiad, Leigh, and Mody 2007; Bijsterbosch and

[14] The potential growth estimates may be biased if the assumption of constant returns to scale is not valid (Dribe et al. 2017). For a detailed discussion of drawbacks of growth accounting, see Dieppe and Kilic Celik (2021). That said, the approach is widely used for its conceptual simplicity and ease of interpretation.

[15] Implicitly, this approach does not account for the possibility that inefficient investment is written off during downturns. Hence, it may overstate the capital stock during downturns.

Kolasa 2010; Feyrer 2007; Turner et al. 2016).[16] To allow for nonlinearities in the productivity dividends from education, schooling is interacted with a dummy for schooling in the bottom two-thirds across the sample. A dummy is included for commodity exporters during the period 2003-07. This dummy is intended to capture the impact of the exceptionally large commodity price boom that temporarily lifted commodity exporters' growth during this period. Potential TFP is thus:

$$\Delta tfp_{i,t} = \alpha_0 + \alpha_1\, GDP\ per\ capita_{i,t} + \alpha_2\, wap_{i,t},$$

$$+ \alpha_3\, education_{i,t} + \alpha_4\, education_{i,t} * D_{edu},$$

$$+ \alpha_5\, D_{cebi,t} + \alpha_6\, \Delta inv_{i,t} + \varepsilon_{i,t},$$

where $\Delta tfp_{i,t}$ is the logarithmic first difference of trend TFP, $GDP\ per\ capita_{i,t}$ is GDP per capita in percent of advanced-economy per capita GDP, $wap_{i,t}$ is the working-age share of the population, $education_{i,t}$ is the percent share of the population who completed secondary school, $\Delta inv_{i,t}$ is the five-year moving average of real investment growth, D_{edu} is a dummy variable taking the value of 1 if the secondary completion rate is in the bottom two-thirds of the distribution, and $D_{cebi,t}$ is a dummy variable for the period 2003-07 taking the value 1 if the country is a commodity exporter.[17]

The data were compiled using a wide range of sources: UN Population Statistics (for population growth, the working-age share of the population); Barro and Lee (2013) (for secondary school completion); the World Development Indicators (for secondary school completion and GDP per capita relative to the advanced economies); and Haver Analytics (for investment).

The regression results are broadly in line with the previous literature (table 1F.5). TFP growth slows as per capita incomes converge toward advanced-economy levels (Barro and Sala-i-Martin 1997). A better-educated population and accelerated investment growth are associated with higher TFP growth. However, the impact of education diminishes as education levels rise toward advanced-economy levels (Benhabib and Spiegel 1994, 2005; Coe, Helpman, and Hoffmaister 1997; Kato 2016). As a result, the coefficient on secondary school completion rates is only significant for countries with completion rates below the top third.

The results are broadly robust to a number of alternative specifications (tables 1F.5 and 1F.6). Two different methodologies are used to estimate trend TFP growth (a linear-

[16] The results are robust to using GDP per capita instead of GDP per capita in percent of advanced-economy GDP per capita. GDP per capita relative to a frontier (advanced economies) is used here to proxy the catch-up effect highlighted in the literature on stochastic frontier analysis (Growiec et al. 2015).

[17] This approach is similar to Abiad, Leigh, and Mody (2007) and Bijsterbosch and Kolasa (2010). Abiad, Leigh and Mody (2007) estimate five-year non-overlapping averages of TFP growth as a function of per capita GDP, schooling, population growth, trade openness and a nonlinear function of current account deficits and FDI for a sample of 22 European countries for 1975-2004. Bijsterbosch and Kolasa (2010) estimate five-year non-overlapping averages of labor productivity growth as a function of relative productivity levels (which here is proxied with relative per capita GDP), the share of high-skilled workers in employment, and investment in percent of value added for sectoral data for eight European countries for 1996-2005.

quadratic trend and 3, 5, and 7-year moving averages) instead of the HP-filtered trend. The 3- and 7-year rolling averages of investment growth are used. In most specifications, the coefficient estimates remain significant and retain their signs; however, the working-age population share became insignificant in some specifications. The inclusion of R&D spending, which is available only for a much smaller sample, and urbanization also do not materially change the results.

Potential labor supply is defined as the product of the working-age population and the fitted value of age- and gender-specific regressions of labor force participation rates ($lfpr_{a,g,t}$) in percent on their structural determinants ($X_{a,g,t}$) and controlling for cohort effects, fixed effects, and the state of the business cycle—defined as the deviation of the logarithm of real GDP from the Hodrick-Prescott-filtered trend. The vector $X_{a,g,t}$ includes gender-specific education outcomes (secondary and tertiary completion rates in percent of the population over the age of 25 and enrollment rates in percent of population of the age group that officially corresponds to the level of education, age-specific fertility rates (births per woman), and life expectancy (in years). These are interacted with a dummy variable D_{emde} which takes the value of 1 for EMDEs. The vector $C_{a,g,t}$ includes all the control variables:[18]

$$lfpr_{a,g,t} = \alpha_{a,g} + \beta_{a,g} X_{a,g,t} + \gamma_{a,g} X_{a,g,t} * D_{emde} + \delta_{a,g} C_{a,g,t} + \varepsilon_{a,g,t}.$$

Data on the working-age population comes from the UN Population Statistics Database. Data for age- and gender-specific labor force participation rates are available from Key Indicators of the Labor Market (KILM) of the ILO Population Statistics Database for 1990-2019, which is spliced by Labour Force Statistics of the OECD for 1960-2020 for 33 advanced economies and 16 EMDEs. This produces data for age- and gender-specific labor force participation rates for 1960-2020 for up to 38 advanced economies and 142 EMDEs.[19] Completion rates of secondary and tertiary education are from Barro and Lee (2013) and the World Bank's World Development Indicators; age-specific fertility rate and life expectancy are from the UN's World Population Projections database; gender-specific secondary and tertiary school enrollment rates are from the World Development Indicators. The regression sample includes up to 35 advanced economies and 133 EMDEs for 1987-2020.[20]

The regression results are broadly in line with findings in the previous literature (table 1F.7).

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[18] This approach combines those by Fallick and Pingle (2007) and Goldin (1994). For the United States, Fallick and Pingle (2007) estimate labor force participation by age group and gender as a function of cohort and age fixed effects as well as business cycle fluctuations. Goldin (1994) models aggregate labor force participation rates as a function of country-level variables such as female schooling. The regression used here incorporates both cohort effects and country-level variables modelling human capital and other factors driving labor force participation.

[19] This is an unbalanced sample because some of the exogenous variables are not available for the full period for all countries. However, the regression results are robust to restricting the sample to the balanced panel with fully available data.

[20] Since UN data for life expectancy is only available for five-year periods, historical life expectancy data from the World Developing Indicators database is used. For projection years or missing data, UN World Population Statistics are spliced with data from World Development Indicators database.

First, among teenage and younger women, fertility rates are associated with higher labor force participation as mothers are more likely to discontinue their education and participate in the labor force, especially in advanced economies (Azevedo, Lopez-Calva, and Perova 2012; Fletcher and Wolfe 2009; Herrera, Sahn, and Villa 2016). This effect is more muted in EMDEs, potentially reflecting an earlier average age of marriage, which tends to be associated with lower female labor force participation (United Nations 2012).

Second, for relevant age groups, educational attainment is associated with higher participation rates, except for young men and women aged 20-24. The positive correlation between completion rates and labor force participation may partly reflect higher compensation for more educated workers. For the young men, higher tertiary educational attainment is associated with lower labor force participation. This might reflect the lack of demand for employment in sectors where these educated workers would expect to be employed, discouraging them from labor force participation (Klasen and Pieters 2013). However, for men aged 50-64 and all workers aged 65 years and older, education becomes an insignificant determinant of labor force participation (as in Fallick and Pingle 2007). Tertiary enrollment rates in all relevant age groups are associated with lower labor force participation rates, as students devote time to completing their degree (Kinoshita and Guo 2015; Linacre 2007; and Tansel 2002).

Third, life expectancy is one of the main determinants of participation for workers aged 50 and above (Fallick and Pingle 2007). For the younger ones among them, between the ages of 50-64, higher life expectancy is associated with higher labor force participation, possibly reflecting the need to accumulate savings for a longer retirement period or the positive association between better health among older workers and higher incomes (Haider and Loughran 2001). Among those aged 65 years or older, higher life expectancy is associated with higher labor force participation in advanced economies, but does not significantly change participation in EMDEs. Life expectancy may be a weak proxy for a healthy old age in EMDEs with less-developed health care systems or where differences in life expectancy might mostly reflect differences in infant mortality (Eggleston and Fuchs 2012).

Fourth, labor force participation is procyclical—albeit less so in EMDEs than in advanced economies—in most age groups until the age of 50. Labor force participation rises when real GDP is above its HP-filtered trend and declines when real GDP is below its HP-filtered trend.[21] As the age increases, the sensitivity to cyclicality decreases and participation eventually becomes countercyclical (Balakrishnan et al. 2015; Duval, Eris, and Furceri 2011). This may reflect greater ability of more experienced workers to remain employed or return to employment after spells of unemployment during recessions (Elsby, Hobijn, and Şahin 2015; Shimer 2013). However, participation becomes pro-cyclical again (although not statistically significant) for workers aged 65

[21] In several instances, there were no statistically significant differences between advanced economies and EMDEs in the cyclicality of their labor force participation. Hence, the interactions were omitted from the regressions.

and above as they become eligible to retire and may be readier to drop out of the labor force in a weaker economy. This result is broadly robust to defining the business cycle as deviations of real GDP from the 10-year moving average or from a linear-quadratic trend (tables 1F.8 and 1F.9).

ANNEX 1B Univariate filters

Univariate statistical filters decompose a series y_t into trend, cyclical, and noise components. The trend component is used as a proxy for potential output. Although they are all essentially weighted moving averages of the series y_t, they differ in their weights.

Five univariate filters are applied to estimate potential output: filters based on Hodrick and Prescott (1997), three band-pass filters (Baxter and King 1999; Butterworth 1930 and Gomez 2001; Christiano and Fitzgerald 2003), and a filter based on an Unobserved Components Model. The measures are estimated for 37 advanced economies and 52 EMDEs for 1980Q1-2022Q2 (table 1F.10). Forecasts from the *Global Economic Prospects* report provide data to 2024. A smaller sample is used in comparisons with other approaches, to ensure consistency of samples (tables 1F.11 and 1F.12).

Hodrick-Prescott filter

The Hodrick-Prescott (HP) filter minimizes deviations of a series y_t from its trend τ_t, assuming a degree of smoothness λ of the trend. The HP filter chooses the trend τ_t that minimizes:

$$\sum_{t=1}^{T}(y_t-\tau_t)^2+\lambda\sum_{t=2}^{T-1}\left[(\tau_{t+1}-\tau_t)-(\tau_t-\tau_{t-1})\right]^2,$$

where T is the sample size. A larger λ indicates a smoother trend. For λ=0, the trend is equal to the actual series and for $\lambda\rightarrow+\infty$ the trend is a linear time trend with a constant growth rate. Typically, the value of λ is set at 1600 for quarterly data. The trend is estimated based on past values as well as projected values of the series y_t.

Band-pass filters

The three band-pass filters aim to isolate fluctuations in a time series which lie in a specific band of frequencies. They eliminate slow-moving components (trend) and very high frequency components (noise) and define the intermediate components as the business cycle. Specifically, the three band-pass filters differ in their approximations of the optimal linear filter (also known as the "ideal" band-pass filter) to deal with finite time series.

The *Baxter and King (BK) filter* is a moving average of the data with symmetric weights on lags and leads. Therefore, it loses observations in the beginning and towards the end of the sample. It is particularly well-suited when the raw series follows a near-independent and identically distributed process (Christiano and Fitzgerald 2003).

Specifically, the BK filter is given by:

$$\hat{c}_t = b(L)\, y_t ,$$

where *b(L)* is the lag polynomial given by:

$$b(L) = \sum_{j=-k}^{k} b_j^k L^j ,$$

with $b_j^k = b_{-j}^k$. Note that k observations will be lost in both ends of the sample. The higher k, the closer the filter is to the ideal filter but also the higher are the number of lost observations. The default business cycle frequencies used here (required for estimation) are between 1.5 to 8 years.

The *Christiano and Fitzgerald (CF) filter* is a one-sided moving average of the data with weights that minimize the distance between the approximated and the "ideal" filter. Since the filter is one-sided, it does not lose observations towards the end of the sample. It is most suitable for random-walk series. The optimal cycle at time t $\hat{c}_t$ is given by:

$$\hat{c}_t = \sum_{j=-f}^{p} b_j^{p,f}\, y_{t-j} ,$$

where $b_j^{p,f}$ are the optimal weights of the CF filter that solve:

$$\underset{b_j^{p,f}}{Min}\, E\left[(\hat{c}_t - c_t)^2 \,\middle|\, y \right],$$

and c_t is the filtered series under the "ideal" (infinite sample) band-pass filter. By default, the CF filter business cycle frequencies are set between 1.5 to 8 years.

The *Butterworth (BW) filter*—widely used in electrical engineering for signal extraction—isolates only low-frequency fluctuations, not high-frequency ones. Pollock (2000) proposes the use of this filter for macroeconomic time series filtering as an alternative to the traditional linear filters such as the Hodrick-Prescott filter. The low-pass BW filter is characterized by two parameters λ and n and can be specified as:

$$b(L) = \frac{\lambda(1+L)^n (1+L^{-1})^n}{(1+L)^n (1+L^{-1})^n + \lambda(1-L)^n (1-L^{-1})^n} ,$$

where L is a lag operator, λ is the smoothness parameter and n is the degree of the filter.

Unobserved Components Model

Most univariate filters can be nested into the Unobserved Components Model.[22] In contrast to other univariate filters, the Unobserved Components Model does not impose specific parameter assumptions about the degree of smoothing, lead and lag windows, or business cycle frequencies. Instead, it relies on assumptions about the underlying process

[22] For example, if the trend and cyclical components are uncorrelated white noise, the unobserved components model coincides with the Hodrick-Prescott filter if the noise-to-signal ratio matches the Hodrick-Prescott filter's smoothing parameter (Hamilton 2018).

followed by output gaps and potential growth, and is estimated using the Kalman filter (Harvey 1990):

$$LY_t = L\bar{Y}_t + Y_{GAPt} \ , \tag{1}$$

$$L\bar{Y}_t = L\bar{Y}_{t-1} + G_t + \varepsilon_{\bar{Y}t} \ , \tag{2}$$

$$G_t = (1-\tau)\, G_{ss} + \tau\, G_{t-1} + \varepsilon_{Gt} \ , \tag{3}$$

$$Y_{GAPt} = \beta_1 Y_{GAPt-1} + \beta_2 Y_{GAPt-2} + \gamma_t Y_{GAP} \ , \tag{4}$$

where LY is the log of seasonally adjusted quarterly real GDP, $L\bar{Y}$ the log of potential output, Y_{GAP} the output gap, G_t potential output growth, G_{ss} the steady state level that growth is assumed to converge to over the long term, and ε_Y and ε_G are independently and identically distributed disturbances. Note that the shock ε_Y shifts the level of potential output whereas ε_G is a shock to potential output growth. Equation (3) assumes that potential growth converges (at a speed of convergence τ) to its steady level G_{ss} after a shock. The output gap follows a commonly used second-order autoregressive process (equation 4). The Kalman filter algorithm yields (posterior) time-varying variance-covariance matrices for the smoothed estimates of the unobserved state variables, potential growth and the output gap. The standard deviation of potential growth is used to calculate the 95 percent confidence band around estimated potential growth.

ANNEX 1C Multivariate filters

The unobserved components model can be expanded to include additional indicators of domestic demand pressures to help identify the output gap (Benes et al. 2010). The most commonly used indicators are inflation and the unemployment rate. Specifically, the univariate model (1-4) is further augmented with a Phillips Curve relationship between inflation and output gaps (equation 5), an Okun's Law relationship between unemployment rates and output gaps (equations 6-9), a relationship between capacity utilization and output gaps (equations 10-13), and a set of equations describing the Taylor rule (equations 14-17).

Given the large variation in available data across economies, switches are employed to add selected equations to each country model based on the country's specific dataset. If house prices or the unemployment rate data is not available for a specific country, the relevant equations would not be included. At minimum, all countries have output, inflation, and commodity price data.[23]

Model components

The *Phillips Curve* relates inflation to the output gap, controlling for the impact of supply side shocks such as import prices on domestic inflation.

[23] Three economies—Lesotho, Namibia, and Tanzania—have only output, inflation, and commodity price data.

$$\pi_t = \rho\,\pi_{t-1} + (1-\rho)\,\pi_{t+1} + \alpha_1 Y_{GAPt} + \lambda_1 \pi_{mt} + \varepsilon_\pi \ , \tag{5}$$

where π_t is annualized quarter-on-quarter inflation at time t, π_{mt} is import price inflation at time t, and Y_{GAPt} is the output gap at time t. Expectations are assumed to be an average of adaptive and rational expectations, weighted by ρ. Inflation expectations are linked to fixed horizon forecasts of inflation from Consensus Economics where available.[24]

Okun's Law relates the unemployment gap U_{GAPt} (defined as the difference between the actual unemployment rate U_t and the equilibrium, or natural, unemployment rate $\bar{U}_t$ in equation 6) to the output gap (in equation 7) as:

$$U_{GAPt} = U_t - \bar{U}_t \ , \tag{6}$$

$$U_{GAPt} = \gamma U_{GAP\,t-1} - \alpha_2 Y_{GAP\,t} + \varepsilon_{tUGAP} \, . \tag{7}$$

Following Blagrave et al. (2015), the equilibrium unemployment rate process is specified in deviation from steady state. Equation (8) specifies the process for U_t. It implies that following a shock, the non-accelerating inflation rate of unemployment (NAIRU) $\bar{U}_t$ converges back to its steady state value U_{ss} according to the parameter τ_1 and has a trend component G_U which has an autoregressive process (9):

$$\bar{U}_t - U_{ss} = \tau_1(\bar{U}_{t-1} - U_{ss}) + G_{Ut} + \varepsilon_{Ut} \, , \tag{8}$$

$$G_{Ut} = \tau_u \, G_{U\,t-1} + \varepsilon_{Gt} \, , \tag{9}$$

Since *capacity utilization* C_t is highly pro-cyclical, it can help identify the cyclical component of output even when other indicators (such as, say, a stable unemployment gap during jobless recoveries or stable inflation in highly open economies) do not signal cyclical upturns. Equations (10)-(13) describe the relation between capacity utilization and output gaps and the exogenous process for capacity utilization, where $\bar{C}_{ss}$ is the steady state of capacity utilization rate, C_{GAPt} is the capacity utilization gap, defined as the difference between actual and non-inflationary capacity utilization $\bar{C}_t$, and G_{Ct} is the growth of capacity utilization:

$$C_{GAPt} = q\ C_{GAPt-1} + \alpha_3 Y_{GAPt} + \varepsilon_{CGAPt} \, , \tag{10}$$

$$C_t = \ C_{GAPt} + \bar{C}_t \, , \tag{11}$$

$$\bar{C}_t - \bar{C}_{ss} = \tau_2(\bar{C}_{t-1} - \bar{C}_{ss}) + G_{Ct} + \varepsilon_{Ct} \, , \tag{12}$$

$$G_{Ct} = \tau_c G_{Ct-1} + \varepsilon_{Gt} \, , \tag{13}$$

[24] Fixed-horizon forecasts transform the fixed-event forecasts (for example, for 2022 and 2023) provided by Consensus Economics to be one year-ahead forecasts (in other words, at a fixed horizon in the future). See Bordo and Siklos (2017) and Siklos (2013) for details.

A *Taylor rule* describes monetary policy in economies where short-term policy interest rates are used as an instrument of monetary policy:

$$i_t = \tau_i i_{t-1} + (1-\tau_i)(r_t^* + \pi_t^* + \gamma_\pi(\pi_{t+4} - \pi_t^*) + \gamma_{YGAP} Y_{GAPt}) + \varepsilon_{it} \ , \quad (14)$$

where i_t is the nominal policy interest rate that responds to forecast inflation from its target (π_t^*) and the output gap. The *ex ante* real interest rate is defined using the Fisher equation as:

$$r_t = i_t - \pi_{4t+1} \ , \quad (15)$$

where π_{4t+1} is the year-on-year change in consumer prices. The neutral real interest rate is modelled as in Laubach and Williams (2003):

$$r_t^* = cG_t + Z_t \ , \quad (16)$$

$$Z_t = Z_{t-1} + \varepsilon_{Zt} \ , \quad (17)$$

An *output gap* process closes the model. Inflation and unemployment might fail to capture all domestic demand pressures, such as credit or asset price growth or commodity price cycles.[25] This may lead to an underestimation of the output gap and an overestimation of potential output, especially at the peak of the cycle. Instead of assuming that the output gap process is exogenous, as in the traditional multivariate Kalman filter, three additional indicators are included in the output gap equation: house price, credit, and commodity price growth:

$$Y_{GAPt} = \beta_1 Y_{GAPt-1} + \beta_2 hpr_{t-1} + \beta_3 compr_{t-1} + \beta_4 cr_{t-1} + \beta_5 (r_t - r_t^*) + \varepsilon_{YGAPt} \ , \quad (18)$$

where cr_t, hpr_t, and $compr_t$ are cyclical components of year-on-year private sector credit growth deflated by consumer price inflation, quarterly seasonally-adjusted house prices, and export-weighted real average commodity prices, respectively, and $r_t - r_t^*$ is the deviation of the real policy rate from its equilibrium level.

Estimation

The model uses the Kalman filter algorithm and Bayesian techniques on quarterly data covering 1980Q1-2022Q2 for up to 36 advanced economies and 52 EMDEs. A key parameter determining the shape of potential output is the variance of the output gap relative to potential growth innovations. The variance of the innovations ε_{YGAPt} and ε_{Gt} are set such that their ratio equals the typically used smoothness parameter of the Hodrick-Prescott filter.

The prior for the elasticity of output gap with respect to commodity price β_3 (the central bank's response to deviations of inflation from target) and the coefficient on potential

[25] See Borio (2013, 2014) and Summers (2014) for advanced economies, Jesus et al. (2015) for Latin America and the Caribbean, Kemp (2015) for South Africa, and Enrique et al. (2016) for East Asia and the Pacific. The cyclical component of copper prices helps explain mining sector output gaps in Chile (Blagrave and Santoro 2016).

growth in the neutral real interest rate follows a normal distribution in the case of commodity prices to allow for a potentially negative impact of commodity price increases in commodity importers. The prior distributions for all standard deviations are inverse gamma distributions. All other estimated priors follow a beta distribution.

The standard deviations of ε_{CGAPt} and ε_{UGAPt} are set as the OLS standard errors of equations (5) and (9) based on Hodrick-Prescott-filtered data. Steady state values of growth, unemployment, and capacity utilization are calibrated to the sample means of their corresponding HP-filtered series. Estimates of potential growth from the Multivariate Filter Model and the Unobserved Components Model used in this paper are based on $L\bar{Y}_t$ and include both level and growth shocks to potential growth.

As in the case of the Unobserved Components Model, the Kalman filter algorithm yields (posterior) time-varying variance-covariance matrices for the filtered estimates of all unobserved state variables, including potential growth. From this matrix, the standard deviation of potential growth is used to calculate the 95 percent confidence band around estimated potential growth.

Data

Based on the univariate and multivariate filters, output gaps and potential growth are estimated for up to 37 advanced economies and 52 EMDEs for as long a period as 1980Q1-2024Q4 (table 1F.10). A smaller sample is used in comparisons with other approaches, to ensure constant samples (tables 1F.11 and 1F.12). GDP, inflation, unemployment rates, private sector credit growth, and capacity utilization rates are from Haver Analytics. House price growth is from Bank for International Settlements, commodity prices are from the World Bank's *Pink Sheet*, and export weights are from the UN *Comtrade* database. Country-specific output gaps are aggregated using real GDP weights at 2010-19 exchange rates and prices.

ANNEX 1D Long-term growth expectations

Expectations of output growth over long horizons capture forecasters' assessment of long-term sustainable growth since they are stripped of unpredictable short-term shocks. Two sources of expectations are used: the International Monetary Fund's *World Economic Outlook* (WEO) database, published twice a year, and Consensus Economics, published on a quarterly basis. Since the longest available forecast horizon is 5-years for IMF's WEO, 5-year-ahead forecasts are selected for both sources for consistency across these two measures. The IMF's WEO provides five-year-ahead forecasts for up to 173 countries (37 advanced economies, 136 EMDEs) for 1990-2021. Consensus forecasts are available for up to 78 countries (34 advanced economies and 44 EMDEs) for 1990-2022 and the database includes the April vintages.

ANNEX 1E Local projection estimation

A local projection estimation is used to explore the evolution of potential growth, employment growth, potential TFP growth, and investment growth following recessions, banking crises, and epidemics. The model estimates the cumulative impact of recessions, following Jordà (2005) and Teulings and Zubanov (2014).[26]

In impulse responses, the model estimates the effect of short-term shocks (the recession, banking crisis, or epidemic event) over a horizon h on potential growth while controlling for other determinants:

$$y_{i,t+h} - y_{i,t} = \alpha_h + \beta_h shock_{i,t} + \gamma_h \Delta y_{i,t-1} + fixedeffects_i + \varepsilon_{i,t} \ ,$$

where $y_{i,t}$ is potential growth. The model controls for country-fixed effects to capture time-invariant cross-country differences.[27] The variable $shock_{i,t}$ is a dummy variable for a recession event (or banking crisis or epidemic), the main variable of interest. Lagged potential growth $y_{i,t-1}$ controls for the history of potential growth.

For channels, the same specification is used, where $y_{i,t}$ is employment growth, potential TFP growth, or investment growth. This model also controls for country-fixed effects to capture time-invariant cross-country differences. Lagged potential growth $y_{i,t-1}$ controls for the history of employment growth, potential TFP growth, or investment growth. Banking crises are defined as in Laeven and Valencia (2018) and the ones corresponding to the potential growth measures are listed in table 1F.13. Epidemics include SARS (2003), swine flu (2009), MERS (2012), Ebola (2014), and Zika (2016) and affected countries are listed in table 1F.14.

Results for the impact of recessions, banking crises, and epidemics on alternative measures of potential growth are shown in tables 1F.15-1F.18. Results for the impact of recessions, banking crises, and epidemics on employment, total factor productivity, and investment growth are shown in tables 1F.19-1F.20.

[26] Plagborg-Møller and Wolf (2021) show that vector autoregression (VAR) and LPM estimations yield the same impulse response functions but Li, Plagborg-Møller and Wolf (2022) show that LPM estimators have larger variance (but lower bias), especially for the medium- and long-term horizons, than VAR estimators.

[27] A dummy for time effects is not necessary because the time variable t refers to the time since the start of the event and pertains to different years for different countries.

ANNEX 1F Tables

TABLE 1F.1 Methodology, time, and country coverage

Methodology	Time coverage*	Advanced economies	EMDEs
Production function approach	1998-2032	**30** (AUS, AUT, BEL, CAN, CHE, CYP, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HKG, HRV, IRL, ISR, ITA, JPN, KOR, LTU, LVA, NLD, NOR, PRT, SVK, SVN, SWE, USA)	**64** (ALB, ARG, ARM, BDI, BEN, BGD, BGR, BOL, BRA, BRB, CAF, CHL, CHN, CMR, COL, CRI, DOM, ECU, EGY, GAB, GTM, HND, HUN, IDN, IND, IRN, IRQ, JAM, JOR, KAZ, KEN, KGZ, LAO, LSO, MAR, MDA, MEX, MNG, MOZ, MRT, MUS, MYS, NAM, NER, NIC, PAK, PER, PHL, POL, PRY, QAT, ROU, RWA, SDN, SEN, SRB, TGO, THA, TJK, TUN, TUR, URY, VNM, ZAF)
Multivariate filter	1981-2024	**37** (AUS, AUT, BEL, CAN, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HKG, HRV, IRL, ISL, ISR, ITA, JPN, KOR, LTU, LUX, LVA, MLT, NLD, NOR, NZL, PRT, SGP, SVK, SVN, SWE, TWN, USA)	**52** (ALB, ARG, AZE, BGR, BHR, BLZ, BOL, BRA, BWA, CHL, CHN, CMR, COL, CRI, DOM, ECU, EGY, GEO, GTM, HND, HUN, IDN, IND, IRN, JOR, KAZ, KEN, KWT, LSO, MAR, MEX, MKD, MNG, MYS, NAM, NGA, NIC, PAN, PER, PHL, POL, PRY, ROU, SAU, SLV, THA, TUN, TUR, TZA, URY, VNM, ZAF)
Univariate filters	1980Q1-2024Q4	**37** (AUS, AUT, BEL, CAN, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HKG, HRV, IRL, ISL, ISR, ITA, JPN, KOR, LTU, LUX, LVA, MLT, NLD, NOR, NZL, PRT, SGP, SVK, SVN, SWE, TWN, USA)	**52** (ALB, ARG, AZE, BGR, BHR, BLZ, BOL, BRA, BWA, CHL, CHN, CMR, COL, CRI, DOM, ECU, EGY, GEO, GTM, HND, HUN, IDN, IND, IRN, JOR, KAZ, KEN, KWT, LSO, MAR, MEX, MKD, MNG, MYS, NAM, NGA, NIC, PAN, PER, PHL, POL, PRY, ROU, SAU, SLV, THA, TUN, TUR, TZA, URY, VNM, ZAF)
WEO five-year ahead expectations	1990-2022	**37** (AUS, AUT, BEL, CAN, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HKG, HRV, IRL, ISL, ISR, ITA, JPN, KOR, LTU, LUX, LVA, MLT, NLD, NOR, NZL, PRT, SGP, SVK, SVN, SWE, TWN, USA)	**136** (AFG, AGO, ALB, ARE, ARG, ARM, ATG, AZE, BDI, BEN, BFA, BGD, BGR, BHR, BHS, BIH, BLZ, BOL, BRA, BRB, BRN, BTN, BWA, CAF, CHL, CHN, CMR, COD, COG, COL, COM, CPV, CRI, DJI, DMA, DOM, DZA, ECU, EGY, ERI, ETH, FSM, GAB, GEO, GHA, GIN, GMB, GNB, GNQ, GRD, GTM, GUY, HND, HTI, HUN, IDN, IND, IRN, IRQ, JAM, JOR, KAZ, KEN, KGZ, KHM, KIR, KNA, KWT, LAO, LBN, LBR, LBY, LCA, LSO, MAR, MDA, MDG, MDV, MEX, MKD, MLI, MMR, MNG, MOZ, MRT, MUS, MWI, MYS, NAM, NER, NGA, NIC, NPL, OMN, PAK, PAN, PER, PHL, PNG, POL, PRY, QAT, ROU, RWA, SAU, SDN, SEN, SLB, SLV, SOM, SRB, SSD, STP, SUR, SWZ, SYC, SYR, TCD, TGO, THA, TJK, TLS, TON, TUN, TUR, TZA, UGA, URY, UZB, VCT, VNM, VUT, WSM, YEM, ZAF, ZMB)

Source: World Bank.
Note: Country codes are available at https://www.iban.com/country-codes.

TABLE 1F.2 Methods to estimate potential growth

Methodology	Advantages	Disadvantages
Production function approach	Produces estimates that help explain the movement of potential output in terms of its inputs. Low correlation with actual output growth.	Relies on proxies for potential productivity and labor supply growth and capital accumulation that could be subject to measurement errors. Relies on assumption of specific functional form.
Time-series filters	Univariate filters are straightforward to implement, even in data-poor environments.	"End-point" problems can lead to large revisions as new data become available.[28]
	Multivariate filters produce output gaps that are consistent with indicators of domestic demand pressures (inflation, unemployment, current account deficits, capacity utilization).	Strong correlation with actual output growth, which could reflect short-term shocks to potential growth or, alternatively, are associated with cyclical movements.
Long-term growth expectations	In principle, incorporate judgment and, thus, capture factors that cannot be modelled during periods of high volatility.	In practice, tend to be sticky and, at times, in ways that are challenging to interpret.

Source: World Bank.

[28] A filter developed by Hamilton (2018) avoids the end-point problem but is highly volatile, especially during recessions. Since it retains much of the cyclical movement of output, it is not included in the database presented here.

TABLE 1F.3 Variable list

Variable	Units	Source	Sample
GDP in U.S. dollars	Millions of U.S. dollars, at market exchange rates	IMF World Economic Outlook database	194 countries, 1980-2021
Real GDP in local currency	Millions of local currency	Haver Analytics	93 countries, 1980Q2-2021Q4
GDP per capita	U.S. dollars at market exchange rates	IMF World Economic Outlook database; UN population statistics	182 countries, 1980-2021
Population, by age and gender	Number	UN population statistics and projections	184 countries, 1950-2035
Labor force, by age and gender	Number	ILO, Key Indicators of the Labour Market (KILM) database; OECD Labour Force Statistics	180 countries, 1960-2020
Investment growth	Percent	Haver Analytics	187 countries, 1961-2021
Secondary education completion rate	Percent of population that completed secondary education in percent of population in relevant age group	Barro and Lee (2013); World Development Indicators	179 countries, 1960-2020
Tertiary education completion rate	Percent of population that completed tertiary education in percent of population in relevant age group	Barro and Lee (2013); World Development Indicators	174 countries, 1960-2020
Secondary education enrolment rate	Percent of population of the age group corresponding to the level of education	World Development Indicators	193 countries, 1970-2020
Tertiary education enrolment rate	Percent of population of the age group corresponding to the level of education	World Development Indicators	192 countries, 1970-2020
Life expectancy	Years	UN population statistics; UN population projections	181 countries, 1985-2035
Fertility rate	Number of births per 1,000 women	UN population statistics; UN population projections	175 countries, 1960-2095
Employment	Number	Penn World Table	181 countries, 1950-2019
Urban population	Share of total population	World Development Indicators	194 countries, 1960-2020
R&D spending	In percent of GDP	World Development Indicators	144 countries, 1996-2019
Consumer price inflation	Percent	Haver Analytics	93 countries, 1980Q1-2021Q4
Inflation expectations	Percent	Consensus Economics	74 countries, 1980Q1-2021Q4
Unemployment rate	Percent of labor force	Haver Analytics	66 countries, 1980Q1-2021Q4
Capacity utilization rate	Percent of capacity	Haver Analytics	31 countries, 1980Q1-2021Q4
Import price inflation	Percent	Haver Analytics	74 countries, 1980Q1-2021Q4
Private credit growth	Percentage points of GDP	Haver Analytics	57 countries, 1980Q1-2021Q4
Average commodity export price	Index	World Bank; Federal Reserve Bank of St. Louis; UN Comtrade	93 countries, 1980Q1-2021Q4
Monetary policy rates	Percent	Haver Analytics	80 countries, 1980Q1-2021Q4
House price growth	Percent	Bank for International Settlements	55 countries, 1980Q1-2021Q4

TABLE 1F.3 Variable list (*continued*)

Variable	Units	Source	Sample
WEO real GDP growth forecasts	Percent	IMF World Economic Outlook database	175 countries, 1990-2021
Consensus real GDP growth forecasts	Percent	Consensus Economics	78 countries, 1990-2022

Source: World Bank.

TABLE 1F.4 Sample coverage for production function-based estimates of potential growth

Economy	Sample period
Australia	1998-2032
Austria	1998-2032
Belgium	1998-2032
Canada	1998-2032
Cyprus	1998-2032
Croatia	1998-2032
Denmark	1998-2032
Estonia	1998-2032
Finland	1998-2032
France	1998-2032
Germany	1998-2032
Greece	1998-2032
Hong Kong SAR, China	1998-2032
Iceland	1998-2032
Israel	1998-2032
Italy	1998-2032
Japan	1998-2032
Korea	1998-2032
Latvia	1998-2032
Lithuania	2000-2032
Netherlands	1998-2032
Norway	1998-2032
Portugal	1998-2032
Slovak Republic	1998-2032
Slovenia	1998-2032
Spain	1998-2032
Sweden	1998-2032
Switzerland	1998-2032
United Kingdom	1998-2032
United States	1998-2032
East Asia and Pacific	
China	1998-2032
Indonesia	1998-2032
Malaysia	1998-2032
Mongolia	1998-2032
Philippines	1998-2032
Thailand	1998-2032
Vietnam	2013-2021
Europe and Central Asia	
Albania	1998-2032
Armenia	1998-2032
Bulgaria	2000-2032
Hungary	1998-2032
Kazakhstan	1998-2032
Kyrgyz Republic	2000-2032
Moldova	2013-2032
Poland	1998-2032
Romania	1998-2032
Serbia	1998-2032
Tajikistan	1998-2032
Turkey	1994-2030
Latin America and Caribbean	
Argentina	1998-2032
Barbados	1998-2016
Bolivia	1998-2032
Brazil	1998-2032
Chile	1998-2032
Colombia	1998-2032
Costa Rica	1998-2032
Dominican Republic	1998-2032
Ecuador	1998-2032
Guatemala	1998-2032
Honduras	1998-2032
Jamaica	1998-2032
Mexico	1998-2032
Nicaragua	1998-2032
Paraguay	1998-2032
Peru	1998-2032
Uruguay	1998-2032
Middle East and North Africa	
Egypt, Arab Rep.	1998-2032
Iraq	2001-2019
Iran, Islamic Rep.	1998-2032
Jordan	1998-2032
Morocco	1998-2032
Qatar	1998-2016
Tunisia	1998-2032
South Asia	
Bangladesh	1998-2032
India	1998-2032
Pakistan	1998-2032
Sub-Saharan Africa	
Benin	1998-2032
Burundi	1998-2032
Cameroon	1998-2032
Central African Republic	1998-2019
Gabon	1998-2032
Kenya	1998-2032
Lesotho	1998-2032
Mauritania	2000-2032
Mauritius	1998-2032
Mozambique	1998-2032
Namibia	1998-2032
Niger	1998-2032
Rwanda	2000-2016
Senegal	1998-2032
South Africa	1998-2032
Sudan	1998-2019
Togo	1998-2032

Source: World Bank.
Note: Methodology and assumptions underlying projections for 2022-32 are detailed in chapter 5.

TABLE 1F.5 Regression results for total factor productivity

Dependent variable: TFP growth	Baseline HP-trend	3-year moving average	5-year moving average	7-year moving average	Linear-quadratic trend
GDP per capita rel. to advanced economies	-0.06***	-0.07***	-0.07***	-0.06***	-0.06***
	(0.000)	(0.001)	(0.002)	(0.002)	(0.001)
Working-age population	4.16*	3.05	4.70	6.86**	3.13
	(0.100)	(0.326)	(0.143)	(0.044)	(0.321)
Secondary completion rate	0.003	0.003	0.010	0.009	-0.029***
	(0.701)	(0.807)	(0.375)	(0.397)	(0.002)
Secondary completion rate (bottom two-thirds)	0.009*	0.012*	0.009	0.004	0.004
	(0.061)	(0.068)	(0.142)	(0.466)	(0.464)
Investment growth (five-year moving average)	0.088***	0.178***	0.185***	0.169***	0.118***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Commodity exporters credit boom dummy	0.592***	1.094***	0.778**	0.664**	1.001***
	(0.000)	(0.002)	(0.035)	(0.040)	(0.000)
Number of observations	706	694	692	687	706
Number of countries	125	125	125	125	125
Within R-square	0.26	0.27	0.29	0.29	0.25

Source: World Bank.
Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Estimations are based on standard errors clustered around countries. The methodology is defined in annex 1.3. Sample includes unbalanced panel of 33 advanced economies 92 EMDEs for 1983-2020. p-statistics are shown in parentheses.

TABLE 1F.6 Regression results for total factor productivity

Dependent variable: TFP growth	HP-trend	HP-trend	HP-trend	HP-trend
GDP per capita relative to advanced economies	-0.06***	-0.06***	-0.06***	-0.05***
	(0.000)	(0.000)	(0.000)	(0.000)
Working-age population	5.96**	4.70	6.54**	6.13**
	(0.024)	(0.115)	(0.038)	(0.047)
Secondary completion rate	-0.002	-0.001	0.013	0.000
	(0.770)	(0.847)	(0.139)	(0.968)
Secondary completion rate (bottom two-thirds)	0.007	0.011**	0.012**	0.006
	(0.125)	(0.028)	(0.013)	(0.255)
Investment growth (three-year moving average)	0.009			
	(0.672)			
Investment growth (five-year moving average)			0.084***	0.111***
			(0.000)	(0.000)
Investment growth (seven-year moving average)		0.007		
		(0.763)		
Commodity exporters credit boom dummy	0.953***	0.924***	0.557***	0.902***
	(0.000)	(0.000)	(0.000)	(0.000)
Urban population			-0.066**	
			(0.031)	
R&D spending as percent of GDP				-0.092
				(0.752)
Number of observations	778	698	706	497
Number of countries	125	125	125	109
Within R-square	0.15	0.15	0.28	0.34

Source: World Bank.
Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Estimations are based on standard errors clustered around countries. Sample includes unbalanced panel of 33 advanced economies and 92 EMDEs for 1983-2020. p-statistics are shown in parentheses.

TABLE 1F.7 Regression results for labor force participation rates, baseline

	15-19 years old		20-24 years old		25-49 years old		50-64 years old		65+ years old	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Fertility	0.734***		0.057*		0.000					
	(0.000)		(0.000)		(0.945)					
Secondary enrollment	0.197***	0.127***								
	(0.000)	(0.000)								
Tertiary enrollment			-0.114***	-0.180***						
			(0.000)	(0.000)						
Completion of tertiary education			0.039	-0.023	0.235***	0.130***	0.406***	0.063		
			(0.249)	(0.394)	(0.000)	(0.000)	(0.000)	(0.221)		
Completion of tertiary education			0.158**	-0.099*	0.323***	0.313***	0.486**	0.426**		
			(0.002)	(0.045)	(0.000)	(0.000)	(0.003)	(0.002)		
Life expectancy							0.569***	-2.679**	0.101***	0.227***
							(0.000)	(0.003)	(0.000)	(0.000)
Cycle	16.14***	21.43***	1.04	11.54***	1.504	-0.591**	0.590	-2.329**	1.435	21.76
	(0.000)	(0.000)	(0.144)	(0.000)	(0.182)	(0.008)	(0.495)	(0.008)	(0.394)	(0.399)
Cycle * life expectancy									-0.031	-0.192
									(0.216)	(0.584)
Fertility * EMDE	-0.669***		-0.066**							
	(0.000)		(0.006)							
Secondary enrollment * EMDE	-0.337***									
	(0.000)									
Completion of secondary education * EMDE			-0.027	-0.038						
			(0.495)	(0.238)						
Completion of tertiary education * EMDE			-0.127	0.153*						
			(0.056)	(0.000)						
Life expectancy * EMDE									-0.143***	-0.608***
									(0.000)	(0.000)
Secondary enrollment * EMDE	-0.337***									
	(0.000)									
Completion of secondary education * EMDE			-0.027	-0.038						
			(0.495)	(0.238)						

TABLE 1F.7 Regression results for labor force participation rates, baseline (*continued*)

	15-19 years old		20-24 years old		25-49 years old		50-64 years old		65+ years old	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Completion of tertiary education * EMDE			-0.127	0.153*						
			(0.056)	(0.000)						
Life expectancy * EMDE									-0.143***	-0.608***
									(0.000)	(0.000)
Cycle * EMDE	-17.90***	-24.21***		-11.72***	-1.456*					16.46
	(0.000)	(0.000)		(0.000)	(0.038)					(0.526)
Cycle * life expectancy * EMDE										0.039
										(0.912)
Coefficient of fertility in EMDEs	0.065***		-0.009							
	(0.000)		(0.234)							
Coefficient of secondary enrollment in EMDEs	-0.133***									
	(0.000)									
Coefficient of secondary education in EMDEs			-0.012	-0.058***						
			(0.570)	(0.000)						
Coefficient of tertiary education in EMDEs			0.031	-0.063						
			(0.478)	(0.189)						
Coefficient of cycle in EMDE	-0.145**	-2.78**		-0.18	0.048**					
	(0.008)	(0.001)		(0.801)	(0.009)					
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes
County-cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4432	4484	3741	3789	21382	21654	12239	12261	5111	5111
Number of countries	163	165	151	154	158	160	145	145	168	168
Adjusted R-square	0.997	0.997	0.999	0.999	0.997	0.999	0.986	0.993	0.998	0.999

Sources: Barro and Lee 2013; Key Indicators of the Labor Market (KILM), International Labour Organization; Labour Force Statistics, Organisation for Economic Co-operation and Development (OECD); UN Population Prospects; World Development Indicators, World Bank; and World Bank staff estimations.
Note: Business cycles defined as deviation of real GDP from Hodrick-Prescott-filtered trend. Sample includes unbalanced panel of 35 advanced economies and 133 EMDEs for 1987-2020. p-statistics are shown in parentheses.

TABLE 1F.8 Regression results for labor force participation rates, robustness test: 10-year moving average

	15-19 years old		20-24 years old		25-49 years old		50-64 years old		65+ years old	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Fertility	0.706***		0.076**		0.004**					
	(0.000)		(0.009)		(0.002)					
Secondary enrollment	0.202***	0.149***								
	(0.000)	(0.000)								
Tertiary enrollment			-0.112***	-0.171***						
			(0.000)	(0.000)						
Completion of secondary education			0.022	0.030	0.252***	0.149***	0.341***	-0.014		
			(0.540)	(0.296)	(0.000)	(0.000)	(0.000)	(0.786)		
Completion of tertiary education			0.167**	-0.070	0.354***	0.335***	0.570***	0.145		
			(0.002)	(0.166)	(0.000)	(0.000)	(0.000)	(0.265)		
Life expectancy							0.621***	1.127***	0.101***	0.227***
							(0.000)	(0.000)	(0.000)	(0.000)
Cycle	26.37***	34.46***	5.54***	19.59***	0.336	0.663	-2.63*	-0.789	1.74	51.62
	(0.000)	(0.000)	(0.000)	(0.000)	(0.832)	(0.077)	(0.042)	(0.566)	(0.826)	(0.127)
Cycle * life expectancy									-0.023	-0.594
									(0.574)	(0.193)
Fertility * EMDE	-0.664***		-0.067**							
	(0.000)		(0.005)							
Secondary enrollment * EMDE	-0.332***									
	(0.000)									
Completion of secondary education * EMDE			-0.023	-0.057						
			(0.565)	(0.080)						
Completion of tertiary education * EMDE			-0.127	0.153*						
			(0.056)	(0.000)						
Life expectancy * EMDE									-0.143***	-0.608***
									(0.000)	(0.000)

TABLE 1F.8 Regression results for labor force participation rates, robustness test: 10-year moving average (*continued*)

	15-19 years old		20-24 years old		25-49 years old		50-64 years old		65+ years old	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Cycle * EMDE	-17.83***	-23.82***		-11.46***	-2.51*					-17.04
	(0.000)	(0.000)		(0.000)	(0.033)					(0.526)
Cycle * life expectancy * EMDE										0.057
										(0.876)
Coefficient of fertility in EMDEs	0.070***		-0.008							
	(0.000)		(0.251)							
Coefficient of secondary enrollment in EMDEs	-0.133***									
	(0.000)									
Coefficient of secondary education in EMDEs			-0.015	-0.046***						
			(0.470)	(0.000)						
Coefficient of tertiary education in EMDEs			-0.035	0.047						
			(0.450)	(0.322)						
Coefficient of cycle in EMDE	-1.69*	-2.09*		0.220	-1.00**					
	(0.033)	(0.039)		(0.745)	(0.006)					
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes
County-cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Sources: Barro and Lee 2013; Key Indicators of the Labor Market (KILM), International Labour Organization; Labour Force Statistics, Organisation for Economic Co-operation and Development (OECD); UN Population Prospects; World Development Indicators, World Bank; and World Bank staff estimations.
Note: Sample of countries is balanced across gender and age specific regressions. Business cycles defined as deviation of real GDP from Hodrick-Prescott-filtered trend. Sample includes balanced panel of 34 advanced economies and 104 EMDEs for 1987-2020. p-statistics are shown in parentheses.

TABLE 1F.9 Regression results of labor force participation rates, robustness check: linear-quadratic trend

	15-19 years old		20-24 years old		25-49 years old		50-64 years old		65+ years old	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Fertility	0.697***		0.059*		0.000					
	(0.000)		(0.011)		(0.922)					
Secondary enrollment	0.202***	0.125***								
	(0.000)	(0.000)								
Tertiary enrollment			-0.113***	-0.180***						
			(0.000)	(0.000)						
Completion of secondary education			0.040	-0.013	0.236***	0.1340***	0.403***	0.064		
			(0.233)	(0.642)	(0.000)	(0.000)	(0.000)	(0.218)		
Completion of tertiary education			0.158**	-0.100*	0.321***	0.311***	0.490**	0.431**		
			(0.002)	(0.041)	(0.000)	(0.000)	(0.003)	(0.001)		
Life expectancy							0.571***	0.972***	0.101***	0.229***
							(0.000)	(0.000)	(0.000)	(0.000)
Cycle	15.11***	24.22***	0.281	12.72***	3.24**	0.156	-1.56	-2.12*	1.45	17.01
	(0.000)	(0.000)	(0.684)	(0.000)	(0.003)	(0.470)	(0.101)	(0.014)	(0.512)	(0.491)
Cycle * life expectancy									-0.027	-0.118
									(0.275)	(0.348)
Fertility * EMDE	-0.630***		-0.067**							
	(0.000)		(0.005)							
Secondary enrollment * EMDE	-0.342***									
	(0.000)									
Completion of secondary education * EMDE			-0.029	-0.048						
			(0.482)	(0.133)						
Completion of tertiary education * EMDE			-0.126	0.155*						
			(0.058)	(0.014)						
Life expectancy * EMDE									-0.145***	-0.620***
									(0.000)	(0.000)

TABLE 1F.9 Regression results of labor force participation rates, robustness check: linear-quadratic trend (*continued*)

	15-19 years old		20-24 years old		25-49 years old		50-64 years old		65+ years old	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Cycle * EMDE	-16.77***	-25.50***		-12.11***	-3.91**					-16.58
	(0.000)	(0.000)		(0.000)	(0.001)					(0.504)
Cycle * life expectancy * EMDE										0.073
										(0.829)
Coefficient of fertility in EMDEs	0.067***		-0.008							
	(0.000)		(0.285)							
Coefficient of secondary enrollment in EMDEs	-0.138***									
	(0.000)									
Coefficient of secondary education in EMDEs			0.011	-0.164***						
			(0.556)	(0.000)						
Coefficient of tertiary education in EMDEs			0.032	-0.083						
			(0.472)	(0.253)						
Coefficient of cycle in EMDE	-1.66**	-1.28		0.35	-0.667*					
	(0.007)	(0.103)		(0.740)	(0.063)					
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes
County-cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4428	4480	3741	3789	21382	21654	12239	12261	5107	5107
Number of countries	163	165	151	154	158	160	145	145	168	168
Adjusted R-square	0.997	0.997	0.999	0.999	0.997	0.999	0.986	0.993	0.998	0.999

Sources: Barro and Lee 2013; Key Indicators of the Labor Market (KILM), International Labour Organization; Labour Force Statistics, Organisation for Economic Co-operation and Development (OECD); UN Population Prospects; World Development Indicators, World Bank; and World Bank staff estimations.
Note: Business cycles defined as deviation of real GDP from linear-quadratic trend. Sample includes unbalanced panel of 35 advanced economies and 133 EMDEs for 1987-2020. p-statistics are shown in parentheses.

TABLE 1F.10 Coverage for univariate and multivariate filter-based estimates

Economy	Sample period
Australia	1981-2024
Austria	1995-2024
Belgium	1995-2024
Canada	1981-2024
Croatia	2000-2024
Cyprus	1995-2024
Czech Rep.	1996-2024
Denmark	1991-2024
Estonia	1995-2024
Finland	1981-2024
France	1981-2024
Germany	1981-2024
Greece	1995-2024
Hong Kong SAR, China	1990-2024
Iceland	1995-2024
Ireland	1995-2024
Israel	1995-2024
Italy	1981-2024
Japan	1981-2024
Korea	1981-2024
Latvia	1995-2024
Lithuania	1995-2024
Luxembourg	1995-2024
Malta	2000-2024
Netherlands	1981-2024
New Zealand	1988-2024
Norway	1981-2024
Portugal	1995-2024
Singapore	1981-2024
Slovak Republic	1995-2024
Slovenia	1995-2024
Spain	1995-2024
Sweden	1981-2024
Switzerland	1981-2024
Taiwan	1982-2024
United Kingdom	1981-2024
United States	1981-2024
East Asia and Pacific	
China	1992-2024
Indonesia	2001-2024
Malaysia	2005-2024
Mongolia	2010-2024
Philippines	1998-2024
Thailand	1993-2024
Vietnam	2008-2024
Europe and Central Asia	
Albania	2008-2024
Azerbaijan	2001-2024
Bulgaria	2000-2024
Georgia	2003-2024
Hungary	1998-2024
Kazakhstan	1996-2024
North Macedonia	2000-2024
Poland	1996-2024
Romania	1995-2024
Turkey	2001-2024
Latin America and Caribbean	
Argentina	2004-2024
Belize	1994-2024
Bolivia	1990-2024
Brazil	1990-2024
Chile	1996-2024
Colombia	2000-2024
Costa Rica	1991-2024
Dominican Republic	2007-2024
Ecuador	2001-2024
El Salvador	1990-2024
Guatemala	2001-2024
Honduras	2000-2024
Mexico	2000-2024
Nicaragua	2006-2024
Panama	2007-2024
Paraguay	1994-2024
Peru	1998-2024
Uruguay	1997-2024
Middle East and North Africa	
Bahrain	2008-2024
Egypt, Arab Rep.	2007-2024
Iran, Islamic Rep.	2012-2024
Jordan	1992-2024
Kuwait	2010-2024
Morocco	1998-2024
Saudi Arabia	2010-2024
Tunisia	2000-2024
South Asia	
India	1997-2024
Sub-Saharan Africa	
Botswana	1994-2024
Cameroon	1999-2024
Kenya	2009-2024
Lesotho	2007-2024
Namibia	2000-2024
Nigeria	2010-2024
South Africa	1981-2024
Tanzania	2010-2024

Source: World Bank.
Note: Forecasts for 2022Q2-2024Q4 are based on the June 2022 *Global Economic Prospects* report.

TABLE 1F.11 Coverage for production function approach, filter-based, and expectations-based estimates: advanced economies

Economy	Production function approach	Univariate and multivariate filters	WEO expectations
Advanced economies			
Australia	1998-2032	1981-2024	1990-2022
Austria	1998-2032	1995-2024	1990-2022
Belgium	1998-2032	1995-2024	1990-2022
Canada	1998-2032	1981-2024	1990-2022
Croatia	1998-2032	2000-2024	1994-2022
Cyprus	1998-2032	1995-2024	1990-2022
Denmark	1998-2032	1991-2024	1990-2022
Estonia	1998-2032	1995-2024	1993-2022
Finland	1998-2032	1981-2024	1990-2022
France	1998-2032	1981-2024	1990-2022
Germany	1998-2032	1981-2024	1990-2022
Greece	1998-2032	1995-2024	1990-2022
Hong Kong SAR, China	1998-2032	1990-2024	1990-2022
Ireland	1998-2032	1995-2024	1990-2022
Israel	1998-2032	1995-2024	1990-2022
Italy	1998-2032	1981-2024	1990-2022
Japan	1998-2032	1981-2024	1990-2022
Korea, Rep.	1998-2032	1981-2024	1990-2022
Latvia	1998-2032	1995-2024	1993-2022
Lithuania	2000-2032	1995-2024	1993-2022
Netherlands	1998-2032	1981-2024	1990-2022
Norway	1998-2032	1981-2024	1990-2022
Portugal	1998-2032	1995-2024	1990-2022
Slovak Republic	1998-2032	1995-2024	1994-2022
Slovenia	1998-2032	1995-2024	1994-2022
Spain	1998-2032	1995-2024	1990-2022
Sweden	1998-2032	1981-2024	1990-2022
Switzerland	1998-2032	1981-2024	1990-2022
United Kingdom	1998-2032	1981-2024	1990-2022
United States	1998-2032	1981-2024	1990-2022

Source: World Bank.

Note: Forecasts for filter-based estimates for 2022Q2-2024Q4 are based on based on the June 2022 *Global Economic Prospects* report. Forecasts for production function-based estimates are derived as described in chapter 5. Univariate filters: Hodrick-Prescott, Baxter and King, Christiano and Fitzgerald, Butterworth, and unobserved component model.

TABLE 1F.12 Coverage for production function approach, filter-based, and expectations-based estimates: EMDEs

Economy	Production function approach	Univariate and multivariate filters	WEO expectations
EMDEs			
Albania	1998-2032	2008-2024	1993-2021
Argentina	1998-2032	2004-2024	1990-2021
Bolivia	1998-2032	1990-2024	1990-2021
Brazil	1998-2032	1990-2024	1990-2021
Bulgaria	2000-2032	2000-2024	2000-2021
Cameroon	1998-2032	1999-2024	1990-2021
Chile	1998-2032	1996-2024	1990-2021
China	1998-2032	1992-2024	1990-2021
Colombia	1998-2032	2000-2024	1990-2021
Costa Rica	1998-2032	1991-2024	1990-2021
Dominican Republic	1998-2032	2007-2024	1990-2021
Ecuador	1998-2032	2001-2024	1990-2021
Egypt, Arab Rep.	1998-2032	2007-2024	1990-2021
Guatemala	1998-2032	2001-2024	1990-2021
Honduras	1998-2032	2000-2024	1990-2021
Hungary	1998-2032	1998-2024	1990-2021
India	1998-2032	1997-2024	1990-2021
Indonesia	1998-2032	2001-2024	1990-2021
Iran, Islamic Rep.	1998-2032	2012-2024	1990-2021
Jordan	1998-2032	1992-2024	1990-2021
Kazakhstan	1998-2032	1996-2024	1993-2021
Kenya	1998-2032	2009-2024	1990-2021
Lesotho	1998-2032	2007-2024	1990-2021
Malaysia	1998-2032	2005-2024	1990-2021
Mexico	1998-2032	2000-2024	1990-2021
Mongolia	1998-2032	2010-2024	1993-2021
Morocco	1998-2032	1998-2024	1990-2021
Namibia	1998-2032	2000-2024	1994-2021
Nicaragua	1998-2032	2006-2024	1990-2021
Paraguay	1998-2032	1994-2024	1990-2021
Peru	1998-2032	1998-2024	1990-2021
Philippines	1998-2032	1998-2024	1990-2021
Poland	1998-2032	1996-2024	1990-2021
Romania	1998-2032	1995-2024	1993-2021
South Africa	1998-2032	1981-2024	1990-2021
Thailand	1998-2032	1993-2024	1990-2021
Tunisia	1998-2032	2000-2024	1990-2021
Turkey	1998-2032	2001-2024	1990-2021
Uruguay	1998-2032	1997-2024	1990-2021
Vietnam	2013-2032	2008-2024	1990-2021

Source: World Bank.
Note: Includes only countries with available data from 2001. Forecasts for filter-based estimates for 2022Q2-2024Q4 are based on the June 2022 *Global Economic Prospects* report. Forecasts for production function-based estimates are derived as described in chapter 5. Univariate filters: Hodrick-Prescott, Baxter and King, Christiano and Fitzgerald, Butterworth, and unobserved component model.

TABLE 1F.13 List of banking crises

Regions	Countries
Advanced economies	AUT (2008), BEL (2008), CHE (2008), CYP (2011), CZE (1996), DEU (2008), DNK (2008), ESP (2008), FIN (1991), FRA (2008), GBR (2007), GRC (2008), HRV (1998), IRL (2008), ISL (2008), ITA (2008), JPN (1997), KOR (1997), LTU (1995), LUX (2008), LVA (1995), LVA (2008), NLD (2008), NOR (1991), PRT (2008), SVK (1998), SVN (2008), SWE (1991), SWE (2008), USA (2007)
Emerging market and developing economies	ALB (1994), ARG (1995), ARG (2001), ARM (1994), AZE (1995), BDI (1994), BFA (1990), BOL (1994), BRA (1990), BRA (1994), CAF (1995), CHN (1998), CMR (1995), COD (1991), COD (1994), COG (1992), COL (1998), CPV (1993), CRI (1994), DJI (1991), DOM (2003), DZA (1990), ECU (1998), GIN (1993), GNB (1995), GNB (2014), GUY (1993), HTI (1994), HUN (1991), HUN (2008), IDN (1997), IND (1993), JAM (1996), KAZ (2008), KEN (1992), KGZ (1995), LBN (1990), LBR (1991), MDA (2014), MEX (1994), MNG (2008), MYS (1997), NGA (1991), NGA (2009), NIC (1990), NIC (2000), PHL (1997), POL (1992), PRY (1995), ROU (1998), STP (1992), TCD (1992), TGO (1993), THA (1997), TUN (1991), TUR (2000), UGA (1994), URY (2002), VNM (1997), YEM (1996)

Sources: Laeven and Valencia 2018; World Bank.
Note: The list of banking crises corresponding to the sample of potential growth measures. Country codes are available at https://www.iban.com/country-codes.

TABLE 1F.14 List of countries affected by epidemics

Epidemics	Countries
SARS (2003)	CAN, CHN, FRA, MYS, PHL, SGP, THA, VNM, ZAF, HKG, TWN.
Swine flu (2009)	AFG, ALB, ARE, ARG, ARM, AUS, AZE, BGD, BGR, BHR, BHS, BIH, BLR, BMU, BOL, BRA, BRB, BRN, CAN, CHE, CHL, CHN, COL, CRI, CUB, CZE, DEU, DOM, DZA, ECU, EGY, ESP, EST, FRA, GBR, GEO, GHA, GRC, GTM, HND, HRV, HUN, IDN, IND, IRL, IRN, IRQ, ISL, ISR, ITA, JAM, JOR, JPN, KHM, KOR, KWT, LAO, LBN, LBY, LKA, LTU, LUX, LVA, MAR, MDA, MDG, MDV, MEX, MHL, MLT, MNE, MNG, MOZ, MUS, MYS, NAM, NGA, NIC, NLD, NOR, NPL, NZL, OMN, PAK, PAN, PER, PHL, POL, PRY, PYF, QAT, ROU, RUS, SAU, SDN, SGP, SLB, SLV, SRB, SUR, SVK, SVN, SWE, SYR, THA, TON, TUN, TUR, TZA, UKR, URY, USA, VNM, WSM, YEM, ZAF.
MERS (2012)	ARE, AUT, DEU, DZA, FRA, GBR, GRC, IRN, JOR, KOR, KWT, MYS, OMN, QAT, SAU, TUN, TUR, YEM.
Ebola (2014)	MLI, NGA, GIN, LBR, SLE.
Zika (2016)	BOL, BRA, COL, DOM, GLP, MTQ, PRI, SUR, USA.

Source: World Bank.
Note: Country codes are available at https://www.iban.com/country-codes.

TABLE 1F.15 Impulse responses of potential growth to recessions

		Recessions: Baseline definition			Recessions: Alternative definition		
Definition of potential output	h	World	AEs	EMDEs	World	AEs	EMDEs
Production-function approach	0	-0.042	0.066	-0.138	-0.046	0.042	-0.123
	1	-1.153***	-0.773***	-1.499***	-1.123***	-0.792***	-1.414***
	2	-1.573***	-1.407***	-1.738***	-1.432***	-1.402***	-1.454***
	3	-1.542***	-1.444***	-1.645***	-1.401***	-1.432***	-1.371***
	4	-1.521***	-1.421***	-1.639***	-1.348***	-1.386***	-1.308***
	5	-1.431***	-1.257***	-1.635***	-1.244***	-1.193***	-1.296***
Multivariate filter	0	-0.355***	-0.354***	-0.352***	-0.348***	-0.342***	-0.352***
	1	-2.082***	-1.782***	-2.465***	-2.014***	-1.709***	-2.419***
	2	-1.298***	-1.485***	-0.947***	-1.215***	-1.372***	-0.91***
	3	-0.734***	-1.033***	-0.192	-0.647***	-0.848***	-0.272
	4	-0.442*	-0.699**	0.06	-0.356*	-0.488**	-0.103
	5	-0.133	-0.215	0.025	-0.123	-0.143	-0.089
Expectations (WEO)	0	-0.058	-0.06	-0.057	-0.04	-0.037	-0.042
	1	-0.208**	0.055	-0.356***	0.08	0.128*	0.052
	2	-0.33**	-0.143	-0.425**	-0.036	-0.042	-0.032
	3	-0.315*	-0.144	-0.403	-0.282	-0.08	-0.395
	4	-0.251	-0.072	-0.348	-0.282**	-0.022	-0.433**
	5	-0.262*	-0.125	-0.336	-0.269**	-0.078	-0.378*
Unobserved component model	0	-0.208***	-0.215***	-0.2***	-0.215***	-0.238***	-0.184***
	1	-1.83***	-1.605***	-2.102***	-1.794***	-1.597***	-2.037***
	2	-0.638***	-0.711***	-0.532***	-0.599***	-0.67***	-0.497***
	3	-0.279***	-0.256**	-0.316*	-0.275***	-0.217**	-0.362**
	4	-0.3***	-0.298**	-0.301**	-0.297***	-0.262**	-0.358***
	5	-0.198*	-0.143	-0.288***	-0.19**	-0.118	-0.314***

Source: World Bank.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. "Recessions: Baseline definition" are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years of output growth that is both negative and one standard deviation below the long-term average (as in Huidrom, Kose, and Ohnsorge 2016). "Mild Recessions: Alternative definition" are defined as years of negative output growth only, regardless of the depth of the output decline. Sample includes unbalanced panel of 33 advanced economies and 77 EMDEs for 1981-2020. p-statistics are shown in parentheses.

TABLE 1F.16 Impulse responses of potential growth to recessions (other measures)

		Recessions: Baseline definition			Recessions: Alternative definition		
Definition of potential output	h	World	AEs	EMDEs	World	AEs	EMDEs
Expectations (CF)	0	0.004	0.04	-0.056	0.012	0.041	-0.04
	1	-0.084	-0.024	-0.189**	-0.087*	-0.058	-0.139*
	2	-0.157**	-0.127	-0.207*	-0.135**	-0.13	-0.145
	3	-0.114	-0.07	-0.171	-0.077	-0.083	-0.067
	4	-0.215**	-0.134*	-0.361	-0.241***	-0.224***	-0.272
	5	-0.19**	-0.187*	-0.203	-0.214**	-0.26**	-0.124
Hodrick-Prescott filter	0	-0.165***	-0.194***	-0.128***	-0.16***	-0.181***	-0.132***
	1	-0.212***	-0.337***	-0.046	-0.2***	-0.298***	-0.066
	2	-0.493***	-0.664***	-0.224	-0.412***	-0.512**	-0.264
	3	-0.32	-0.544*	0.056	-0.232	-0.35	-0.053
	4	-0.146	-0.321	0.17	-0.072	-0.132	0.006
	5	0.058	-0.047	0.249	0.089	0.089	0.055
Christiano-Fitzgerald filter	0	-0.691***	-0.575***	-0.8***	-0.673***	-0.524***	-0.826***
	1	-0.809***	-0.937***	-0.61***	-0.798***	-0.867***	-0.67***
	2	-1.299***	-1.572***	-0.795**	-1.193***	-1.304***	-0.956**
	3	-1.233***	-1.563***	-0.608	-1.061***	-1.215***	-0.749*
	4	-1.029***	-1.419***	-0.257	-0.887***	-1.062***	-0.548
	5	-0.685**	-0.833*	-0.406	-0.598**	-0.579	-0.666
Baxter-King filter	0	-2.161***	-1.983***	-2.388***	-2.113***	-1.932***	-2.351***
	1	-4.197***	-4.099***	-4.327***	-4.08***	-3.983***	-4.216***
	2	-3.413***	-3.607***	-3.071***	-3.132***	-3.295***	-2.843***
	3	-1.589***	-1.799***	-1.2**	-1.42***	-1.512***	-1.254**
	4	-1.469***	-1.614***	-1.166**	-1.303***	-1.281***	-1.353***
	5	-1.333***	-1.298***	-1.396***	-1.167***	-1.047***	-1.417***
Butterworth filter	0	-0.703***	-0.562***	-0.744***	-0.693***	-0.544***	-0.726***
	1	-1.507***	-1.27***	-1.672***	-1.461***	-1.212***	-1.626***
	2	-1.419***	-1.493***	-1.078***	-1.29***	-1.307***	-1.01***
	3	-1.103***	-1.017***	-1.05**	-0.979***	-0.813***	-1.044***
	4	-0.792***	-0.75**	-0.784*	-0.679***	-0.554**	-0.834**
	5	-0.443**	-0.433	-0.425	-0.378**	-0.293	-0.51*

Source: World Bank.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. "Recessions: Baseline definition" are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years of output growth that is both negative and one standard deviation below the long-term average (as in Huidrom, Kose, and Ohnsorge 2016). "Mild Recessions: Alternative definition" are defined as years of negative output growth only, regardless of the depth of the output decline. Sample includes unbalanced panel of 33 advanced economies and 77 EMDEs for 1981-2020. p-statistics are shown in parentheses.

TABLE 1F.17 Impulse responses of potential growth to banking crises and epidemics

		Banking crises			Epidemics		
Definition of potential output	h	World	AEs	EMDEs	World	AEs	EMDEs
Production-function approach	0	-0.574***	-0.538*	-0.763**	-0.731***	-0.846***	-0.68***
	1	-1.605***	-1.508**	-1.865***	-0.796***	-1.035***	-0.649***
	2	-1.75***	-1.979***	-1.402***	-0.77***	-0.911***	-0.655***
	3	-1.467***	-1.958***	-0.451	-0.872***	-1.057***	-0.77**
	4	-1.286***	-1.929***	0.031	-1.083***	-1.126***	-1.062***
	5	-1.169**	-1.908***	0.416	-0.866***	-0.849**	-0.895***
Multivariate filter	0	-0.349**	-0.406**	-0.209	-0.229**	-0.247	-0.214
	1	-0.746***	-0.981***	-0.119	-0.021	-0.198	0.12
	2	-0.724**	-1.25***	0.743	0.195	0.169	0.215
	3	-0.27	-0.81**	1.176**	0.305	0.531*	0.127
	4	0.127	-0.279	1.183*	0.232	0.63**	-0.081
	5	0.4	0.052	1.339*	0.335	0.874**	-0.121
Expectations (WEO)	0	-0.025	-0.044	-0.019	-0.421***	-0.173	-0.525***
	1	-0.08	0.065	-0.155	-0.334***	-0.287***	-0.358**
	2	0.028	-0.035	0.076	-0.313*	-0.176	-0.374
	3	0.276	0.088	0.394	-0.479***	-0.175	-0.609***
	4	0.174	0.141	0.199	-0.519***	-0.19	-0.661***
	5	0.142	0.071	0.199	-0.623***	-0.208	-0.808***
Unobserved component model	0	-0.573***	-0.736***	-0.278	-0.664***	-0.792***	-0.564***
	1	-1.399***	-1.731***	-0.806**	0.139*	0.133	0.146
	2	-0.364**	-0.67***	0.18	0.075	0.083	0.066
	3	-0.133	-0.48***	0.488***	-0.075	-0.059	-0.085
	4	-0.356**	-0.796***	0.43**	-0.198	-0.028	-0.335*
	5	-0.299**	-0.553***	0.152	0.005	0.191	-0.156

Sources: Laeven and Valencia 2018; World Bank.
Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Sample includes unbalanced panel of 33 advanced economies and 98 EMDEs for 1981-2020. p-statistics are shown in parentheses.

TABLE 1F.18 Responses of potential growth to banking crises and epidemics (other measures)

		Banking crises			Epidemics		
Definition of potential output	h	World	AEs	EMDEs	World	AEs	EMDEs
Expectations (CF)	0	0.046	0.093**	-0.046	-0.081	-0.105	-0.062
	1	-0.33**	-0.144	-0.753***	-0.005	-0.148*	0.179
	2	-0.192	-0.163	-0.266	0.077	-0.082	0.275**
	3	-0.094	0.186	-0.632***	-0.056	-0.142**	0.027
	4	-0.212*	-0.102	-0.4	0.003	-0.063	0.082
	5	-0.285*	-0.161	-0.5	-0.104	-0.141	-0.039
Hodrick-Prescott filter	0	-0.132**	-0.229***	0.113	0.065**	0.163***	-0.01
	1	-0.177	-0.431***	0.456	0.297***	0.546***	0.104
	2	0.002	-0.39	0.979	0.499***	0.878***	0.199
	3	0.258	-0.224	1.453*	0.554***	1.037***	0.17
	4	0.497	-0.006	1.747*	0.509**	1.097***	0.042
	5	0.761*	0.299	1.913*	0.456*	1.146***	-0.124
Christiano-Fitzgerald filter	0	-0.485***	-0.53***	-0.253	-0.451***	-0.444***	-0.421***
	1	-1.034***	-1.365***	-0.005	-0.396***	-0.21	-0.513**
	2	-1.096***	-1.612***	0.338	0.032	0.284	-0.151
	3	-0.757	-1.481***	1.181	0.364	0.673**	0.12
	4	-0.344	-1.083**	1.512	0.214	0.57*	-0.086
	5	0.166	-0.501	1.825	0.604**	1.091***	0.174
Baxter-King filter	0	-2.288***	-2.64***	-1.31*	-0.666***	-0.739**	-0.614***
	1	-3.877***	-4.73***	-1.525	0.415	0.492	0.341
	2	-2.149***	-2.975***	0.125	0.677**	0.833**	0.539
	3	-0.921	-1.768***	1.427	0.173	0.428	-0.031
	4	-1.198**	-1.993***	1.001	0.02	0.407	-0.284
	5	-0.875*	-1.59***	1.114	0.249	0.88*	-0.269
Butterworth filter	0	-0.899***	-0.739***	-0.597	-0.45	0.03	-0.553*
	1	-1.382***	-1.429***	-0.515	0.196	0.665***	0.116
	2	-0.892**	-1.085***	0.249	0.295	0.876***	0.095
	3	-0.476	-0.745**	0.782	0.117	0.803***	-0.204
	4	-0.212	-0.619*	1.073	0.214	0.809***	-0.164
	5	0.117	-0.278	1.262	0.212	0.922**	-0.318

Sources: Laeven and Valencia 2018; World Bank.
Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Sample includes unbalanced panel of 33 advanced economies and 98 EMDEs for 1981-2020. p-statistics are shown in parentheses.

TABLE 1F.19 Channels: Impulse responses of TFP, investment, employment and actual growth rates to recessions

		Recessions: Baseline definition			Recessions: Alternative definition		
Definition of potential output	h	World	AEs	EMDEs	World	AEs	EMDEs
TFP	0	-0.066**	-0.019	-0.108**	-0.064**	-0.041**	-0.087*
	1	-0.359***	-0.228***	-0.471***	-0.353***	-0.251***	-0.443***
	2	-0.626***	-0.476***	-0.743***	-0.577***	-0.495***	-0.64***
	3	-0.676***	-0.495***	-0.819***	-0.635***	-0.527***	-0.723***
	4	-0.759***	-0.497***	-0.985***	-0.69***	-0.519***	-0.842***
	5	-0.686***	-0.418***	-0.919***	-0.619***	-0.425***	-0.793***
Investment	0	-1.842**	-2.913***	-1.151	-2.469***	-3.515***	-1.7*
	1	-15.501***	-12.809***	-17.097***	-15.483***	-12.99***	-17.006***
	2	-7.689***	-10.231***	-6.265**	-7.37***	-9.332***	-6.151**
	3	-3.348**	-4.079**	-2.936	-2.963*	-3.696***	-2.484
	4	-2.947*	-2.897	-2.976	-1.814	-2.478*	-1.414
	5	-3.017**	-2.838*	-3.13	-3.601***	-2.588**	-4.216**
Employment	0	-0.432***	-0.309	-0.497**	-0.446***	-0.435***	-0.444**
	1	-1.691***	-2.898***	-1.247***	-1.723***	-2.845***	-1.248***
	2	-1.29***	-3.4***	-0.471	-1.331***	-3.13***	-0.549*
	3	-1.038***	-1.592***	-0.819**	-1.025***	-1.509***	-0.817**
	4	-0.717***	-1.046***	-0.586*	-0.631***	-0.964***	-0.482
	5	-0.398	-0.975***	-0.16	-0.393	-0.86***	-0.179
Unemployment	0	-0.039	-0.077	-0.017	-0.048	-0.055	-0.044
	1	1.326***	1.555***	1.21***	1.281***	1.588***	1.126***
	2	1.88***	3.424***	1.15***	1.78***	3.417***	1.048***
	3	1.786***	3.457***	1.002***	1.698***	3.515***	0.897***
	4	1.689***	3.257***	0.902***	1.577***	3.234***	0.803**
	5	1.656***	3.34***	0.811**	1.464***	3.112***	0.695**
Actual growth	0	0.019	-0.887***	0.419	-0.02	-0.986***	0.446
	1	-8.809***	-7.157***	-9.597***	-8.474***	-6.843***	-9.305***
	2	-4.992***	-4.506***	-5.197***	-4.649***	-3.94***	-4.979***
	3	-1.399**	-2.503**	-0.957	-1.337**	-2.112**	-0.988
	4	-2.349***	-2.539***	-2.28**	-2.095***	-2.012***	-2.144**
	5	-1.124**	-1.609**	-0.903	-0.886*	-1.209**	-0.719

Source: World Bank.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. "Recessions: Baseline definition" are defined as the period from the peak preceding a business cycle trough to the trough, with the troughs defined as years of output growth that is both negative and one standard deviation below the long-term average (as in Huidrom, Kose, and Ohnsorge 2016). "Mild Recessions: Alternative definition" are defined as years of negative output growth only, regardless of the depth of the output decline. Sample includes unbalanced panel of 32 advanced economies and 79 EMDEs for 1981-2020. p-statistics are shown in parentheses.

TABLE 1F.20 Channels: Impulse responses of TFP, investment, employment and actual growth rates to banking crises and epidemics

		Banking crises			Epidemics		
Definition of potential output	h	World	AEs	EMDEs	World	AEs	EMDEs
Total factor productivity	0	-0.177***	-0.119***	-0.279**	-0.235***	-0.241***	-0.223***
	1	-0.559***	-0.419***	-0.771***	-0.276***	-0.307***	-0.248***
	2	-0.627***	-0.566***	-0.748***	-0.296***	-0.306***	-0.278***
	3	-0.562***	-0.619***	-0.531**	-0.394***	-0.389***	-0.388***
	4	-0.54***	-0.655***	-0.446	-0.524***	-0.358***	-0.606***
	5	-0.375**	-0.558***	-0.189	-0.315***	-0.093	-0.434***
Investment	0	-4.451*	-4.119	-4.576	-12.522***	-9.658***	-13.252***
	1	-14.031***	-16.744***	-12.31***	-3.487**	-1.575	-4.275**
	2	-1.649	-11.541***	4.509	-2.762*	2.696**	-4.803**
	3	3.182	-2.718	6.846*	-3.202***	0.203	-4.575***
	4	0.507	-6.409***	4.781*	-3.442**	-0.446	-4.772**
	5	-2.145	-6.08***	0.303	-4.085***	1.671	-6.537***
Employment	0	-0.223	-0.677*	-0.03	-1.662***	-2.784***	-1.167***
	1	-1.196***	-3.444***	-0.358	-0.951***	-1.419***	-0.764*
	2	-0.501	-2.528***	0.243	-0.866***	-0.584**	-1.009**
	3	-0.166	-1.511***	0.339	-0.574*	-0.897***	-0.44
	4	-0.198	-1.551***	0.316	-0.926***	-0.662*	-1.021**
	5	0.12	-1.403***	0.692**	-0.828***	-0.377	-1.039***
Unemployment	0	0.382**	0.473**	0.355	0.869***	1.881***	0.465***
	1	1.592***	2.81***	0.909***	1.063***	2.516***	0.497**
	2	1.891***	3.574***	0.928***	1.089***	2.402***	0.599**
	3	1.828***	3.822***	0.663**	1.151***	2.701***	0.592**
	4	2.1***	4.494***	0.694**	1.316***	2.841***	0.742***
	5	2.156***	4.684***	0.661**	1.033***	2.401***	0.51*
Actual growth	0	-0.629	-2.113**	0.026	-3.956***	-4.161***	-3.76***
	1	-2.026	-5.123***	-0.64	-0.362	0.903	-0.871
	2	0.967	-0.462	1.609	-0.128	0.491	-0.403
	3	1.809**	0.055	2.596**	-1.124***	-0.51	-1.379***
	4	1.859**	-1.334	3.292***	-1.137***	-0.287	-1.491***
	5	1.66*	-0.419	2.603**	-1.081***	0.183	-1.731***

Sources: Laeven and Valencia 2018; and World Bank.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Sample includes unbalanced panel of 32 advanced economies and 100 EMDEs for 1981-2020. p-statistics are shown in parentheses.

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CHAPTER 2

Regional Dimensions of Potential Growth: Hopes and Realities

Potential growth slowed in most emerging market and developing economy (EMDE) regions in the past decade. The steepest slowdown occurred in the Middle East and North Africa (MNA), followed by East Asia and the Pacific (EAP), although potential growth in EAP remained one of the two highest among EMDE regions, the other being South Asia (SAR), where potential growth remained broadly unchanged. Projections of the fundamental drivers of growth suggest that, without reforms, potential growth in EMDEs will continue to weaken over the remainder of this decade. The slowdown will be most pronounced in EAP and Europe and Central Asia because of slowing labor force growth and weak investment, and least pronounced in Sub-Saharan Africa where the multiple adverse shocks over the past decade are assumed to dissipate going forward. Potential growth in Latin America and the Caribbean, MNA, and SAR is expected to be broadly steady as slowing population growth is offset by strengthening productivity. The projected declines in potential growth are not inevitable. Many EMDEs could lift potential growth by implementing reforms, with policy priorities varying across regions.

Introduction

The global economy has suffered two major adverse shocks in to start the 2020s—the COVID-19 pandemic and Russia's invasion of Ukraine. After a strong rebound in 2021 from the pandemic-induced recession of 2020, global growth in 2022 slowed precipitously (figure 2.1). The war in Ukraine has disrupted activity and trade, pent-up demand in the wake of COVID-19 lockdowns has faded, and macroeconomic policy support for demand is being withdrawn amid high inflation.

While the growth slowdown in EMDEs in 2022 was partly cyclical, it also reflected underlying, structural weakness. Potential growth—the rate of increase of potential output, or the level of output an economy would sustain at full capacity utilization and full employment—slowed in the past decade (2011-21) relative to the preceding one in a wide swath of EMDEs and in almost all EMDE regions (chapter 1). If the drivers of current trends do not undergo major reversals, potential growth is expected to continue slowing down over the remainder of this decade.

Yet, there have been wide differences in these trends, as well as in prospects for long-term growth, across EMDE regions and these have implications for regional policy

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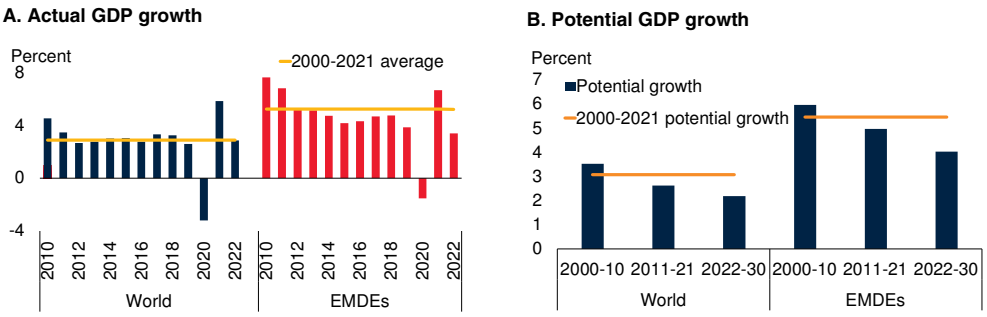
Note: This chapter was prepared by Sergiy Kasyanenko, Philip Kenworthy, Sinem Kilic Celik, Franz Ulrich Ruch, Ekaterine Vashakmadze, and Collette Wheeler.

FIGURE 2.1 Actual and potential growth in EMDEs

After recovering in 2021 from the pandemic-induced recession, global growth is expected to decline sharply in 2022-23, as the war in Ukraine disrupts activity and trade and as policy support for demand in many countries is withdrawn amid high inflation. This cyclical slowdown is occurring amid a broad-based slowdown in potential growth, both in aggregate and per capita terms. The estimates of potential growth are robust to the estimation method used.



Sources: Haver Analytics; Penn World Tables; UN Population Prospects; World Bank.
Note: EMDEs = emerging market and developing economies. Data for 2022-30 are forecasts.
A. Aggregate growth rates are calculated using GDP weights at average 2010-19 prices and market exchange rates.
B. Period average of annual GDP-weighted averages. World sample includes up to 53 EMDEs and 30 advanced economies.

priorities. This chapter examines differences across the World Bank's six EMDE regions by addressing the following questions for each region.

- How have potential growth and its drivers evolved since the turn of the century?
- What are the prospects for potential growth?
- Which policies would lift potential growth?

Contributions. This chapter adds regional granularity to the analysis of global potential growth in the preceding chapter 1 and does so in a consistent manner across EMDE regions. Drawing on a rich body of region-specific studies and using the comprehensive new database introduced in chapter 1, this chapter is the first study to systematically analyze potential growth in all six EMDE regions in a consistent manner. Other major cross-country studies of potential growth have largely focused on advanced economies (Dabla-Norris et al. 2015; IMF 2015; OECD 2014) or Asian economies (ADB 2016). This chapter examines data for up to 6 EMDEs in EAP, 9 in ECA, 16 in LAC, 5 in MNA, 3 in SAR, and 14 in SSA over the past two decades (2000-21) and considers prospects for the remainder of this decade (2022-30).

Findings. The chapter documents a rich array of regional differences. First, the potential growth slowdown in the past decade (2011-21) from the preceding decade (2000-10) was steepest in the Middle East and North Africa (MNA), followed by East Asia and the Pacific (EAP) although potential growth in EAP remained higher than in all other regions except South Asia (SAR). Europe and Central Asia (ECA) and Latin America

and the Caribbean (LAC) experienced less pronounced slowdowns but potential growth in LAC remained the lowest among all EMDE regions. In SAR, potential growth remained almost unchanged, at the highest rate among EMDE regions and, in Sub-Saharan Africa (SSA), potential growth weakened only moderately and remained one of the lowest among EMDE regions, at around half the average for SAR.

Second, looking ahead, EAP is expected to be the EMDE region with the sharpest decline in both aggregate and per capita potential growth during 2022-30—about 1.6 percentage points a year on average—mainly reflecting slower capital accumulation and TFP growth in China. The second largest decline in potential growth in 2022-30 is projected for ECA, resulting in part from the fallout from the war in Ukraine but also from the continued weakness in labor force growth. In SSA, potential growth is projected to decline moderately as strengthening TFP growth is expected to partially offset weakening investment and slowing population growth. Elsewhere, potential growth is projected to be broadly unchanged (in LAC and SAR) or even rise (in MNA) in 2022-30 as strengthening TFP growth offsets demographic headwinds to potential growth.

Third, particularly weak TFP growth in LAC, MNA, and SSA makes policy action to raise productivity growth especially important for these regions. There is also considerable room to strengthen flagging labor force growth, in MNA and SAR, by encouraging female labor force participation, and, in EAP and ECA, by raising labor force participation among older workers. Prospects for investment growth in LAC and SSA are particularly weak, and a wide range of measures are likely to be required to reignite it. Such measures are discussed in chapter 4. A climate-related investment push could catalyze a boost to potential growth in all EMDE regions.

Regional potential growth in the rear-view mirror

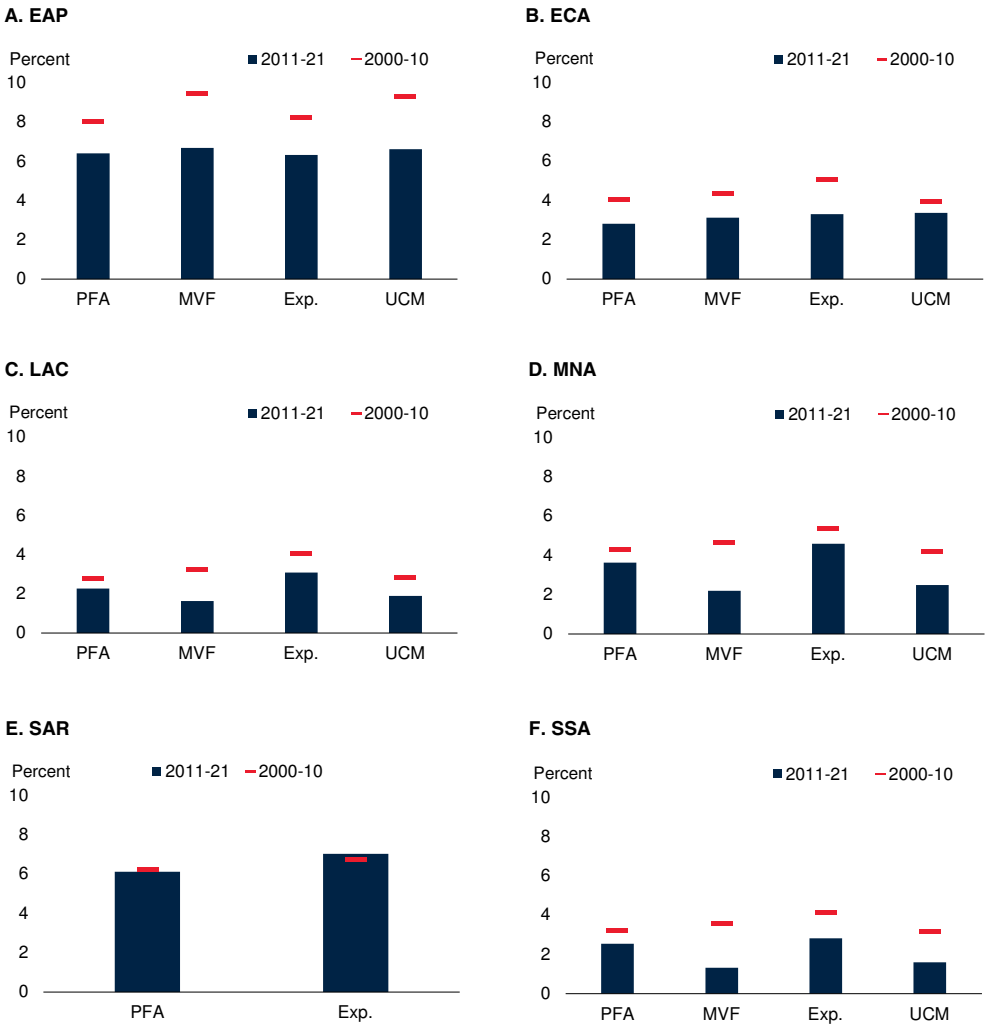
Potential growth weakened broadly across EMDEs in the past decade (2011-21) relative to the preceding one (2000-10). In the past decade, potential growth in EMDEs averaged 5 percent a year, 1.0 percentage point below its average in the preceding one.[1] Per capita potential growth also slowed. Potential growth slowed in more than half of EMDEs and in all but one EMDE region (SAR). This finding is robust to the approach to measuring potential growth (figure 2.2).

Weakening potential growth is cause for worry. First, the slowdown in potential growth raises concerns about the prospects for per capita income growth, poverty reduction, and convergence of per capita incomes with advanced economies. In some EMDE regions, especially MNA, EAP, and ECA, per capita income convergence with advanced

[1] Unless otherwise noted, and in keeping with the long-term focus of this chapter, potential growth is estimated using the production function approach, which takes into account movements in labor supply and capital accumulation, and which provides estimates of total factor productivity growth based on various assumptions (for example, that factors of production are paid their marginal products). Detailed descriptions of the production function approach and alternative methods for measuring potential growth (including statistical filters and a growth-expectations approach) are provided in chapter 1.

FIGURE 2.2 Potential growth in EMDE regions, 2000-10 and 2011-20

Potential growth was slower in the 2010s than the 2000s by virtually all estimation methods and in all EMDE regions except one—SAR—with the steepest slowdowns in MNA and EAP. Nevertheless, potential growth in EAP, along with SAR, remained higher than in the other EMDE regions.



Sources: Haver Analytics; Penn World Tables; UN Population Prospects; World Bank.
Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Period average of annual GDP-weighted averages. Samples differ across measures, depending on data availability. PFA = production function approach. MVF = multivariate filter-based. UCM = univariate filter-based (specifically, the Hodrick-Prescott filter). "Exp." = estimates based on five-year-ahead *World Economic Outlook* growth forecasts. For SAR, insufficient data available for filter-based estimates until 2010. The sample includes 28 economies; 3 countries in EAP (China, Philippines, and Thailand), 5 countries in ECA (Bulgaria, Hungary, Kazakhstan, Poland, and Romania), 10 countries in LAC (Bolivia, Brazil, Chile, Colombia, Costa Rica, Honduras, Mexico, Paraguay, Peru, and Uruguay), 3 countries in MNA (Jordan, Morocco, and Tunisia), 4 countries in SAR (Bangladesh, India, Pakistan, and Sri Lanka), and 3 countries in SSA (Cameroon, Namibia, and South Africa). Due to the limited sample, other measures are excluded from the SAR region. Note that quantitative estimates may differ from those presented in figure 2.3 because of sample differences. Figure 2.2 ensures sample consistency across measures; figure 2.3 ensures sample consistency across time.

economies was significantly slower in 2011-21 than in 2000-10. Declining potential growth is likely to impede the ability of EMDEs to meet their development goals, including poverty reduction.[2] Second, a weakening of potential growth erodes countries' ability to service their debt. This is a serious ongoing concern, with government debt relative to GDP at multi-decade highs in all EMDE regions except SSA.

The weakening of potential growth in EMDEs in the past decade was broad-based, with all of its drivers—total factor productivity (TFP) growth, labor force growth, and capital accumulation—fading (chapter 1). Developments across regions nonetheless varied. The MNA region experienced the steepest decline in potential growth, by 2.4 percentage points per year. Capital accumulation plunged due to the sharp drop in oil prices from mid-2014 to early 2016, policy uncertainty increased in some parts of the region, and capital was destroyed by conflicts in certain countries.

Potential growth fell almost 1.4 percentage points a year on average in EAP although, at around 6.2 percent a year, it remained higher there than in all other regions except SAR. The slowdown in EAP is largely due to developments in China—rebalancing of growth away from investment, together with slower growth of both TFP and the working-age population. Potential growth in the rest of the region strengthened by 0.6 percentage point a year, reflecting rebounds in capital accumulation following the downturn originating in the 1997-98 Asian financial crisis, amid generally supportive demographic trends.

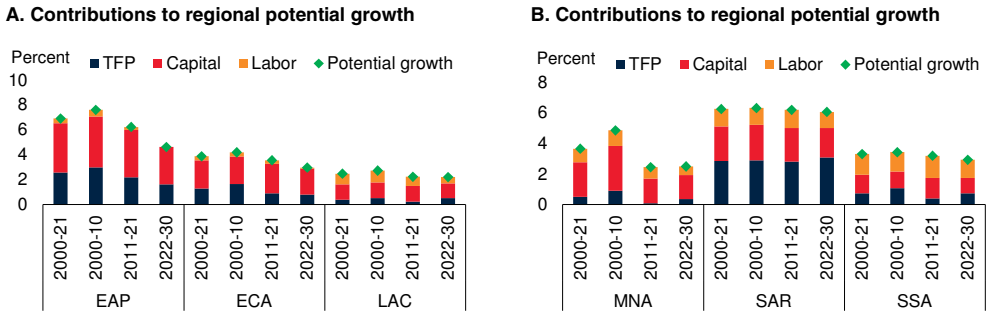
In ECA, LAC, and SSA, potential growth fell more moderately in 2011-21, by 0.6, 0.5, and 0.2 percentage points a year, respectively, but from lower rates in 2000-10 than in EAP and SAR. The decline in ECA reflected diminishing productivity catch-up with Western Europe following two decades of rapid integration into its production networks, labor markets, and institutions, and a slowdown in labor force growth as working-age population growth slowed and, in some cases, turned negative. Potential growth in LAC remained the lowest among EMDE regions. In LAC, it was dampened by slowing labor force growth and a continued decline in TFP growth, as a series of shocks, including plunging commodity prices, debt distress, and bouts of political instability, hit the region. In SSA, buoyant labor force growth and rising capital accumulation were more than offset by a sharp slowdown in TFP growth. Capital accumulation in SSA was supported by investment in natural resource sectors and infrastructure.

In contrast to the other EMDE regions, potential growth in SAR was virtually unchanged in 2011-21 and became, together with EAP, the strongest among EMDE regions. All the drivers of growth remained broadly steady, with demographic trends remaining supportive and investment weakness and lower TFP growth in India offset by robust investment growth and solid TFP growth elsewhere.

[2] Research suggests that two-thirds of cross-country differences in growth of the poorest households' income is attributable to differences in average income growth (Barro 2000; Dollar, Kleineberg, and Kraay 2016).

FIGURE 2.3 Contributions to potential growth in EMDE regions

Without reforms, potential growth in EMDEs will continue to weaken over the remainder of this decade. The slowdown will be most pronounced in EAP and ECA due to slowing labor force growth and weak investment. The slowdown is projected to be least pronounced in SSA, where the multiple adverse shocks over the past decade are assumed to dissipate going forward. Potential growth in LAC, MNA, and SAR is expected to be broadly steady as slowing population growth is offset by a recovery in productivity as past shocks dissipate.



Sources: Haver Analytics, Penn World Tables, UN Population Prospects, World Bank.
Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Period averages of annual GDP-weighted averages. Estimates based on the production function approach. Sample includes 6 countries in EAP, 9 in ECA, 16 in LAC, 5 in MNA, 3 in SAR, and 14 in SSA. Note that quantitative estimates may differ from those presented in figure 2.2 because of sample differences. Figure 2.2 ensures sample consistency across measures; figure 2.3 ensures sample consistency across time. Data for 2022-30 are forecasts.

Prospects for regional potential growth

In the absence of reforms, potential growth in EMDEs is projected to decline further in the remainder of the 2020s (figure 2.3). The pandemic-induced shock in 2020 is expected to have lasting effects on long-term growth across EMDEs, and many of these effects will be exacerbated by the fallout from the war in Ukraine. The adverse effects of the two shocks on human capital, investor confidence, fixed capital formation, and supply chains will weigh on long-term growth prospects.

Current projections of the fundamental drivers of potential growth in EMDEs suggest that it will slow by a further 0.9 percentage point a year in the remainder of this decade (2022-30) to 4.0 percent a year (chapter 5).[3] The slowdown is expected to be broad-based, reflecting declining contributions from all the fundamental drivers of growth, but especially from capital accumulation, which accounts for more than half of the slowdown. Decelerating TFP growth and slowing labor supply growth are each expected to account for one-quarter of the slowdown.

[3] Throughout this chapter, potential growth projections for 2022-30 are predicated on population size and composition in line with the medium fertility scenario of the UN Population Projections, trend improvements in education and health outcomes, and investment growth constant at its long-term average. Details are provided in chapter 5.

Of the six EMDE regions, EAP is expected to experience the sharpest decline in potential growth during 2022-30—about 1.6 percentage points a year on average. This is primarily due to reduced capital accumulation and slower TFP growth, especially in China. The country's policy efforts to rein in credit growth are expected to resume once economic activity recovers from pandemic disruptions. After a decade of resilience, potential growth elsewhere in the region is also expected to moderate somewhat (by 0.1 percentage point a year on average) as labor force growth eases.

In ECA and SSA, potential growth is projected to slow somewhat. Investment weakness and diminishing demographic dividends in the rest of the decade are expected to be only partially offset by a moderate pick-up of TFP growth as the adverse shocks of the past decade subside. In ECA, the slowdown in potential growth slowdown also reflects the fallout from the war in Ukraine that will depress investment in the region for several years.

In SAR, LAC, and MNA, potential growth is projected to be broadly unchanged in 2022-30. SAR benefited from demographic tailwinds over the past decade, but these are expected to fade in the remainder of the 2020s; this is expected to be offset by a recovery in TFP growth. Labor force growth is expected to continue declining in LAC, but this too should be counteracted by modestly quicker TFP growth, assuming political and social stability do not deteriorate. In MNA, the effect of slowing working-age population growth is expected to outweigh the recovery in TFP growth as adverse shocks that dampened TFP growth over the past decade (war, political uncertainty, and commodity price shocks) do not recur.

In per capita terms, potential growth is expected to slow fastest in EAP between 2011-21 and 2022-30, while staying stable in ECA. In LAC, SAR, and SSA, potential growth is expected to inch up in per capita terms. In MNA potential growth in per capita terms is expected to strengthen by 0.5 percentage point between 2011-21 and 2022-30.

There is substantial uncertainty about potential growth prospects but, on balance, risks to the baseline projections are tilted to the downside. The main downside risks are related to the possibility of a prolonged war in Ukraine or geopolitical tensions elsewhere and their impact on global trade, value chains, and commodity prices. A prolonged war or other geopolitical tensions that disrupt global markets and networks would weigh on both TFP growth and capital accumulation. In addition, a sharper-than-assumed tightening of global financial conditions, possibly in response to persistently high inflation, could trigger global financial stress and stall investment (chapter 1). Future epidemics could lead to further learning losses and thus hold back human capital accumulation, especially among the most vulnerable. This would deepen inequality within and across EMDEs (World Bank 2022a).

In some regions, specific factors could improve potential growth prospects relative to the baseline forecasts. These include an acceleration of technological innovation after the pandemic (particularly in SAR), easing of labor supply constraints in countries hosting Ukrainian refugees (in ECA), and possibly higher global demand for inputs needed to achieve the energy transition away from fossil fuels (particularly in LAC).

Regional reform priorities

The prospect of a further weakening of potential growth in EMDEs is unfortunate, but not inevitable. Reforms, especially those tailored to specific regions or countries, can lift potential growth. Reforms could target any of a range of shortcomings: unfilled investment needs, poor human capital accumulation (such as low school enrollment or completion rates and poor health indicators), weak labor force growth (such as increasingly challenging demographic conditions and low female labor force participation), and weak productivity (such as product and labor market distortions or high rates of informality).

Particularly weak TFP growth in LAC, MNA, and SSA makes policy action to raise productivity growth especially important for these regions. In LAC, such actions could include improvements in transport infrastructure, harmonization of regulatory standards to deepen regional and global trade, improved access to education for poor households, and measures to incentivize more research and development (R&D). In MNA, priorities include further efforts to diversify economies away from energy production, measures to reduce the role of the state and level the playing field for the private sector, and improvements in education. In SSA, priorities include measures to improve agricultural productivity; expand access to markets, finance, and inputs; strengthen education outcomes and the quality of schools; and improve business climates. Still-robust working-age population growth may provide SSA with an opportunity for higher potential growth—as long as job creation can keep pace with labor force growth to ensure productive employment.[4]

Even in the regions with the strongest TFP growth—EAP and SAR—measures to raise it further are available. In SAR, tackling high levels of informality, improving regional integration, and boosting participation in global value chains could all strengthen productivity growth. In EAP, productivity growth could be boosted by spurring innovation and technology adaptation through higher spending on R&D and increased foreign direct investment, which can be an important source of technology transfer. In China and other upper-middle-income economies in the region, the effectiveness of R&D spending could be improved, and measures could also be taken to raise productivity in the service sectors, by reducing barriers to competition.

In MNA and SAR, in particular, there is significant room to strengthen flagging labor force growth. Female labor force participation in these regions is around one-half the EMDE average, and if measures were taken to raise it to the EMDE average, potential growth in the remainder of the decade could be boosted by 1.2 percentage points a year. In other regions, especially EAP and ECA, population aging will be a heavy drag on potential growth unless measures are taken to extend healthy lives and increase working opportunities for older people.

[4] To the extent that younger cohorts have greater labor force participation rates and are better educated than older cohorts, working age population growth would also boost potential growth per capita.

Prospects for investment growth in LAC and SSA are particularly weak. Efforts to improve the stability of policy frameworks and the macroeconomy could generate important growth dividends in many economies, as could improvements to business climates and security.

In LAC, strengthening investment growth would require structural reforms to increase domestic saving, boost private investment returns, and prioritize productive public investment over unproductive government spending. Such measures could help upgrade infrastructure to raise international competitiveness and to improve adaptation to more frequent natural disasters.

In SSA, reforms to improve the efficiency of state-owned enterprises could free up capital for other firms to invest. Economic diversification to non-resource sectors and productivity increases in agriculture could also draw investment into these sectors. Additionally, greater openness to trade, technological readiness, security, and policy stability may improve investment prospects. Lowering non-tariff trade barriers may help boost intra-African trade and, thus, increase market size and attract investment. Many SSA countries have large investment gaps, while public investment spending is severely constrained by limited fiscal space and high debt. Joint efforts from national governments, international partners, and the private sector are needed to finance growth -enhancing investment projects, especially in infrastructure, health care, and education.

Mitigation and adaptation policies to limit carbon emissions and the impact of climate change are key to lifting potential growth in all EMDE regions. Incentives for green investment can raise capital accumulation and productivity growth while helping meet nationally determined contributions to climate change-related goals. Similarly, improving infrastructure (for example, installing better draining systems for flood protection) and planning for extreme weather events (including higher temperatures) could reduce economic losses and preserve capital stocks and productivity (EAP, SSA; chapter 5).

The pandemic has also highlighted the dividends that can be obtained by boosting digital infrastructure investment. Policies supporting automation and adoption of digital technologies can enhance productivity and potential growth (EAP, ECA, and SSA).

The remainder of this chapter discusses the recent evolution of, and prospects for, potential growth in each of the six EMDE regions. Each section examines the drivers of the region's potential growth and presents region-specific policy options for lifting it.

EAST ASIA and PACIFIC

Potential output growth in the East Asia and Pacific region (EAP) declined in 2011-21 relative to 2000-10, in part due to COVID-19 pandemic-related economic disruptions. The weakening of potential growth in EAP was broad-based, with all of its drivers fading. Prospects for the fundamental drivers of growth suggest that without policy reforms, the recent slowdown of potential growth in EAP will accelerate and broaden in the remainder of this decade. While policies may be able to stem or even reverse the projected slowing in the growth of factor inputs, policies to raise TFP growth offer a more promising way for many of the region's economies to mitigate the slowdown of potential growth and speed up the convergence of per capita income toward advanced economy levels. Higher infrastructure investment designed to improve disaster resilience and meet climate goals could provide an additional boost to potential growth.

Introduction

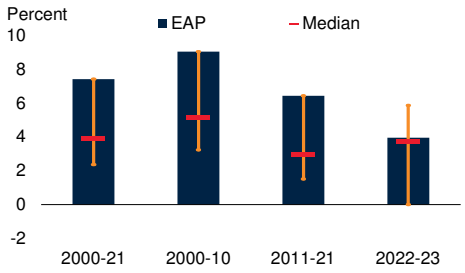
Since the 1997-98 Asian financial crisis, output growth in the East Asia and Pacific region (EAP) has been nearly twice as high as in the median EMDE (figure 2.4). However, the region's growth slowed between 2011-21, reflecting both cyclical downturns and a weakening of the region's potential growth, most notably in China, which accounts for 84 percent of the region's GDP. Elsewhere in the region, potential growth strengthened somewhat in 2011-21, particularly in Indonesia, Malaysia, and the Philippines, in part reflecting reforms implemented to rebuild economies devastated by the 1997-98 financial crisis.

The COVID-19 pandemic has caused major economic disruptions in the region, including a plunge in fixed capital investment and a sharp decline in labor supply in 2020. The subsequent recovery has been uneven across EAP countries and investment remains below pre-pandemic levels in many economies. The worst affected and the slowest to recover are Myanmar and several Pacific Island countries. The pandemic is expected to have an enduring impact on business investment (because of lower revenues, increased costs, and heightened uncertainty), productivity, and labor markets. Weaker educational attainments, especially in countries that were the most heavily impacted by the shock (Cambodia, Myanmar, the Philippines, Thailand, and many Pacific Island economies), is expected to have a lasting effect on labor markets. Weaker human and physical capital will weigh on medium- and long-term growth prospects in the region and exacerbate the current slowdown.

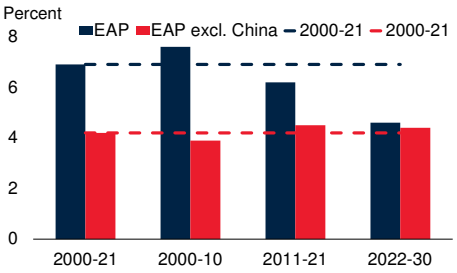
FIGURE 2.4 EAP: Regional actual and potential output growth

Following the 1997-98 Asian financial crisis, output growth in EAP was nearly twice as high as in the median EMDE between 2000-21. However, the region's growth slowed in the latter half of this period, owing to both cyclical developments and a weakening of the region's potential growth rate, which mainly reflected slowing potential growth in China. Elsewhere in the region, potential growth strengthened somewhat in 2011-21, in part due to reform efforts.

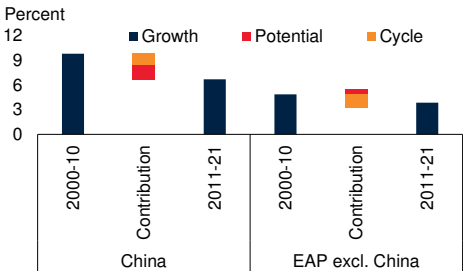
A. GDP growth



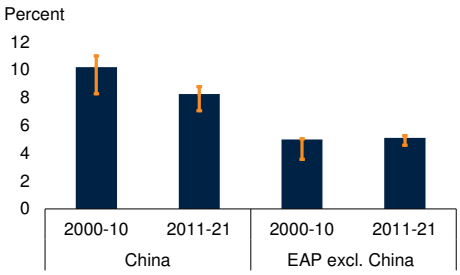
B. Potential output growth



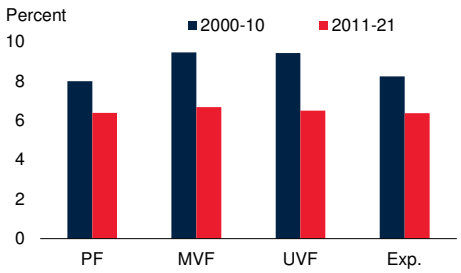
C. Contribution of potential growth and business cycle to actual growth



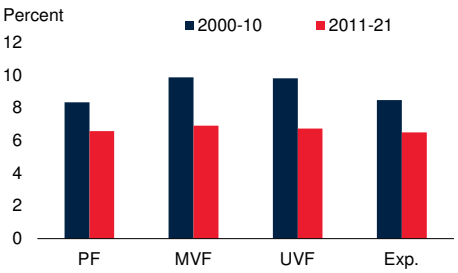
D. Potential growth estimates



E. Regional potential growth by different estimates



F. China's potential growth by different estimates



Sources: ADB (2016); Anand et al. (2014); Barnett et al. (2013); International Monetary Fund; Penn World Tables; UN Population Prospects; World Bank, World Development Indicators database.

Note: EAP = East Asia and Pacific. GDP weighted averages (using average real U.S. dollar GDP at average 2010-19 prices and market exchange rates). Period averages. Data for 2022-23 and 2022-30 are forecasts.

A. Markers show median GDP-weighted averages of the six EMDE regions; orange whiskers show minimum-maximum range.

B.C. Potential growth estimates based on production function approach. Sample includes six EAP economies (China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand).

C. Blue bars denote average actual growth over each ten-year period. Red bars denote contribution of potential growth to change in actual growth between the two five-year periods; orange bars denote contribution of cyclical growth.

D. Orange whiskers show min-max range of potential growth estimates in the four sources listed above. "EAP ex. China" includes Indonesia, Mongolia, Philippines, and Thailand.

E. F. MVF = multivariate filter; PF = production function approach; UVF = univariate filter (Hodrick-Prescott filter). Expectations-based estimates ("Exp.") are potential growth proxied by five-year-ahead IMF *World Economic Outlook* growth forecasts. Details on the approaches are provided in chapter 1. Sample includes three EAP economies (China, the Philippines, and Thailand).

EAP faces several major challenges to inclusive and sustainable growth: slowing global growth and external demand; elevated and rising debt, exacerbated by tighter financing conditions; highly volatility commodity prices and uncertainty related to the outlook for supply chains, trade, technology transfer, and investment amid the war in Ukraine and lingering geopolitical tensions. These negative developments are exacerbating the ongoing structural trends and are further depressing regional investment and potential growth.

In the remainder of the current decade (2022-30), potential output growth in EAP is projected to slow to 4.6 percent a year on average, from 6.2 percent a year in 2011-21. China's potential growth will continue to decelerate on diminishing returns to capital investment and slowing TFP growth. Potential growth in the rest of the region is also expected to decline somewhat as a result of slowing labor force growth.

Policy efforts in several areas could boost potential growth, support poverty reduction, and help several middle-income economies attain high-income status. While policies may be able to stem or even reverse the projected slowing of factor inputs, policies to raise productivity growth offer the most promising path for the region's economies to improve their growth performance and speed up the convergence of their per capita incomes to advanced economy levels.

Lowering non-tariff barriers and liberalizing trade in services would help the region take advantage of shifts in the global trade landscape and will boost productivity and competitiveness. Achieving more efficient allocation of financial resources would require strengthening prudential measures and supervision. In the field of energy, policies must address energy security issues with long-term sustainable development strategies (World Bank 2022b). Encouraging investment in renewables could improve long-term energy security and reduce emissions. More climate-resilient infrastructure could also help mitigate a possible climate change-related reduction in annual potential growth resulting from increasingly frequent extreme weather events that damage capital stocks and erode labor productivity.

Evolution and drivers of potential growth in EAP

At an average annual rate of 6.2 percent over 2011-21, potential output growth in EAP was nearly twice as high as in the median EMDE, but it was still below its 7.6 percent average rate in 2000-10.[5] The slowdown of potential growth is mostly attributable to China, where potential growth is estimated to have fallen from 8.3 percent a year in

[5] Estimates of potential growth can vary depending on the methodology used. However, other studies have obtained results similar to those described here, and the slowdown of China's potential growth, in particular, is clear and undisputed. For instance, Anand et al. (2014) report that China's potential GDP growth peaked around 2006-07 at 11 percent a year and declined to below 8 percent by 2013. By contrast, potential growth in ASEAN (Association of Southeast Asian Nations) countries (for example, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam) has been stable or rising. ADB (2016) reported a gradual decline in China's potential growth since 2008. Bai and Zhang (2017), Nabar and N'Diaye (2013), Maliszewski and Zhang (2015), and Perkins and Rawski (2008) have also confirmed the slowdown of potential growth in China.

2000-10 to 6.6 percent a year in 2011-21. Following efforts to prop up growth through credit-fueled investment, the Chinese government initiated policies in 2012 to make growth more sustainable and less dependent on investment and exports (World Bank 2017a). By 2019, China's growth had converged to its potential rate, but significant financial vulnerabilities that had accumulated remained unresolved (World Bank 2021a).

In EAP outside China, potential output growth rose to 4.5 percent in 2011-21, 0.6 percentage point higher than in 2000-10. Following the 1997 Asian financial crisis, Indonesia, Malaysia, the Philippines, and Thailand introduced policy reforms that helped investment growth rebound from its collapse during the crisis. In some countries, however, potential growth declined in 2021-21 compared to 2000-21 largely owing to unfavorable demographic trends and idiosyncratic factors. In Thailand, for example, potential growth weakened to around 3.2 percent a year in 2011-21 (from 3.5 percent in 2000-10), close to the lowest in Southeast Asia, as demographic dividends diminished and domestic uncertainty and frequent flooding weighed on TFP growth and capital accumulation (World Bank 2020a).

The pandemic disruptions of 2020-22 are expected to have lasting negative effects on economic growth across EAP through their adverse impact on human capital and fixed capital formation. Following a significant contraction in 2020, investment in the region rebounded in 2021 but remained about 4 percentage points below its pre-pandemic trend; this gap is not expected to close over the remainder of the decade. Actual and potential output in the region was also negatively affected by pandemic-related school closures, lost working hours and job skills, and especially large declines in earnings of those working in the informal sector—a significant proportion of the workforce in some economies in the region (World Bank 2020b). The collapse in activity, investment, and trade, as well as prolonged border closures, is also estimated to have dampened TFP growth.

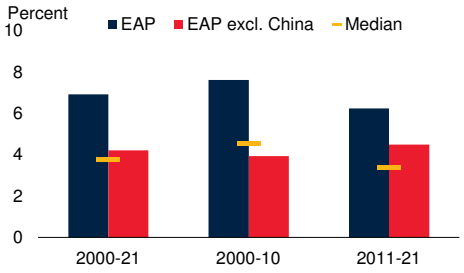
Of the 1.4 percentage point decline in EAP's annual potential growth rate between 2000-10 and 2011-21, falling TFP growth is estimated to account for about three-fifths, with the remaining two-fifths attributable equally to slowing labor supply growth and capital accumulation (figure 2.5). The shift in each of these drivers was strongly influenced by developments in China, which experienced a broad-based slowdown in all drivers of potential growth. The slowing in China's TFP growth may be attributed to several factors, including narrowing room for productivity catchup, declining returns to investment and a misallocation of resources during a prolonged investment boom, and shifts of resources from manufacturing to services (Maliszewski and Zhang 2015; Nabar and N'Diaye 2013). Nevertheless, the contribution of TFP growth to potential output growth in China in 2011-21 remained above the EMDE average (Anand et al. 2014; World Bank 2018a).

The reduced contribution of labor force growth to potential output growth reflects a sharp slowdown in China's working-age population growth related to aging. Thus, the

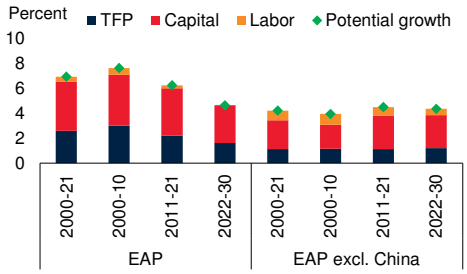
FIGURE 2.5 EAP: Drivers of potential output growth

The slowdown of EAP's potential output growth in 2011-21 relative to 2000-10 is mostly attributable to China, where potential growth fell from 8.3 percent to 6.6 percent a year. Of the 1.4 percentage-point fall in EAP's annual potential growth, slower total factor productivity (TFP) growth accounts for three-fifths, with the remainder due to slower labor force growth and slower capital accumulation. China experienced a broad-based slowdown in all drivers. In the rest of the region, potential growth in 2011-21 continued to rely heavily on growth of factor inputs, especially fixed investment. In most EAP countries, TFP growth slowed or remained weak in the pre-pandemic decade.

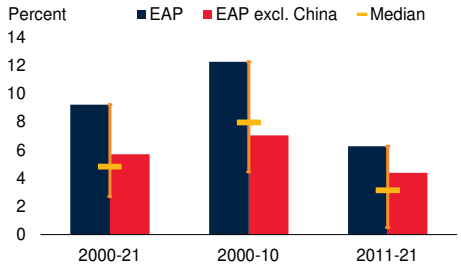
A. Potential GDP growth



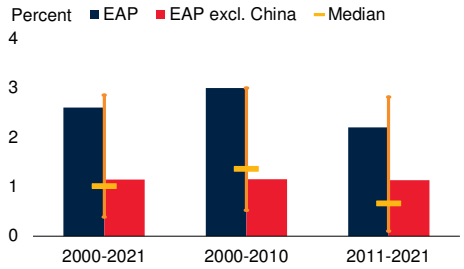
B. Contributions to potential GDP growth



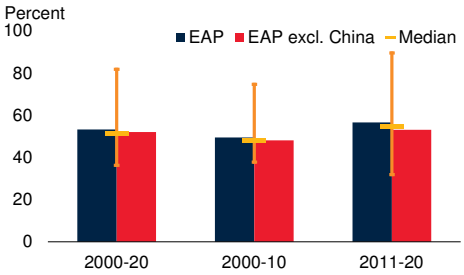
C. Investment growth



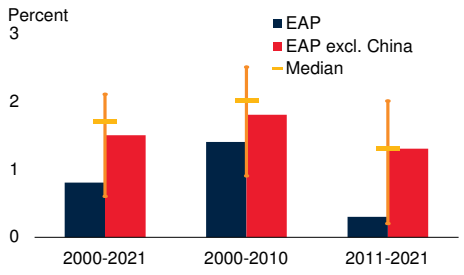
D. Potential TFP growth



E. Secondary education attainment



F. Working-age population growth



Sources: Haver Analytics; Penn World Tables; UN Educational, Scientific, and Cultural Organization (UNESCO) Institute of Statistics; UN Population Prospects; World Bank; World Development Indicators database.

Note: EAP = East Asia and Pacific; TFP = total factor productivity. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-30 are forecasts.

A.C.-F. Bars show period averages of annual GDP-weighted averages. Markers show median of GDP-weighted averages of the six EMDE regions. Orange whiskers show min-max ranges.

A.B. Estimates based on production function approach. Sample includes 53 EMDEs, of which six economies are from EAP (China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand).

C.D. Sample includes China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand (where potential growth estimates are available for both investment growth and TFP growth measures for the period 2000-21).

E. Period averages of simple annual averages. Percentage of population ages 25 and above that completed at least lower secondary education. "EAP ex. China" includes Indonesia, Malaysia, Mongolia, the Philippines, and Thailand.

F. Working-age population refers to population ages 15-64. Sample includes six EAP economies.

contribution of labor force growth to China's potential output growth fell from 0.5 to 0.2 percentage point between 2000-10 and 2011-21. Finally, the reduced contribution of capital accumulation to China's potential growth in 2011-21 reflects a moderation from the stimulus-driven investment peaks of 2010-12, which had produced overcapacity in some sectors. Nevertheless, China's investment-to-GDP ratio was still as high as 60 percent, on average, in 2011-21.

Aside from China, the rest of the region relied more heavily on growth in factor inputs, particularly capital, to drive potential output growth during 2011-21. Notably, a diminished contribution from slowing labor force growth was outweighed by a larger contribution from capital accumulation. Although TFP growth remained subdued overall, it inched up in 2011-21 in the Philippines from its post-Asian financial crisis lows. In Mongolia, domestic policy setbacks and commodity price volatility weighed on total factor productivity growth and capital accumulation.

In the five decades to around 2010, economic growth in EAP was supported by a rapidly growing working-age population (IMF 2017a; World Bank 2015). Many economies in the region reaped a "demographic dividend" as the number of workers grew faster than the number of dependents. In the region as a whole, demographic trends have since become less favorable and are expected to deteriorate further over the next decade. The deceleration in working-age population growth has been especially stark in China and Thailand, due to population aging (Bloom, Canning, and Fink 2011). Several economies in the region, however, are still enjoying a demographic dividend (Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, and the Philippines).

Several factors besides demographic developments have affected labor force growth in EAP. Labor force participation rates (and productivity) have been boosted by an increase in secondary school completion rates of 10 percentage points between 2000-10 and 2011-21, a rise in the tertiary enrollment rate of 14 percentage points, and improvements in health reflected in an extension of life expectancy by two years. China and Malaysia have made particularly large strides in improving life expectancy and education over the past two decades. Although female labor force participation rates increased in some countries between 2000-10 and 2011-21, they remain relatively low in several of the largest economies in the region (Indonesia, Malaysia).

Capital accumulation slowed in most EAP economies in the second half of 2011-21 owing to several factors. In some ASEAN economies, such as Indonesia and the Philippines, supportive monetary policy spurred investment in the first decade after the global financial crisis, but its influence subsequently waned. In Malaysia, capital accumulation increased in the aftermath of the Asian financial crisis but later moderated, reflecting the worsening of terms of trade and heightened policy uncertainty. Despite the slowdown, the contribution of capital accumulation to potential growth in EAP remained larger than in other EMDE regions, reflecting high domestic savings rates and generally sustained FDI inflows. The region attracted half of global FDI during

2011-21, with FDI representing over 5 percent of GDP in one-third of EAP economies and playing an important role in the transfer of new technologies, the development of human capital, integration into global markets, enterprise restructuring, and improved competitiveness (Moura and Forte 2010; World Bank 2017b). The region's relatively rapid capital accumulation helped finance infrastructure upgrades. In the Philippines, for instance, improved macroeconomic policy management and the government's public-private partnership initiative have boosted infrastructure investment.

In most EAP countries, potential TFP growth slowed or remained relatively weak in 2011-21. The slowing has been attributed to both temporary and more persistent factors (Asian Productivity Organization 2016; World Bank 2018a). Temporary factors include heightened policy uncertainty (Myanmar) and investment weakness in several commodity-exporting economies that were severely affected by the 2014-16 plunge in commodity prices (Mongolia, Papua New Guinea). More persistent factors include a declining scope for closing the technology gap with advanced economies (China), the maturing global value chains of some products (China, Malaysia), and slowing human capital accumulation in lower-income economies with limited fiscal space for education spending (Cambodia, Lao PDR). Slowing TFP growth due to slowing factor reallocation from agriculture to sectors with higher or faster productivity growth also has had persistent effects (China, Malaysia, Thailand).

Productivity in the region, and especially China, was boosted by rapid integration into global and regional supply chains in the wake of China's accession to the World Trade Organization in 2001. More recently, the maturing of these supply chains has caused previously surging productivity growth to wane (Constantinescu, Mattoo, and Ruta 2017; Kummritz, Taglioni, and Winkler 2017). Among the factors constraining TFP growth in EAP are weak research and development spending (Indonesia, the Philippines, Thailand, and Vietnam), inadequate infrastructure (Indonesia and Thailand), low economic complexity (Indonesia, the Philippines, Vietnam), and price distortions and stringent product market regulations (Malaysia, Thailand). Distortions of economic incentives leading to factor misallocation also appear to be holding back TFP growth in China and Vietnam (World Bank 2022b).

The COVID-19 pandemic has caused damage that is likely to be long-lasting to key drivers of EAP's potential growth. In addition to significantly disrupting economic activity, trade, and investment in 2020, the pandemic has left deep scars, including reduced physical and human capital and a retreat from global supply chains, which are likely to dampen potential growth for a prolonged period. Worsening health outcomes, food insecurity, job losses, and school closures have contributed to the erosion of human capital. COVID-19-related school disruptions have resulted in substantial learning losses in many EAP countries: it is estimated that students in EAP lost an average of two-thirds of a year of learning, with significant variations across subregions. These learning losses add to challenges that the region already faced prior to the pandemic, as a number of countries were already performing poorly on international learning assessments (ADB 2022; World Bank 2021b, 2021c).

Higher public and private indebtedness, weaker bank balance sheets, and increased uncertainty associated with the pandemic now threaten to limit public and private capital accumulation—the main driver of potential growth in much of EAP. Reduced investment, coupled with firm closures and losses of valuable intangible assets (like firm-worker relationships), have weighed on productivity. The disruption of trade and global value chains could also affect productivity by leading to a less efficient allocation of resources across sectors and firms, and by dampening the diffusion of technology.

Prospects for potential growth in EAP

Potential GDP growth in EAP is projected to slow further to an average rate of 4.6 percent a year in 2022-30, down from 6.2 percent a year in 2011-21. China accounts for much of the projected slowdown, but slowing potential growth is expected to spread to the rest of the region as well. Part of the projected slowdown is due to the pandemic and the war in Ukraine, which are expected to be most severe and longest lasting in the countries that have suffered most from the collapse of global tourism and trade. Growth prospects have also deteriorated for countries that have recently suffered natural disasters, domestic policy uncertainty, and terms of trade shocks.

In terms of the production function framework, each of the three main drivers of potential output growth are expected to contribute to the worsening outlook, with weaker capital accumulation accounting for most of the slowdown followed by falling TFP growth and labor supply growth. Capital accumulation is projected to slow most steeply in China, where policy efforts to rein in credit growth have recently resumed. In contrast, in the Philippines, investment is expected to pick up from depressed levels and boost potential output growth. Heightened geopolitical tensions may weaken investment in the region through higher interest rates, reduced business confidence, and heightened uncertainty.

TFP growth in EAP is expected to be dampened further by maturing electronics technologies and the slowing expansion of global value chains. Geopolitical tensions may also weaken gains from increasing international division of labor and diffusion of technology.

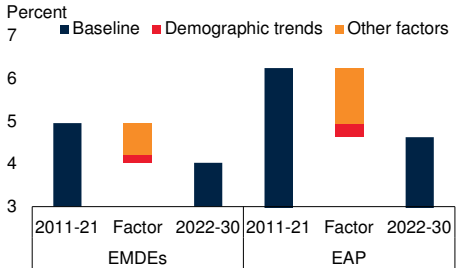
Demographic trends that are already slowing labor force growth are expected to continue, putting the region at risk of growing old before becoming rich (figure 2.6). The largest decline in the share of working-age population is expected in China. In contrast, for some countries, including Cambodia, Lao PDR, and Papua New Guinea increases in working-age populations are expected, and these countries could continue to reap demographic dividends if they generate sufficient jobs.

Risks to the baseline projection for potential output growth are predominantly on the downside. Downside risks include a worsening of the conflict between Russia and Ukraine, persistent geopolitical tensions, and associated trade disruptions. Worsening geopolitical tensions could further destabilize global economic activity and, in the longer

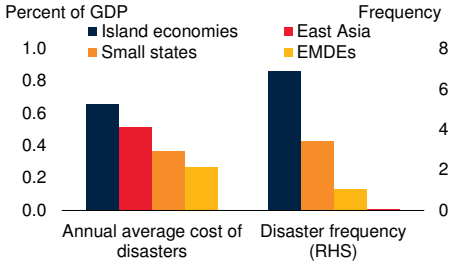
FIGURE 2.6 EAP: Potential growth—baseline and reform scenarios

Projections for the fundamental drivers of potential growth suggest that unless policy reforms are implemented, the recent slowdown in EAP will accelerate and broaden during 2022-30. Demographic trends are set to continue slowing potential growth. In a scenario in which the largest 10-year improvements in investment growth, educational outcomes, life expectancy, and female labor force participation during 2000-21 are repeated in each country in EAP, potential growth could be raised by 0.8 percentage point a year by the end of this decade.

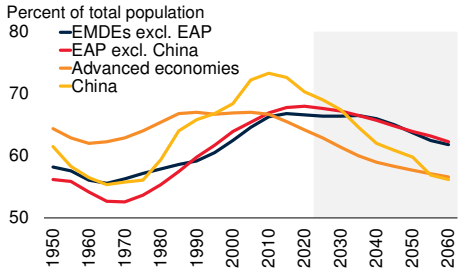
A. Baseline projection of potential output growth



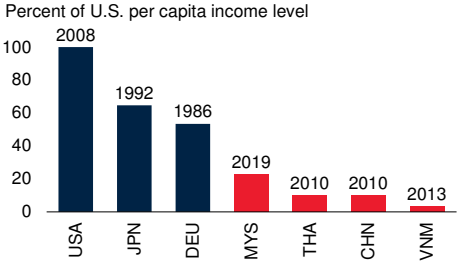
B. Natural disasters, 1980-2021



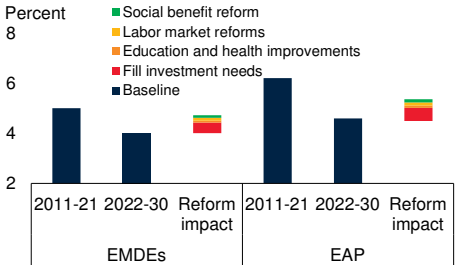
C. Working-age population



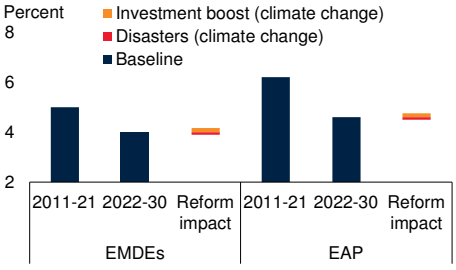
D. Per capita income at peak working-age population share



E. Reform scenarios



F. Climate change scenarios



Sources: International Monetary Fund; Penn World Tables; UN Population Prospects; World Bank.

Note: EAP = East Asia and Pacific; EMDEs = emerging market and developing economies; Shaded areas indicate forecast. GDP-weighted averages (using average real U.S. dollar GDP at average 2010-19 prices and market exchange rates). Period averages. Data for 2022-30 are forecasts.

A. Potential growth estimates based on production function approach. The methodology is described in chapter 1 and projections are described in chapter 5. "Other factors" include trend improvements in human capital and investment growth relative to its long-term average. Sample includes 53 EMDEs (6 from EAP).

B. East Asia includes 10 EMDEs in EAP; Island economies includes 13 EMDEs in EAP. Disaster frequency is calculated based on the annual average number of natural disaster incidents from 1980-2021 per 10,000 square kilometers of land area.

C. The working age population is defined as those aged 15 to 64.

D. Per capita income in the year that working-age population share peaked (years shown above the bars). Red bars are EAP economies and include only those whose working-age population shares are expected to have peaked before 2020.

E.F. Potential growth estimates based on production function approach. Sample includes 53 EMDEs (6 from EAP: China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand). Methodology is described in chapter 1 and reform scenarios are described in chapter 5.

term, cause global trade, investment, technology transfer, and financial networks to fragment (World Bank 2022c). The drag on activity from persistent trade and supply disruptions and high commodity prices could also cause the global economy to become mired in stagflation, with inflationary pressures requiring substantially more monetary tightening than currently assumed.

Policy options to lift potential growth in EAP

The baseline projection for 2022-30 shows a further slowdown in EAP's potential output growth, which will also result in a slower convergence with per capita incomes of advanced economies. However, this can be avoided if countries in the region implement growth-enhancing reforms. To illustrate, in a scenario in which the largest 10-year improvements in investment growth, educational outcomes, life expectancy, and female labor force participation during 2000-21 are assumed to be repeated in each country in EAP, it is estimated that potential growth could be raised by 0.8 percentage point a year by the end of this decade. More than half of this increase (around 0.5 percentage point a year) would come from the boost to investment growth.

The region faces the consequences of climate change, including more frequent and more severe droughts, flooding, coastal erosion, typhoons, and cyclones, as well as rising oceans. It is estimated that investment in climate change mitigation and adaptation could strengthen the region's resilience to climate change and boost annual potential growth by 0.1 percentage point by the end of this decade. Small island countries remain particularly vulnerable to risks of natural disasters, including weather-related events, losing on average about 1 percent of GDP a year to damage from such disasters (Scandurra et al. 2018). More climate-resilient infrastructure could also help mitigate a possible climate change-related reduction in annual potential growth resulting from increasingly frequent extreme weather events that damage capital stocks and erode labor productivity.

The EAP region, particularly China, is a major contributor to rising greenhouse gas emissions: its emissions tripled between 2000 and 2019, and they now account for nearly one-third of global emissions (World Bank 2021d). Early action by the region on climate change, therefore, has global as well as regional importance. A transition to less carbon-intensive growth requires fundamental and costly shifts in consumption and production patterns. Policy priorities include phasing out fossil fuel and energy subsidies; adjusting carbon prices; fostering green public investment in low carbon and resilient infrastructure and innovation; and undertaking low-carbon policy reforms in key sectors, such as energy, transport, agriculture, land use, and urban planning. The increased viability of green technologies should allow EAP countries to cut carbon emissions and preserve energy security.

A major contributor to the region's rapid growth of potential output in past decades has been the reallocation of labor and other resources from agriculture to higher-productivity sectors, a process that has encouraged urbanization. EAP has the potential

for continued, rapid urban development (Baker and Gadgil 2017). Although more than 450 million people moved to cities between 2000 and 2016, the share of people in EAP living in urban centers was only 57 percent in 2020, well below the advanced economy average of 80 percent.[6] In China, the urbanization rate in 2020 was 65 percent, with only 25 percent of the population living in urban agglomerations, compared to 45.3 percent in the United States. With a large share of the EAP workforce still engaged in agriculture, there is still scope for substantial productivity gains from resource reallocation, particularly in Cambodia, Indonesia, the Philippines, Timor-Leste, Thailand, and Vietnam. To promote further urbanization, possible measures include investing in infrastructure and social services, making land more accessible on a fair and transparent basis, encouraging facilities that support recent migrants, and coordinating urban services across municipal boundaries.[7]

At the same time, to increase productivity in agriculture, renewed efforts are required to remove barriers and distortions that prevent a reallocation of productive resources across farms. At the same time, sustaining growth in agricultural productivity requires the adaptation of a steady stream of new farm practices and technologies by farmers, more efficient management of inputs, adoption of new crops and production systems, improvements to the quality of their products, and conservation of natural resources.

Institutional reforms—such as better corporate governance, enhanced auditing and accounting standards, and stronger regulatory frameworks—could promote competition and productivity growth (Malaysia, Thailand). Improving the business climate would also help raise productivity in some economies (Cambodia, Fiji, Lao PDR, Myanmar, Papua New Guinea, Timor-Leste, and the small Pacific Islands). Cambodia, Lao PDR, Myanmar, and Papua New Guinea rank low on the Corruption Perception Index produced by Transparency International and on other governance indicators. Enhanced transparency, strengthened accountability, and greater responsiveness of state institutions to the needs of the private sector would bolster investor confidence and invite productivity-enhancing investment (World Bank 2021c).

Several countries in the region continue to have sizable infrastructure investment needs (Vashakmadze et al. 2017). In some economies, better public infrastructure could foster connectivity and spur innovation. Financing such investment will depend on country circumstances: by broadening the tax base (Cambodia, Indonesia, Lao PDR, Malaysia, Mongolia, Papua New Guinea, the Philippines), increasing the efficiency of public investment (Indonesia, Lao PDR, Vietnam; Dabla-Norris et al. 2012), rebalancing public expenditures toward investment, or promoting public-private cooperation (Cambodia, Pacific Island countries; World Bank 2022d). Developing and implementing rigorous and transparent processes for project selection, appraisal, and procurement could make public investment more efficient and improve the operation

[6] Urbanization rates are particularly low in Papua New Guinea (13 percent), Cambodia (21 percent), and Myanmar and Vietnam (around 35 percent).

[7] See, for instance, ADB (2016), Bryson and Nelson (2016), Creehan (2015), and World Bank and PRC (2014).

and maintenance of assets (Ollivaud, Guillemette, and Turner 2016). Enhancing the transparency and governance of state-owned enterprises could also help to ease pressure on fiscal resources.

Over several decades, the region's openness to international trade has led to significant productivity gains (Eris and Ulasan 2013; Havrylyshyn 1990; Trejos and Barboza 2015). Increased domestic and international competition could strengthen incentives for productivity-enhancing technological innovation. However, in recent years, weaker growth in advanced economies, signs of weakened commitment to trade liberalization, and increased risks of protectionism have threatened prospects for a further trade expansion. On the other hand, the movement of some production out of China and an incipient digital transformation are creating new opportunities for some economies in the region to expand their exports. Policy efforts in several key areas could help counter these risks and make the most of these opportunities.

Lowering non-tariff barriers would further expand global and regional trade, help the region take advantage of shifts in the global trade landscape, and improve the international allocation of investment, thereby boosting productivity and competitiveness. Barriers to services trade remain elevated in many countries of the region (Indonesia, Malaysia, the Philippines, Thailand; Beverelli, Fiorini, and Hoekman 2017; World Bank 2022e). Restrictions on foreign control and ownership of firms, discretionary licensing, and limits on the operations of foreign companies can all reduce trade in international services. In addition, foreign entry restrictions in some EAP countries curtail the provision of legal, accounting, engineering, and other professional services.

Participation in deep trade agreements such as the ASEAN economic community and the Regional Comprehensive Economic Partnership can catalyze domestic reforms as well as secure access to markets abroad. Growth-promoting domestic reforms may include policies that facilitate domestic labor mobility and the entry and exit of firms to allow reallocation of resources to more efficient enterprises. These partnerships can also help boost the region's resilience, as they did during the global financial crisis in 2008-09, and support the development of small and medium-sized enterprises (Estrades et al. 2022).

The ASEAN-4 countries (Indonesia, Malaysia, Thailand, and the Philippines) have begun to strengthen the quality and flexibility of domestic education systems. Many EAP countries, however have long suffered from a learning crisis, with low levels of educational attainment partly due to the absence of policy initiatives. Extended school closures during the pandemic—with schools in the region closed for about 73 percent of instruction days between February 2020 and October 2021—led to substantial further learning losses, especially for the poor. These losses must be reversed to prevent lasting damage to student progression, human capital formation, and opportunities for productive work (ADB 2022). Reforms to improve education quality would also raise labor-force skills and promote productivity growth (World Bank 2018a). Learning losses

can also be mitigated through measures to adjust school curricula and develop rapid catch-up periods now that schools have reopened. In the longer term, countries should seek to develop more resilient and inclusive education systems that can deliver learning in the event of future crises, including through remote learning. In addition, reforms that raise female secondary and tertiary enrollment and completion rates could increase female workforce participation rates.

The growth of TFP and potential output could also be boosted by policies that spur innovation and technology adaptation (Cirera and Maloney 2017). These include higher spending on research and development (R&D) and the promotion of inward FDI, which can be an important source of technology transfer. In China and other upper-middle-income economies in EAP, reducing barriers to competition could improve the effectiveness of R&D spending and raise productivity in the services sectors (Bai and Zhang 2017; World Bank and PRC 2012). Lower-middle-income countries may be able to capitalize on FDI inflows by strengthening their capacity to adopt new technologies, the diffusion of which could boost productivity across a broad range of firms (World Bank 2022d). However, building adoptive capacity may require enhancing managerial and technical skills, and improving access to finance and digital infrastructure (Acemoglu and Restrepo 2017).

EUROPE and CENTRAL ASIA

Potential output growth in Europe and Central Asia is projected to slow to an annual average pace of 3.0 percent in 2022-30 from 3.6 percent in 2011-21. Investment has weakened against the backdrop of sustained geopolitical tensions and pronounced uncertainty, as has the growth of the labor force. The dual shocks of the COVID-19 pandemic and the war in Ukraine are expected to inflict substantial damage to the drivers of potential growth and exacerbate existing structural challenges. Given the limited fiscal space in the region, structural reforms are needed to help boost jobs and incomes, strengthen resilience to shocks, and promote sustainable growth over the next decade.

Introduction

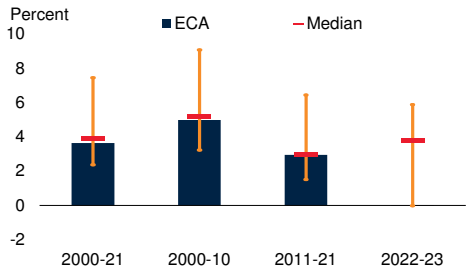
Emerging market and developing economies (EMDEs) in Europe and Central Asia (ECA) have been hit hard by two destabilizing shocks in quick succession. The COVID-19 pandemic induced a recession in 2020, reversing recent progress in raising living standards and leaving deep economic scars among vulnerable populations. Just as regional output was edging toward its pre-pandemic trend in early 2022, the Russian Federation invaded Ukraine. The invasion has since unraveled the region's economic recovery from the pandemic-induced recession, with its effects reverberating through commodity and financial markets, trade and migration links, business and consumer confidence, and weaker external demand from the euro area—ECA's largest trading partner (Guénette, Kenworthy, and Wheeler 2022; World Bank 2022f). Regional output is forecast to shrink by about 0.3 percent in 2022 and to barely grow in 2023 (figure 2.7.A; World Bank 2022c, forthcoming). As a result, the regional economy faces large output losses—particularly in Russia and Ukraine (figure 2.7.B).

In the past, large negative shocks to economic activity have often been followed by downward revisions to long-term growth forecasts—as was the experience for the region in the 2010s after the global financial crisis and European debt crisis, as well as after the 2014-16 oil price plunge for ECA's energy exporters (figure 2.7.C). Once again, the region is at risk of facing another decade of disappointing growth, as the pandemic and invasion of Ukraine inflict damage to the underlying drivers of long-term growth—especially labor productivity—by weakening investment, disrupting supply chains, hindering innovation, and scarring human capital through sustained education and job losses (Dieppe 2021; Dieppe, Kilic-Celik, and Okou 2021).

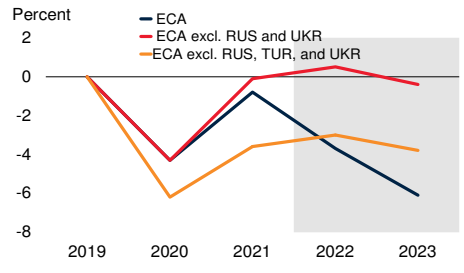
FIGURE 2.7 ECA: Output growth and potential growth

As the ECA region emerged from the steep pandemic-induced recession of 2020, it appeared set to close the output gap that had resulted. Russia's invasion of Ukraine, however, has proven to be a major setback and the gap has since widened. Scarring from the pandemic and war, combined with intensifying demographic pressures, is expected to dampen output growth over the remainder of this decade. Potential growth is projected to fall from 3.6 percent a year over 2011-21 to 3.0 percent a year over 2022-30.

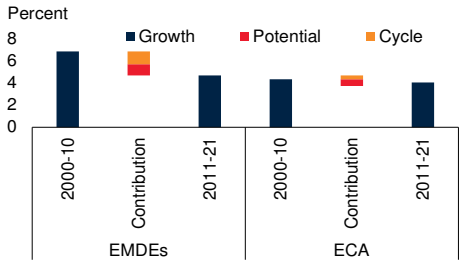
A. GDP growth



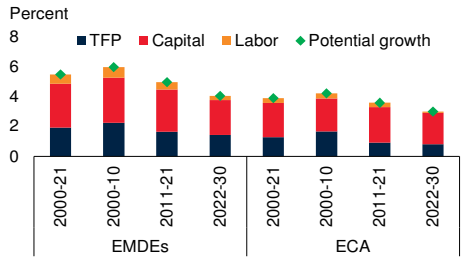
B. Deviation of output from pre-pandemic trend



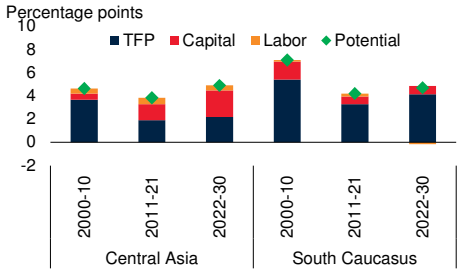
C. Contributions of potential growth and business cycle to actual growth



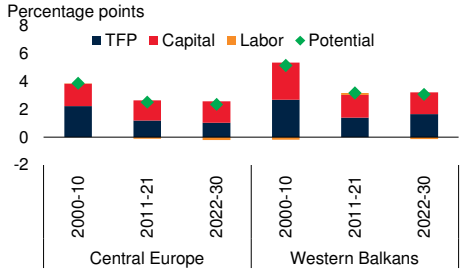
D. Contributions to potential growth: EMDEs and ECA



E. Contributions to potential growth: Central Asia and South Caucasus



F. Contributions to potential growth: Central Europe and Western Balkans



Sources: Penn World Tables; World Bank

Note: ECA = Europe and Central Asia; EMDEs = emerging market and developing economies. RUS = Russian Federation; UKR = Ukraine; TUR = Türkiye. TFP = total factor productivity. Shaded area indicates forecast. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-30 are forecasts.

A. Bars show period averages of annual GDP-weighted averages. Markers denote the median region, with orange whiskers showing min-max ranges across regions.

B. Figure shows the percent deviation between the *Global Economic Prospects* report forecasts released in June 2022 (World Bank 2022c) and January 2020 (World Bank 2020c). For 2023, the January 2020 baseline is extended using projected growth for 2022.

C. Blue bars denote average actual growth over each ten-year period. Red bars denote contribution of potential growth to change in actual growth between the two five-year periods; orange bars denote contribution of cyclical growth.

C.-F. Period averages of annual GDP-weighted averages. Estimates based on production function approach. Sample includes 53 EMDEs, of which 9 are from ECA (Türkiye, 2 in Central Asia, 4 in Central Europe, 1 in South Caucasus, and 1 in Western Balkans). The Russian Federation and Ukraine are excluded.

Against this backdrop, potential output growth is projected to slow from an annual average pace of 3.6 percent per year over 2011-21 to 3 percent per year over 2022-30 (figure 2.7.D).[8] The projected slowdown is not broadly shared across ECA countries, however, as it largely reflects weaker growth in Türkiye and to a lesser extent Poland—the second and third largest economies in the region, respectively. Elsewhere in ECA, potential growth in the remainder of this decade is projected to be either stronger or broadly in line with its pace in 2011-21 (figure 2.7.E). In some Central European and Western Balkan economies, a pick-up in growth is expected, driven by significant spending related to the European Union (EU) and associated reforms (figure 2.7.F). In particular, increased research and development (R&D) spending could support the digital and green agendas in ECA EU countries and encourage the acceleration of technological innovation and total factor productivity (TFP).

The region's longstanding structural challenges have been amplified by the pandemic and invasion of Ukraine. These include deteriorating governance in some countries, lack of infrastructure in some cases in the eastern part of the region, and education systems that create skills mismatches in the labor market. With limited space for fiscal stimulus, structural reforms are needed to raise ECA economies to higher growth paths than the baseline projection, boost jobs and incomes, and strengthen resilience to shocks. These include reforms to the still-large state-owned enterprise sector, governance, and education systems, as well as efforts to achieve green and inclusive growth.

Evolution and drivers of potential growth in ECA

Even prior to the invasion of Ukraine, potential output growth in ECA had fallen from 4.2 percent during 2000-10 to 3.6 percent in 2011-21. The period before the global financial crisis (GFC) was characterized by robust growth, as rapid economic transformation supported capital accumulation. Relatively strong growth partly reflected the benefits of high commodity prices for the region's commodity exporters and sweeping reforms in several countries as part of the EU accession process (EBRD 2017).

Following rapid progress toward convergence with the EU over the 2000s, the region has been hit by a series of shocks—the GFC of 2008-09, the European debt crisis of 2010-12, the 2014-16 oil price plunge, the COVID-19 pandemic that erupted in 2020, and Russia's invasion of Ukraine in early 2022—all of which have dampened growth and investment drivers and prospects. In addition to these shocks, various domestic crises, including those related to social and political unrest, have also weighed on growth prospects. As a result, per capita income growth fell from 3.8 percent per year over 2000-10 to 3.4 percent per year over 2011-21.

[8] Given data limitations, estimates of potential growth and its drivers are available for nine ECA economies: Armenia, Albania, Bulgaria Hungary, Kazakhstan, Kyrgyz Republic, Poland, Romania, and Türkiye. Central Europe is thus represented only by Bulgaria, Hungary, Poland, and Romania; Central Asia by Kazakhstan and the Kyrgyz Republic; the South Caucasus by Armenia; and the Western Balkans by Albania. For the purposes of this section, the 2000s are assumed to cover the period 2000-10, the 2010s the period 2011-21, and the 2020s the period 2022-30. The 2000s and 2010s are selected to ensure that the averages include both the global recession and its rebound. The 2020s are selected to cover projections.

Capital accumulation has been the largest contributor to potential output growth in ECA over the past two decades. Average private investment growth in the region fell to about 4.9 percent per year over 2011-21, down from 7 percent per year in 2000-10. Total investment fell from 8 percent per year over 2000-10 to 4.7 percent per year over 2011-21 (figure 2.8.B). Capital accumulation contributed 2.4 percentage points a year to potential growth, on average, during 2011-21, broadly in line with 2000-10. Private sector and investment growth continues to struggle due to unskilled labor forces or skill mismatches, limited access to finance, and burdensome logistics and poor market integration in many ECA economies, particularly those in the eastern part of the region that are not tied to the EU-accession process. Dividends from public investment in ECA have lagged the EU, in many cases reflecting institutional quality gaps, weak public procurement processes, and constraints to administration and absorption capacity.

For most of the 2010s, investment in several ECA economies—including Albania, Armenia, Bulgaria, and Romania—failed to regain ground lost in the wake of the GFC and European debt crises. In the region's energy exporters, investment weakened alongside the sharp fall in oil prices over 2014-16. The rise in geopolitical tensions following Russia's annexation of Crimea in 2014 also triggered a broad decline in investor confidence. The maturing of global value chains—the expansion of which had been a major driver of productivity-enhancing investment—is also likely to have played a role in slowing capital accumulation, given ECA's deep integration into global markets.

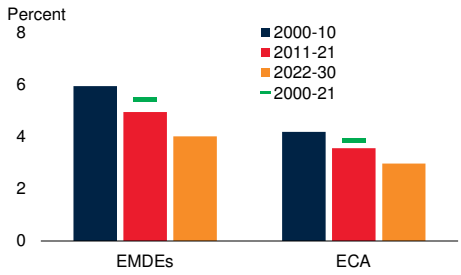
While demographic developments in some other EMDE regions were supportive of output growth over the past two decades, in many ECA economies a combination of aging populations, low birth rates, and emigration weighed on growth. In several ECA economies, particularly those in Central Europe, the share of the elderly in the population rose rapidly. In Poland, the increase in the share of the population aged 65 years or older exceeded 5 percentage points over the 2010s—well above the EU average of 3 percentage points (European Commission 2021). In many parts of the region, emigration added to the pressures arising from the natural drop in the population and the effect of population aging on labor-force growth (Bossavie et al. 2022). As a result, growth in working-age populations and labor supplies slowed and labor shortages in individual sectors were common (figures 2.8.C and D). Demographic developments, however, have been uneven across ECA. Over the past two decades, half of the region's economies saw population declines, while others, especially in Central Asia and Türkiye, reported population gains (and in some cases strongly).

Demographic pressures in many ECA countries stem from low labor force participation, especially among those living in rural and underserved areas. Precarious employment and low-quality jobs contributed to a high incidence of undeclared work in some ECA economies, including those in Central Europe where informality tends to be lower than in other parts of the region (El-Ganainy et al. 2021; Ohnsorge and Yu 2021). Employment opportunities for women, especially migrants, were more limited than those for men with similar levels of tertiary education (Frattini and Solmone 2022).

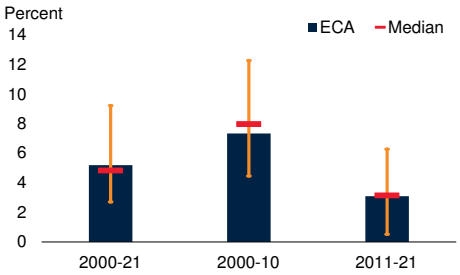
FIGURE 2.8 ECA: Potential output growth and its drivers

All drivers of potential growth are expected to weaken in the remainder of this decade. Private investment has been hard hit by Russia's invasion of Ukraine and heightened policy uncertainty. Meanwhile, a projected further decline in the labor force, largely reflecting population aging, will be a drag on potential growth. Earlier gains from human capital accumulation are fading, with the quality of education in some economies deteriorating.

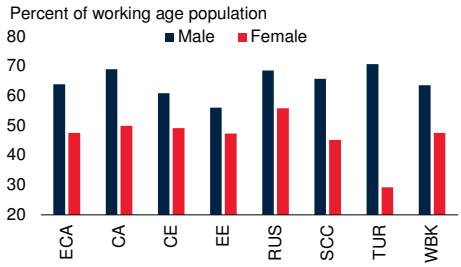
A. Potential GDP growth



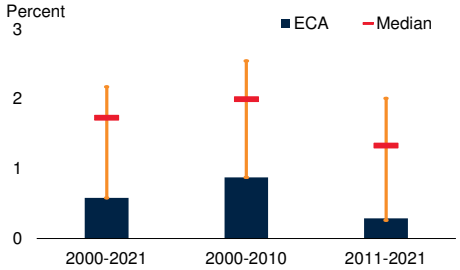
B. Investment growth



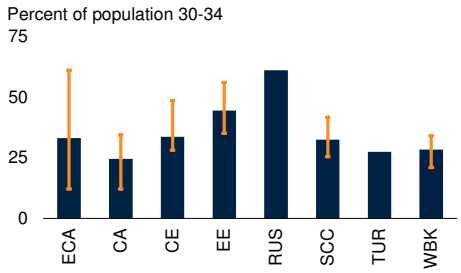
C. Labor force participation rate



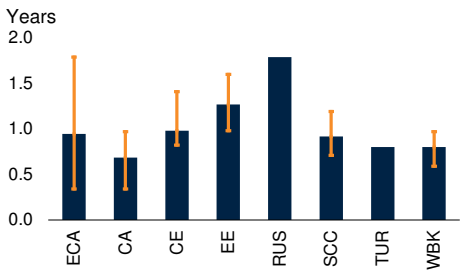
D. Working-age population growth



E. Share of population aged 30-34 years with tertiary education



F. Quality-adjusted years of higher education



Sources: European Commission; Eurostat; Penn World Tables; UN Population Prospects; World Bank, World Development Indicators database.

Note: CA = Central Asia; CE = Central Europe; ECA = Europe and Central Asia; EE = Eastern Europe; EMDEs = emerging market and developing economies; RUS = Russian Federation; SCC = South Caucasus; TUR = Türkiye; WBK = Western Balkans. GDP-weighted averages (using average real U.S. dollar GDP at average 2010-19 prices and market exchange rates). Period averages. Data for 2022-30 are forecasts.

A. Estimates based on production function approach. Sample includes 53 EMDEs, of which 9 are from ECA (Türkiye, 2 in Central Asia, 4 in Central Europe, 1 in South Caucasus, and 1 in Western Balkans). The Russian Federation and Ukraine are excluded.

B. Bars show averages. Orange whiskers show min-max ranges. Sample includes 13 ECA economies, including Türkiye, the Russian Federation, and Ukraine.

C. Figure shows share of population age 15 and older by gender that is economically active. Unweighted averages.

D. Bars show averages. Median marker and whiskers show median and min-max ranges of EMDE regions. Working-age population refers to population aged 15-64 year. Sample includes 22 ECA economies.

E.F. Aggregates calculated as simple averages of country-level data as calculated in World Bank (2020e).

This was most evident in Romania. As a result of these challenges, labor activity rates in many ECA countries have remained below those of EU peers. Because of these trends, the average contribution of labor force growth to potential output growth in ECA remained modest though stable between 2000-10 and 2011-21.

The accumulation of human and physical capital lost momentum in the last decade—weighing on potential TFP growth. Gains in both life expectancy and educational achievement leveled off, with educational reform losing momentum after the large strides of the early 2000s (Patrinos 2022). Although school enrollment rates in ECA have been high for decades and the average number of years of education is the highest among EMDE regions for both males and females, quality-adjusted years of education and PISA scores trail the EU average in many cases, with some backsliding even in the decade prior to the pandemic (figure 2.8.E; World Bank 2020d). The levels of basic skills in reading, mathematics, and science, as measured by PISA scores, fell between 2006 and 2018, roughly to levels observed in 2000 (Patrinos 2022). Educational outcomes are low even in some ECA EU countries, such as Bulgaria, where almost half of teenagers lack basic reading, mathematics, and science skills (against one in five in the EU). In contrast, Poland's educational outcomes have been high and years of quality-adjusted education have been increasing, especially in the younger cohorts, which has likely contributed to faster catch-up with the EU than among ECA peers (World Bank 2022g).

While several factors seem likely to have contributed to the apparent fall in educational attainment in ECA, insufficient investment, especially in pre-primary and primary education, has likely played a significant role. In ECA as a whole, government spending on education fell from 4.2 to 3.9 percent of GDP between 2009 and 2019. Widening income inequality among the families of students in the region may have also had an effect. Learning outcomes in many ECA countries are considerably higher for socioeconomically advantaged students than for disadvantaged students, who are often effectively segregated from high achievers (OECD 2021a).

But educational challenges not only weigh on an inclusive recovery, but also hinder the private sector and dampen long-term growth prospects.[9] Mismatches between labor market needs and skills form a significant constraint on potential output growth in ECA. ECA countries rank above the EU average in skill mismatches, the gaps being particularly large for Albania and Bulgaria (IMF 2021a). Across ECA, skills of graduates from vocational and higher education are often poorly aligned with needs. One result is the high proportion of young people neither employed nor in education or training (NEETs). NEET rates in 2021 were above the EU average in most ECA countries, and more than 10 percentage points higher for women than men in Bulgaria, Poland, and Romania. High NEET rates may reflect weak labor market policies and lower spending

[9] Enterprise Survey data from the World Bank indicate that an inadequately educated workforce is one of the largest constraints on firms' ability to grow in Bulgaria, Poland, and Romania—especially in Bulgaria and Romania, where nearly a quarter of firms identified education as a constraint (World Bank 2022c).

in ECA countries compared to the EU. Participation in training (based on survey data from recent years) ranged from less than 2 percent of the population aged 25-64 years in Bulgaria to 6 percent in Hungary and Türkiye. This compares with an EU average of 11 percent (European Commission 2022).

Other major drivers of TFP growth also slowed in 2011-21. After a boost from EU-accession reforms, governance reform efforts have slowed in many of the new member states and backtracked in others, weakening the business environment and likely hindering competition and innovation. Pervasive corruption and large informal sectors in some countries are major constraints on the ability of private firms to invest, innovate, and close productivity gaps with the EU. In 2018, ECA countries continued to fall short of the EU average in the public institutions component of the Global Competitiveness Index, with already sizable gaps in ethics and corruption widening in some cases. The adverse effects of such poor governance tend to be magnified by the state's outsized footprint on the economy (figure 2.9.A-D). Even in ECA's EU countries, World Bank Enterprise Survey data for 2019 indicate that institutional weakness hindered private sector activity: firms highlighted obstacles related to meeting with tax officials in Bulgaria and Romania and competition from informal firms in Bulgaria and Poland (figures 2.9.E and 2.9.F).

Another important driver of TFP growth is R&D spending, which promotes technological innovation (Hallward-Driemeier et al. 2020).[10] Average R&D spending in the region remained under 1 percent of GDP throughout the 2010s, whereas in the EU it rose from about 2 percent in 2010 to 2.2 percent by 2018. Thus, a deteriorating business environment, weakening governance, and sluggish R&D investment have likely all tended to slow or constrain TFP growth in the past decade, with the average contribution of TFP growth to potential output growth estimated to have declined from 1.7 percentage points in 2000-10 to less than 1 percentage point in 2011-21.

The COVID-19 pandemic and the Russian invasion of Ukraine are likely to have weakened ECA's potential growth through several channels. Fixed investment is likely to have been dampened by increased uncertainty, including about the longer-term international economic landscape and risks of deglobalization, and by reduced investor confidence.

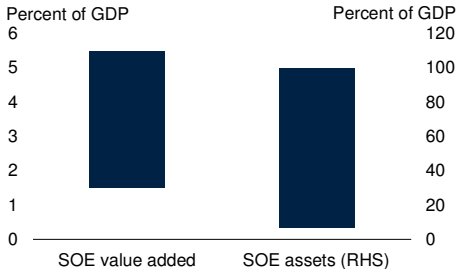
The pandemic has also set back human capital formation. Schools in ECA were closed completely for nearly 65 days and partially for over 75 days, on average, between March 2020 and September 2021 (Donnelly and Patrinos 2021; Patrinos 2022). Survey data point to a year's worth of learning losses among students in at least 11 ECA countries (Patrinos 2022). The adverse economic effects will become more pronounced as the cohort of current children enters the labor market. Education losses from the pandemic

[10] Innovations are typically the result of a financially demanding research processes that generates intellectual property assets. These include patented inventions or ideas for the digital setting that are protected by copyright or otherwise (Pelikánová 2019).

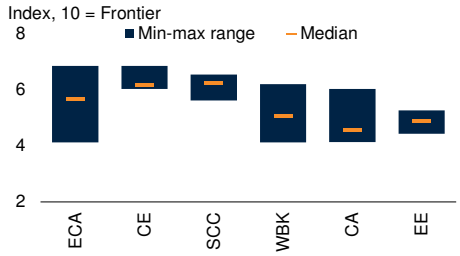
FIGURE 2.9 ECA: Drivers of potential output growth

Progress with reforms and the transition to a competitive market economy has stalled in many ECA countries. Inefficiencies of state-owned enterprises, stalled efforts to improve governance and reduce corruption, and delays in promoting private-sector development weigh on potential growth.

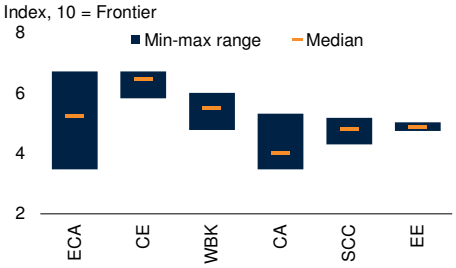
A. EBRD state-owned enterprise activity and assets



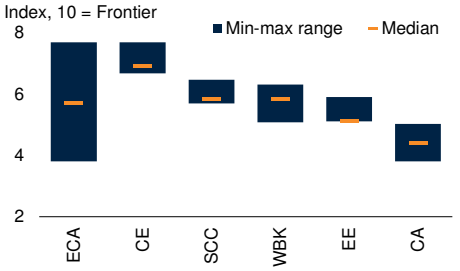
B. EBRD assessment of governance, 2021



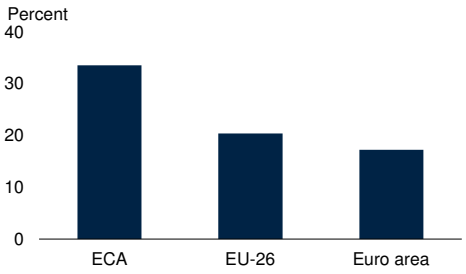
C. EBRD assessment of transition to a competitive market economy, 2021



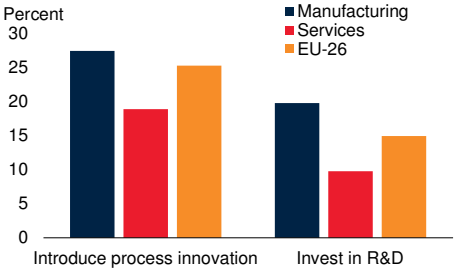
D. EBRD assessment of integration, 2021



E. World Bank Enterprise Surveys: Share of firms that met with tax officials



F. World Bank Enterprise Surveys: Share of firms that introduce process innovation and invest in R&D



Sources: EBRD (2020, 2021); World Bank; World Bank, Enterprise Surveys database.

Note: CA = Central Asia; CE = Central Europe; ECA = Europe and Central Asia; EE = Eastern Europe; RUS = Russian Federation; SCC = South Caucasus; SOE = state-owned enterprises; TUR = Türkiye; WBK = Western Balkans.

A. SOE data are 2014-16 averages, as presented in Sanja and Tabak (2020). Sample includes 25 of the 38 countries covered by EBRD, of which 17 are ECA EMDEs.

B.-D. Data reflect the scores of transition qualities, which measures each economy's performance against that of comparator economies in EBRD regions, as presented in EBRD (2021). Scores range from 1 to 10, where 10 represents a synthetic frontier corresponding to the standards of a sustainable market economy.

E.F. Data for the EU-26 grouping and the euro area exclude Germany. Aggregates are calculated as averages. Data are for 2019.

E. Figure shows percent of firms that were visited or inspected by tax officials or were required to meet with them over the last year.

F. "Introduce process innovation" data indicate the percent of firms that introduced any new or significantly improved process over the last three years, including methods of manufacturing products or offering services; logistics, delivery, or distribution methods; or any supporting activities for processes. "Invest in R&D" data indicate the percent of firms over the last fiscal year that invested in formal research and development activities.

have likely been larger in poor and vulnerable populations and underserved regions, partly owing to pre-existing challenges that include uneven digital connectivity, low public expenditure on education, and inequitable learning opportunities and outcomes. On top of that, Russia's invasion of Ukraine has triggered an influx of displaced people from Ukraine—about half of which are children—to neighboring ECA countries, which will require additional resources to meet their educational needs.

As in past crises, the pandemic triggered a rise in the share of young people who are neither employed nor in education or training. The recent increase raises concern that many of today's young people will remain out of the labor market for years to come, facing a higher likelihood of poverty and reducing actual and potential output in the countries where they live (European Commission 2022).

Prior to the invasion of Ukraine, ECA working hours had nearly returned to their pre-pandemic trend (ILO 2022a). The negative impacts of the pandemic on labor supply and markets has varied across ECA countries, partly owing to differing levels of government support for jobs and incomes, resulting in an uneven shock to country-level potential growth. In some economies, job losses were partly mitigated by employment retention schemes, resulting in 2020 employment rates that were largely unchanged from 2019. This was observed, for example, in Hungary, Poland, and Romania, as well as in some Western Balkan economies, including North Macedonia and Serbia. In contrast, employment rates fell and unemployment rose sharply in 2020 in many countries in Eastern Europe, the South Caucasus, and Central Asia, where employment retention schemes were smaller or absent. In many of these countries, where informality tends to be high, increases in unemployment were somewhat stemmed by shifts from wage and salaried work to self-employment (ILO 2022a).

The labor market recovery since 2020 has been similarly uneven across and within countries, as well as across sectors. In Türkiye, Poland, and Kazakhstan—ECA's second, third, and fourth largest economies, respectively—employment has returned to pre-pandemic rates, and in the Central European economies labor market slack has returned to or fallen below pre-pandemic levels.[11] In contrast, the recovery has been more sluggish in some economies in South Caucasus and Central Asia. In some cases, labor market recoveries have been shallower than unemployment data suggest because employment losses have been offset by increases in people outside the labor force—reflecting, for example, job seekers that have become discouraged from long spells of unemployment. High-frequency World Bank Household Survey data indicate persistent financial concerns among the poor and vulnerable, as pandemic-related job and income losses have disproportionately affected them, particularly in lagging regions within countries (World Bank 2022h).[12] As a result, the erosion of human capital from

[11] Labor market slack is measured by Eurostat and is defined as unemployed, inactive, unavailable, and underemployed people as a share of the labor force and potential additional labor force (that is, those inactive and unavailable).

[12] As measured by Eurostat's NUTS 2 and NUTS 3 regions, which comprise Bulgaria, Hungary, Montenegro, Poland, Serbia, Romania, and Türkiye.

pandemic-induced unemployment has varied in ECA, which could lead to divergences in potential growth over the coming years.

The pandemic has highlighted not only the critical role of digital connectivity for the continuity of public service provision and economic activity, but also the digital divide across income groups and geographic regions. Although access to broadband internet has expanded over the past decade in ECA, with almost all households having access by 2018, a large share of the population still lacks basic digital skills and does not use digital technologies. In 2021, fewer than half of Central and Eastern Europeans had basic digital skills. This has limited the use of the internet for e-commerce and interaction with public authorities to levels much lower than in the rest of Europe.[13] Moreover, it has been much easier for highly skilled and high-wage workers to work remotely compared to low-skilled workers. Thus, low-skilled workers experienced a significantly larger drop in employment, especially during the first wave of the pandemic when policies on social interaction were at their most restrictive. Lack of access to digital devices during school closures also put disadvantaged students at higher risk of learning losses (World Bank 2021e). This underscores the fact that for the potential benefits of the digital transition to be widely harnessed, a broad range of complementary elements are required, including access to broadband, trust in the digital system and a baseline of digital skills among the population.

Potential growth prospects in ECA

Potential output growth in ECA is projected to slow from an annual average pace of 3.6 percent per year over 2011-21 to 3.0 percent per year in 2022-30—compared with 4.2 percent per year in 2000-10. As a result, potential per capita growth is expected to slightly decelerate to 2.8 percent per year over 2022-30 from 2.9 percent per year in 2011-21. The projected slowdown reflects a continued deceleration of all the main drivers of growth, exacerbated by the effects of the pandemic and the war in Ukraine.

Potential growth is expected to depend increasingly on capital accumulation as its other drivers—growth of the labor force and TFP—weaken due to increasingly unfavorable demographic developments. Labor force growth is expected to be constrained by intensifying demographic pressures, and its contribution to potential growth is projected at less than 0.1 percentage point a year, on average, over 2022-30. Meanwhile, TFP growth is expected to remain relatively weak, at less than 1 percent a year, over the remainder of this decade. Capital accumulation may be constrained by slowing progress with reforms; lingering structural bottlenecks, including lack of digital skills; low R&D spending; and waning gains from earlier reforms, particularly in ECA's five EU member

[13] In 2021, ECA countries ranked among the lowest in the EU in the European Commission's Digital Economy and Society Index. Low rankings reflect weakness in digital connectivity (for example, in Bulgaria, where only 59 percent of households subscribe to broadband services, well below the EU average of 77 percent), online public service delivery (Bulgaria, Romania), and digital skills (for example, in Bulgaria, Poland, and Romania; only 29 percent of Bulgarians aged 16 to 74 years have basic digital skills compared to the EU average of 56 percent).

states, inch closer to convergence with the EU.[14] Thus, in the baseline projection, capital accumulation accounts for about 70 percent of potential output growth in 2022-30.

The projected slowdown in potential output growth in ECA is not evenly spread across countries. It largely reflects slowdowns in Türkiye and, to a lesser extent, Poland. In Türkiye, potential growth is projected to fall from 4.6 percent a year in 2011-21 to 3.4 percent a year in 2022-30, as the contribution of capital accumulation slows. Investment prospects have deteriorated sharply owing to a weakening of macroeconomic policy frameworks and macroeconomic stability, which has dented confidence and increased uncertainty. The earthquakes that hit Türkiye in February 2023 may result in increased investment over the next few years as reconstruction efforts get underway, but largely to replace capital stock that has been damaged or destroyed (chapter 4). Despite the possibility of temporary upticks in growth due to reconstruction, adverse events such as earthquakes can have large sustained negative effects on productivity in the longer run through dislocating labor, tightening credit conditions, disrupting value chains, and decreasing innovation. Beyond the impact of the earthquakes and heightened uncertainty around investment prospects, other structural headwinds are weighing on potential growth over the remainder of the decade, including low labor force participation and weak productivity growth (World Bank 2020e).

In Poland, also, all drivers of potential growth are expected to weaken in the remainder of this decade. TFP gains from earlier reforms are expected to fade as the country continues to close its per capita income gap with the EU. The disbursement of Next Generation EU funds has been delayed, dampening investment, compounding existing challenges with the absorption of funds, and threatening a missed opportunity to boost TFP given that investments and reforms associated with these funds must be implemented by end-2026. The contribution from labor force growth is expected to become negative as the working-age population declines, though this could be partly offset by the immigration of Ukrainian workers—an upside risk to the baseline forecast.

Elsewhere in ECA, potential output growth in 2022-30 is projected to be either stronger than, or close to, the growth rates of 2011-21. In some Central European and Western Balkan economies, faster growth is expected to be driven by sizable EU-related spending. Potential growth in these economies could be even stronger than projected in the baseline if the associated reforms are successfully implemented (World Bank 2022i). In particular, national targets for increasing R&D spending could support digital and green agendas and help raise TFP growth above the baseline.

Although potential growth prospects vary across the region, demographic headwinds are expected to intensify in each ECA economy as populations age and with birth rates remaining low (European Commission 2021). Consequently, the working-age shares of populations in ECA economies are expected either to continue increasing more slowly

[14] This is especially true of Poland, where output per capita in equivalent purchasing power terms was already about three-quarters of the EU average in 2019.

or to fall from peaks reached a decade ago or earlier; the shares of those retiring are expected to rise. Without policies to bolster labor-force participation rates, improve job opportunities to discourage emigration, and better integrate immigrants, labor-force growth will continue to fall and could become a drag on potential growth, with added fiscal challenges. Thus, the average contribution of labor-force growth to potential growth in ECA is projected in the baseline to fall from 0.3 percentage point a year over 2011-21 to less than 0.1 percentage point a year over 2022-30. For 9 of the 13 countries with available data, labor-force growth is expected to be a drag on potential growth. Even in the countries where this is not the case—Türkiye and the countries of Central Asia—the contribution in 2022-30 is expected to be weaker than in 2011-21. Türkiye, in particular, suffers from low labor force participation: its employment rate in 2019, at 54 percent, was nearly 20 percentage points below the EU average, reflecting, in particular, a large gap in female participation and employment (34 percent in Türkiye versus 67 percent in the EU).

The baseline projection is subject to many risks related to the possibilities of further pandemic outbreaks and a more prolonged or severe conflict in Ukraine than presently envisaged. Even after the pandemic and war recede, they may have lingering effects in increasing inequality by magnifying existing disparities and causing large human capital losses among people who are already disadvantaged. This could weaken potential growth, especially if large segments of the population are left behind.

There are also some upside risks to the projections. For countries neighboring Ukraine, the migration resulting from Russia's invasion could alleviate labor supply constraints. Some of Ukraine's neighbors in ECA, particularly Poland and Romania, have taken in large numbers of Ukrainian refugees. Unlike some previous migration waves, however, roughly half of these migrants are children, and the share over the age of 64 years is also relatively high (UNHCR 2022). The inflows of Ukrainian refugees could boost the labor supply by around 1 million in Poland and over 60,000 in Romania, implying increases in potential output growth of 0.4 and 0.1 percentage point a year, respectively, unless or until the migrants return (IMF 2022a; Strzelecki, Growiec, and Wyszyński 2020; World Bank 2022i). The integration of these new workers is being supported by the EU's recently announced measures to provide services to forcibly displaced persons. The possible increase to potential growth could be even higher, since Ukrainian migrants, on average, have more years of schooling than the native populations in these receiving countries.

Policy options to lift potential growth in ECA

ECA faces formidable challenges in seeking to achieve convergence of living standards with the EU, particularly given the prospect of weakened potential output growth in the years ahead (Dieppe 2021). However, potential growth could be meaningfully lifted by reforms that fill the region's remaining investment needs, including climate adaption and resilience; bolster human capital to address the pandemic's negative effects and deteriorating education outcomes; and mitigate demographic headwinds. Investment could be boosted, and potential growth further lifted, by reforms that address ECA's

structural shortcomings related to the quality of governance and institutions, private sector development, and increased investment in R&D and the digital transition.

In a scenario in which the largest ten-year increases on record in each country in investment growth, education outcomes, life expectancy, and elderly and female labor force participation are assumed to be repeated, it is estimated that potential output growth could pick up from the baseline rate of 3.0 percent a year to 3.8 percent a year in 2022-30—faster than the 3.5 percent annual pace of 2011-21 (figure 2.10.A). Higher investment is expected to contribute three-quarters of the 0.8 percentage-point boost to annual potential growth. Social benefit reforms (assumed to raise labor force participation) account for another quarter. The remainder results from labor market reforms (also assumed to raise labor force participation) and education and health improvements. In a separate scenario in which investment is increased to tackle climate change, potential growth over 2022-30 would rise by 0.4 percentage point a year over the baseline, to 3.4 percent—only slightly lower than the average pace of 2011-21 (figure 2.10.B).[15]

Private investment and innovation are encouraged by strong institutions and conducive business climates, a strong rule of law with secure and enforceable property rights and minimal expropriation risk, a stable and confidence-inspiring policy environment, and low costs of doing business. The same factors encourage participation in the formal sector, where productivity tends to be higher than informal activity (World Bank 2018a, 2019a, 2021e). Stronger private sector-driven growth in ECA will depend critically on structural reforms to make the region's economies more market-based.

Given large gaps in the quality of governance between ECA's economies and EU peers, reforms that strengthen institutions should be prioritized. Action on this front would support TFP growth as well as investment (World Bank 2021e). A weak rule of law can result in an uneven playing field that disadvantages the private sector when competing against the state, while corruption can contribute to state capture of private sector activity. Failure to establish a strong rule of law and eliminate corruption will damage economic growth and increase fiscal risks, including those related to spillovers from impaired corporate balance sheets to public sector balance sheets, which, as history shows, can lead to large fiscal costs (Bova et al. 2016).

A related challenge is the large and still not entirely reformed state-owned enterprise sector in many ECA countries. Indeed, the state's large footprint in many ECA economies has grown larger since 2020 because of the need for government support related to the pandemic and the war in Ukraine.[16] A larger state footprint, combined with weak rule of law in many cases, increases the likelihood of an uneven playing field that disadvantages the private sector. Pervasive corruption and state capture likewise

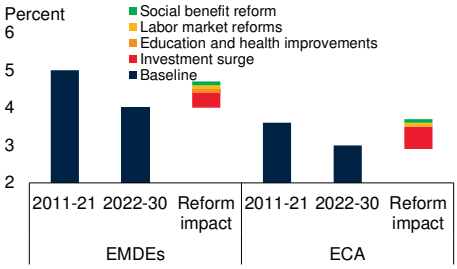
[15] See chapter 5 for a detailed description of the assumptions.

[16] In the near to medium term, policy makers must carefully balance the need to support vulnerable populations, especially given the sharp increases in commodity prices exacerbated by the war in Ukraine, with the need to shore up fiscal sustainability—a key requirement of government effectiveness. Over time, government involvement is likely to retreat as support is unwound.

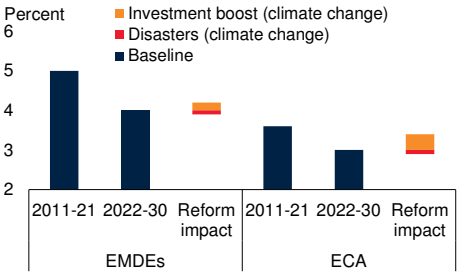
FIGURE 2.10 ECA: Potential output growth: scenario results

A reform package targeting an aging workforce, female labor force participation, education, and investment could lift potential growth in ECA in 2022-30 above its 2011-21 average. Climate change investment alone could boost potential growth above its 2011-21 average. In ECA's EU economies, substantial EU funding and associated reforms could double potential growth in some economies.

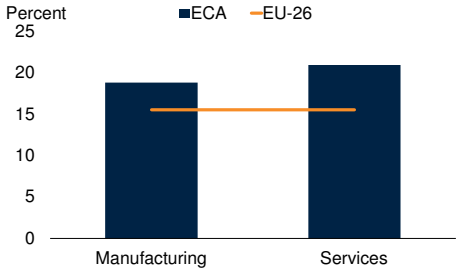
A. Potential growth under reform scenarios



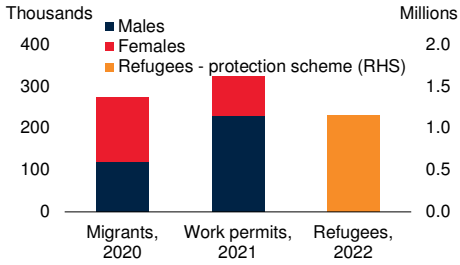
B. Climate change scenarios



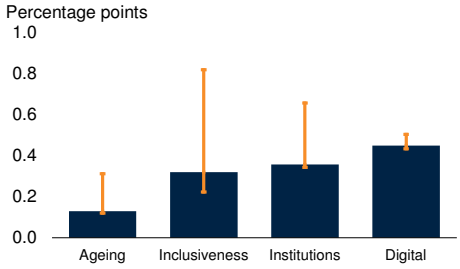
C. Share of firms reporting competition from informal firms as a constraint, 2019



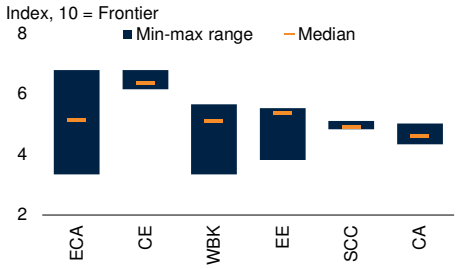
D. Poland: Ukrainian migrants and forcibly displaced people, through June 2022



E. Impact on Central European potential growth from NGEU reforms and policy targets



F. EBRD assessment of green transition, 2021



Sources: EBRD (2020, 2021); Enterprise Surveys database; Haver Analytics; IMF; Oxford Economic Model; Penn World Tables; UNHCR; United Nations (2020); UN Population Prospects; World Bank; World Bank Development Indicators database.
Note: CA = Central Asia; CE = Central Europe; ECA = Europe and Central Asia; EE = Eastern Europe; RUS = Russian Federation; SCC = South Caucasus; TUR = Türkiye; WBK = Western Balkans. Period averages of real GDP-weighted averages. Data for 2022-30 are forecasts.
A.B. Potential growth estimates based on production function approach. Sample includes 53 EMDEs. of which 9 countries are from ECA. Methodology is described in chapter 1 and reform scenarios are described in chapter 5.
C. Percent of firms identifying practices of competitors in the informal sector as a major constraint. Data for the EU-26 country grouping and the euro area exclude Germany. Aggregates are calculated as averages.
D. Refugees indicate those registered for national protection schemes. Migrants indicate migrant stock in mid-2020.
E. Impact on Central Europe potential output of Next Generation EU (NGEU) reforms, as described in World Bank (2022i). Orange whiskers show min-max range. Sample includes Bulgaria, Poland, and Romania.
F. Scores for transition quality, which measures each economy's performance against that of comparator economies in EBRD regions, as presented in EBRD (2021). Scores range from 1 to 10 (10 = standards of a sustainable market economy).

form formidable constraints on the ability of private firms in ECA to invest and innovate. It is thus critical for ECA countries to strengthen institutional quality and ensure that the state promotes the efficient allocation of resources.

Among the most effective and ways of improving government efficiency, accountability, control of corruption, and service delivery are digitalization and broader use of information technologies in the public sector (World Bank 2021b). Policies to enhance data transparency and security can also play an important role in strengthening institutions, including by making governments more accountable, which in the long run should raise per capita incomes (Islam and Lederman 2020).

In the context of institutional reform, there is considerable scope for ECA governments to reform and even dismantle regulatory barriers to doing business and entrepreneurship. The aim should be to ensure effective regulation that is conducive to the efficient working of competitive markets while addressing market failures (figure 2.10.C; Kilic Celik, Kose, and Ohnsorge 2020).

Lack of exposure to international competition—often the result of non-tariff barriers and complex trade rules, as well as restrictive product market and services regulations—remains a structural bottleneck to growth in the region, hindering the ability to raise exports as well as attract domestic and foreign investment. The OECD's product market regulation indicator shows conditions in ECA to be 30 percent more prohibitive than the EU average, with particular bottlenecks arising from high public ownership and barriers to trade and investment (OECD 2022).

The invasion of Ukraine has put at risk decades of hard-won gains in regional trade and investment integration by fracturing critical trade routes, supply chains, and financial intermediation. This could result in less specialization, fewer economies of scale, less competition, and the slower spread of productivity-enhancing innovations.

Policies are urgently needed in many ECA countries to tackle intensifying demographic pressures by raising labor force participation. These include measures that would help raise retirement ages toward EU levels and help align retirement ages between men and women. In most ECA countries, the average effective labor market exit age remains below the EU average, with a large part of this gap accounted for by an earlier retirement age for women. Over the next decade, average effective retirement ages are expected to increase in the EU to 65 years for men and women, but in most ECA countries they will remain below this level (European Commission 2021). In some cases, such as Poland, earlier reforms to increase the retirement age of women have been reversed, with current legislation setting retirement ages at 65 years for men and 60 years for women. But in several economies (Bulgaria, Romania, Türkiye) pension reforms are planned that lift statutory retirement ages for men and women over the next decade or so.[17] These measures can be supplemented with others that increase the average effective

[17] Increasing the female retirement age has been found to bolster female participation in such countries as Japan and Switzerland (Lalive and Staubli 2015).

labor market exit age (Carone et al. 2016). For instance, pension age reforms can be complemented with broader labor market policies tailored to older workers, including measures that incentivize job searches by older workers, and that support the retention of older workers, as well as increased investing in health care to promote healthier aging (Bodnár and Nerlich 2020).

Despite efforts to increase female labor force participation, women continue to make up a large share of the inactive population in both ECA and the EU.[18] Female labor force participation may be boosted by job training programs specifically for women, including vocational training. This is especially urgent given low training participation in the region (Bandiera, Buehren, Burgess, et al. 2020).

Measures that support the integration of migrants from Ukraine could boost the labor force and consequently potential growth (figure 2.10.D; IMF 2022a; Strzelecki, Growiec, and Wyszyński 2020).

The skill-matching issues discussed above can be addressed by active labor market policies, including measures that promote job search, training, and re-training. Many of these policies should target lower-income and lower-skilled households, where the risk of lost human potential is likely to be greatest. Digital infrastructure in schools needs urgent attention, while the rural-urban gap in education and challenges for inclusion (for example, for Roma in Romania) persist. Even in Poland, where learning outcomes are strongest among EU ECA countries, there are significant regional disparities, with the share of 25-64 year olds with tertiary education as low as 24 percent in some regions—less than half that in the Warsaw capital region (OECD 2021b). To address the harm caused by the pandemic and facilitate recovery of lost learning, potential measures could include high-quality, school-based tutoring and enrichment programs targeting the most vulnerable students (Patrinos 2022).

For ECA's EU economies, the EU's National Recovery and Resilience Plans (NRRPs), funded by the largest financing package ever approved by the EU, provide a unique opportunity for a new reform wave to boost potential growth and accelerate convergence with the EU (figure 2.10.E). NRRPs are intended to include policy measures and investments—including from Next Generation EU (NGEU), the EU's 800 billion euro program to support the economic recovery from the COVID-19 pandemic. NRRPs aim to promote equitable recovery, indicating that some of the additional jobs could be created in lagging regions. If the additional jobs from these investments draw on the inactive working-age population in lagging regions, the benefits could be substantial, with a 1 percent boost to the labor force by 2030 relative to the baseline projection.

The green transition will require policies to promote investment and structural change. An increase in green investment would likely boost potential growth, assuming it is not

[18] In Romania, about three-quarters of the inactive population aged 25 to 59 years are women (among the highest of the EU), pointing to the need for further investment to expand access to child and elder care. The share of women in the inactive population aged 55 to 64 years is above the EU average in both Poland and Romania, partly reflecting lower legislated retirement ages and thus younger average effective exit ages.

offset by cuts in other capital expenditures. And if these investments involve technological innovation, thus lifting TFP, the boost to potential growth could be larger. The impact on growth of the green transition will depend on green fiscal and other complementary policies (World Bank 2022g). In Central Europe, green investments mapped out in the NRRPs are expected to lift potential growth over the next decade but will require private sector investment and participation to reach longer-term climate goals.[19] The EU's Economic and Investment Plan for the Western Balkans, aimed at fostering integration and convergence with the EU, includes sizable funding for the green transition—a key priority given that these economies are among those in ECA farthest from the green transition frontier (figure 2.10.F).

The pandemic has highlighted the urgent need for reforms to promote the adoption of automation and digital technologies in ECA, given the region's wide digital gaps with the EU and persistent labor shortages. Policies to expand access to digital connectivity can raise productivity and potential output, including by helping to advance inclusion and catch up, institutional improvement, and the green transition. Expanding broadband and mobile internet access would promote more equitable access for distance learning across income levels and facilitate remote working (Barrero et al. 2021; Morikawa 2021). In addition to its productivity-enhancing effects, wider internet access has been found to increase female labor force participation (Viollaz and Winkler 2020). ECA's EU countries should take full advantage of NGEU-funded reforms to foster the digital transition.

Policies to raise R&D spending have considerable potential in ECA, given its current low levels and that it's an important driver of TFP growth (Yuan et al. 2021). Raising R&D spending may be one of the most promising ways of speeding up the convergence of ECA's per capita income with the EU. Increasing R&D spending might improve digital connectivity and promote more inclusive growth. Smaller firms and lagging regions in ECA have much to gain from such innovation (Hallward-Driemeier et al. 2020).

[19] The NGEU is anticipated to deliver a large boost to public investment, with the largest share of NRRP spending allocated toward climate change-related investments (37 percent of NRRPs).

LATIN AMERICA and the CARIBBEAN

Potential output growth in Latin America and the Caribbean (LAC) has been set back by the COVID-19 pandemic and the war in Ukraine, exacerbating a trend that goes back two decades. Following a steep decline in 2020, investment largely recovered in 2021, but medium-term prospects for investment growth remain too modest for it to lift potential growth. This, together with sustained weakness in total factor productivity growth and slow growth of working-age populations, most notably in South America, suggests that potential output growth will remain weak in the remainder of this decade. Reforms to boost labor force participation and improve education and health outcomes could help lift potential growth, but the most effective approach is likely to be addressing reforms that raise investment growth or boost productive efficiency. Investment in the climate transition could also boost potential output growth in LAC.

Introduction

Prior to the pandemic-induced recession of 2020, output growth in LAC had already slowed sharply, from a high of 6.7 percent in 2010 to an annual average of less than 1 percent between 2015 and 2019, including a recession in 2016. This weakening of the region's growth was due to a combination of cyclical and structural factors, including lower global commodity prices and economic and political challenges in some of the region's largest economies. Total factor productivity growth (TFP) slowed to a crawl in the pre-pandemic deacde, turning negative in some years. Potential output growth in LAC is also estimated to have declined in the 2010s, and is the lowest among the EMDE regions.

In 2020, LAC experienced the deepest pandemic-induced recession of any EMDE region, and several LAC countries were among those with the highest per capita death rates globally. Widespread disruptions to education and severe damage to public health set back human capital accumulation. Following a precipitous fall in 2020, investment largely recovered in 2021, but consensus forecasts suggest that investment growth will remain too low to lift potential output growth significantly. The global supply shock from the war in Ukraine that began in February 2022 is also likely to reduce potential growth in LAC. The war's impacts on inflation and commodity markets have contributed to an extended period of macroeconomic instability, raising recession risks even as recovery from the 2020 recession remains incomplete (World Bank 2022j). Negative effects on investment due to tighter financial conditions are likely to outweigh any positive response to higher prices in regional commodity exporters.

The prospect of sustained weakness in TFP growth and deteriorating demographic conditions, most notably in South America, suggests that potential output growth in the remainder of this decade will be roughly unchanged from its low levels in 2011-21. Policies to boost labor force participation and improve education and health outcomes could raise potential growth to some extent, but the most effective approach in LAC is likely to be reforms that increase investment growth or improve productive efficiency. Investment in climate transition could also boost growth in LAC, given the region's endowments of natural resources that are likely to be critical inputs to achieve transition, such as lithium and copper.

Evolution and drivers of potential growth in LAC

During 2011-21, potential output growth in LAC is estimated to have averaged around 2.2 percent a year, below the 2000-10 annual average of 2.7 percent (figure 2.11).[20] The slowing of potential growth is accounted for by shrinking contributions from the growth of TFP and labor. The finding that potential growth declined is robust to the method of estimation.

Potential TFP growth in LAC, which has long been below that in other EMDE regions, slowed to virtually zero after peaking in 2007; potential TFP was essentially flat between 2015 and 2019. Weak investment growth, starting in the mid-2010s, held back the absorption of productivity-enhancing new technologies, with commodity-exporting economies struggling to adapt to falling commodity prices (OECD 2016). Worsening terms of trade, a consequence of the downturn in commodity prices, may also have dampened TFP growth in the region's commodity exporters by reducing spending on research and development (R&D) and slowing innovation (Aslam et al. 2016). This hypothesis is supported by evidence that improving terms-of-trade during 2001-07 explained more than one-quarter of average TFP growth in this period in Mexico, Chile, and Peru (Castillo Bardález and Rojas Zia 2014). In keeping with anemic TFP growth and a severe cyclical downturn, per capita growth fell far below its estimated potential level of 1.2 percent per year during 2011-21, registering actual per capita income growth of only 0.4 percent per year.

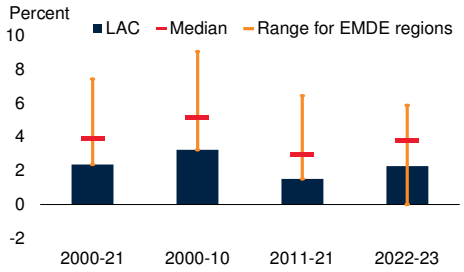
Shortcomings in education and training have long dampened productivity growth in LAC. Although access to education has steadily risen in recent decades, the low quality of primary and secondary education, relative to international standards and countries with similar per capita incomes, has hindered productivity gains (OECD 2015; OECD/CAF/ECLAC 2016; World Bank 2021f). Further, at the tertiary level, graduation rates are low, and quality appears to have suffered as demand has expanded rapidly (World Bank 2021g). Regional productivity growth is further impeded by still-stringent labor and product market regulations and high levels of informality, as well as institutional weaknesses, reflected in such problems as elevated levels of wasteful government expenditure and corruption (de Paulo, de Andrade Lima, and Tigre 2022; IDB 2018).

[20] For the period 2000-22, 20 LAC economies are included in the estimation, representing 99 percent of 2020 LAC GDP.

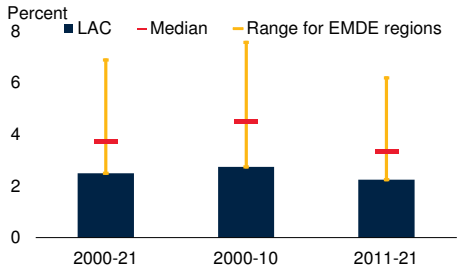
FIGURE 2.11 LAC: Output growth and drivers of potential growth

While much of the decline in output growth during the period 2011-21 was cyclical, drivers of potential growth also weakened markedly compared to 2000-10. Potential TFP growth slowed to near-zero, while investment growth was anemic, in part reflecting much weaker terms of trade.

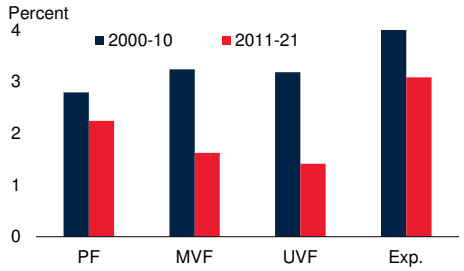
A. GDP growth



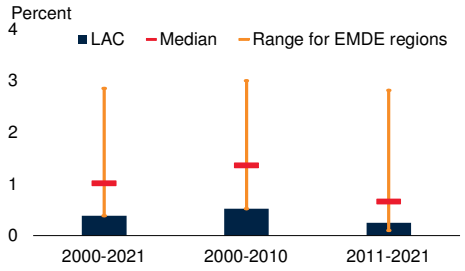
B. Potential GDP growth



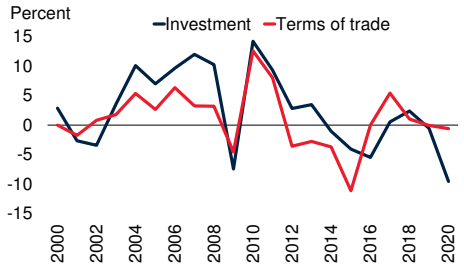
C. Potential growth by different measures



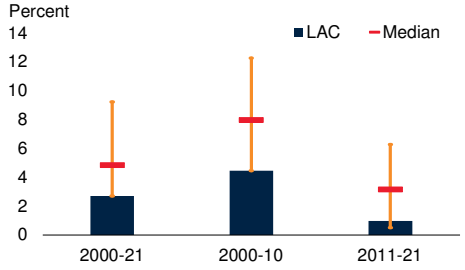
D. Potential TFP growth



E. Investment growth and changes in terms of trade



F. Investment growth



Sources: Haver Analytics; National statistical agencies; Penn World Tables; UN Population Prospects; World Bank; World Development Indicators.

Note: EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-23 are forecasts.

A.B.D.F. Bars show period averages of annual GDP-weighted averages. Markers show the median of GDP-weighted averages of the six EMDE regions; orange whiskers show min-max EMDE range (of which LAC is the minimum).

B. Estimates based on production function approach.

C. MVF = multivariate filter; PF = production function approach; UVF = univariate filter (specifically, the Hodrick-Prescott filter). Expectations-based estimates ("Exp.") are potential growth proxied by five-year-ahead IMF *World Economic Outlook* growth forecasts. Details on the approaches are provided in chapter 1. Sample is a consistent set of 10 economies.

D.F. Sample includes 53 EMDEs, of which 16 are LAC economies.

E. Investment-weighted average growth rates and GDP-weighted terms of trade changes. Sample includes 20 LAC economies.

Numerous studies have documented that weak TFP growth has been the principal contributor to the region's low potential output growth (Aravena, Friedman, and Hofman 2017; IMF 2017b; Loayza, Fajnzylber, and Calderón 2005).[21] One study found that in the nearly half-century leading up to the financial crisis of 2008-09, relatively low TFP growth, rather than relatively weak capital accumulation or labor force growth, was the main factor contributing to the widening income gap between most LAC countries and the United States (Daude and Fernández-Arias 2010).[22]

The contribution of labor force growth to LAC's potential output growth has declined substantially since the early 2000s, mainly owing to falling population growth. The growth of the working-age population fell to an average of 1.3 percent a year in 2011-21 from 1.8 percent a year in 2000-10 in spite of a marginal rise in the working-age share of the population. Labor's contribution to growth has declined even though female labor force participation has risen more than in other EMDE regions. It increased by approximately 10 percentage points between the mid-1990s and 2019, reaching nearly 60 percent.

The growth of fixed capital investment in LAC over 2000-21 broadly followed the contours of movements in commodity prices and the region's terms of trade. It was weak in the early 2000s, stronger in the decade 2003-13 (except for the period of the global financial crisis), and weaker again in 2014-19, contracting by 1.3 percent a year on average. There was then a collapse of more than 11 percent in the 2020 recession, followed by a rebound in 2021 amid sharply rising commodity prices. In 2011-21, investment grew at an average of just 1 percent a year, well below the 2000-10 annual average of 4.5 percent. Although the deterioration in the region's terms of trade was a key factor underlying much of the investment decline prior to the pandemic, policy uncertainty and bouts of tightening financial conditions have also been important (chapter 4; IMF 2015; World Bank 2016, 2017a). The role of commodity price movements was augmented in some commodity-exporting countries by procyclical effects on fiscal revenues and public capital expenditures.

In terms of LAC's three sub-regions, the slowing of potential growth between 2000-10 and 2011-21 is accounted for predominantly by South America—the largest subregion in economic size. Around half of the countries in South America experienced a slowdown in potential growth, including the largest two economies, Brazil and Argentina (figure 2.12). Although the contribution to potential growth from TFP in Mexico and Central America remained lower than in other LAC subregions, at just 0.2 percentage point a year during 2011-21, this subregion avoided the slowdown in potential TFP growth that afflicted South America and other EMDEs. TFP growth

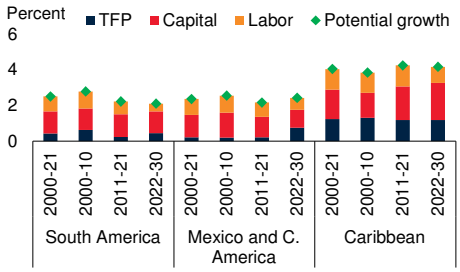
[21] See also, for instance, Faal (2005) on Mexico and Ollivaud, Guillemette, and Turner (2016) on Chile.

[22] Another study applying growth accounting to data from 1820 onwards found that over nearly 200 years, among nine LAC countries, only Chile narrowed its per capita income differential with the United States (Hofman and Valderrama 2020).

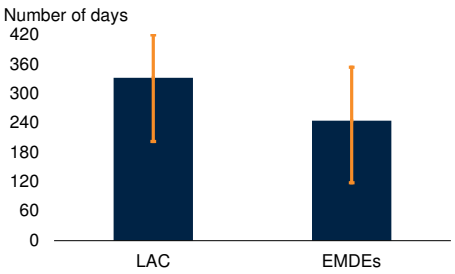
FIGURE 2.12 LAC: Potential output growth

Slowing growth of the working population and potential TFP weakened potential output growth in South America in 2011-21, relative to 2000-10. In Mexico and Central America, weaker potential growth in 2011-21 reflected demographics and capital accumulation. In the Caribbean, potential output growth rose. Outsized pandemic-related school closures in LAC have damaged human capital accumulation.

A. Contributions to subregional potential growth



B. Duration of school closures



Sources: Hale et al. (2021); Haver Analytics; Penn World Tables; UN Population Prospects; World Bank.
Note: EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean. TFP = total factor productivity. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates) for the period 2011-19. Data for 2022-30 are forecasts.
A. Period averages of annual GDP-weighted averages. Potential growth estimates based on production function approach. South America includes nine economies (Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, and Uruguay), Mexico and Central America includes five economies (Costa Rica, Guatemala, Honduras, Mexico, and Nicaragua), and Caribbean includes two economies (Dominican Republic and Jamaica).
B. Simple averages. Orange whiskers are interquartile range. Sample includes 137 EMDEs (33 from LAC).

contributed more to potential growth in the Caribbean than in the other subregions, but still slowed between 2000-10 and 2011-21. Increasing contributions from labor force growth and capital accumulation offset this, however, so that the Caribbean was the only LAC sub-region where potential growth increased in 2011-21, relative to 2000-10.

The pandemic-induced recession of 2020, which was deeper in LAC than any other EMDE region, and its after-effects, have eroded potential growth further. Although total investment largely recovered to its long-term trend in 2021, inward foreign direct investment is estimated to have fallen more sharply in 2020, and not to have recovered to its pre-pandemic level in 2021 (UNCTAD 2022). This may imply less transfer of productivity-enhancing knowledge and technology (Bruhn, Calegario, and Mendonca 2020). Perhaps even more significant, LAC saw the longest school closures among EMDEs, holding back the development of human capital in young people. In March 2021, it was estimated that the number of secondary school children in LAC unable to read a basic text may have increased by more than 15 percent (World Bank 2021f). Such learning losses, if not remediated promptly, are likely to lower labor productivity and lifetime incomes for the current school-age generation (Werner, Komatsuzaki, and Pizzinelli 2021). To the extent that they compromise social mobility, such losses can also compound over generations (Hill and Narayan 2020).

Potential growth prospects in LAC

In the rest of the 2020s, potential output growth in LAC appears likely to stagnate at low levels, with no improvement in South America, and a slight pick-up in Mexico and Central America offset by a modest slowdown in the Caribbean. Labor force growth seems likely to continue to decline. Investment growth is expected to improve somewhat on average, but not markedly and only after further near-term weakness. TFP is expected to regain some momentum from its near-zero growth rate in 2011-19, but only enough to offset the effects of slowing labor force growth. Thus, without significant policy action or a major productivity breakthrough, potential growth in LAC is expected to remain at 2.2 percent a year in 2022-30, identical to the period 2011-21 and the lowest of all EMDE regions (figure 2.13).[23]

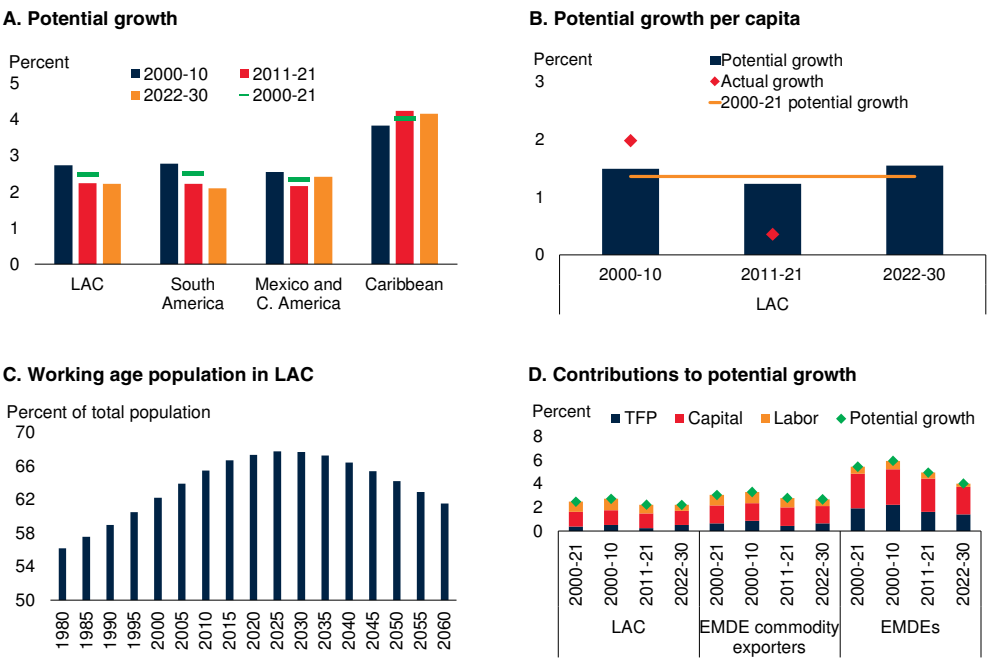
The contribution of labor force growth to potential output growth in 2022-30 will be constrained not only by a falling working-age population share (expected to soon peak), but also by limited potential for additional gains in already high female labor force participation rates. With the contribution from labor force growth shrinking, potential growth is expected to sustain due to a slight increase in per capita potential growth in 2022-30, to 1.6 percent. Improved per capita potential growth is underpinned by a modest projected pick-up in potential TFP growth, expected to contribute about 0.5 percentage point a year to potential growth. This estimate takes into account the past relationships in LAC between investment growth and TFP growth, and between rising commodity prices and investment growth. However, no simple mapping can be assumed between commodity-related investment and productivity improvements, especially given the potential for expansion of primary commodity exports to crowd out manufacturing and compromise the competitiveness of other sectors (Alvarado, Iniguez, and Ponce 2017).

The war in Ukraine is expected to have largely negative effects on potential output growth in LAC (World Bank 2022k). It has contributed to tighter financial conditions, through both confidence and monetary policy channels. By driving commodity prices higher, the war further increased already elevated inflation in LAC and advanced economies, contributing to larger interest rate increases as central banks sharply tightened rates to ensure inflation expectations remained anchored. Elevated geopolitical uncertainty brought on by the war has also soured global risk appetite, which is likely to curb investment in many EMDEs, including in LAC. The combination of a sharp rise in global interest rates and faltering investor confidence could precipitate financial crises in some EMDEs, including vulnerable countries in LAC, possibly resulting in large permanent output losses (Kose et al. 2021). A sustained war and secular rise in geopolitical uncertainty could also further fracture global trade and financial networks, which could raise trade costs, shrink markets, and slow the dissemination of technological innovation (Guénette, Kenworthy, and Wheeler 2022).

[23] For the period 2022-30, 16 LAC economies are included in estimations, representing 97 percent of 2020 LAC GDP.

FIGURE 2.13 LAC: Potential growth prospects

Potential output growth is expected to stagnate in 2022-30 as modest improvements in Mexico and Central America are offset by declines in South America and the Caribbean. Slowing labor force growth is the primary reason potential growth is not expected to improve, with potential per capita growth projected to increase marginally. In contrast to EMDEs as a whole, LAC economies are expected to see a small improvement in potential TFP growth.



Sources: Haver Analytics; Penn World Tables; UN World Population Prospects; World Bank.
Note: EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates) for the period 2011-19. Data for 2022-30 are forecasts.
A. D. Period averages of annual GDP-weighted averages. Estimates based on production function approach.
A. LAC subregions as in figure 2.12.
C. Projections based on median fertility and mortality scenario, and medium international migration, per the definition of projection scenarios in the *World Population Prospects* published by the United Nations Department of Economic and Social Affairs.
D. Sample includes 53 EMDEs, of which 16 are from LAC, and 30 commodity-exporters.

However, the war could also have some partially offsetting effects that benefit potential growth in LAC. Concerns about the resilience of geographically dispersed manufacturing supply chains could bolster manufacturing investment in some LAC economies (so-called "nearshoring"). Heightened awareness of vulnerabilities related to fossil fuel dependence and supplier concentration could also raise investment in the region's extractive industries. LAC is endowed with minerals and metals that are important inputs for electrification and the manufacture of renewable energy technologies, demand for which could accelerate given heightened focus on energy security globally (World Bank 2022k). The region also offers potential alternative sources of oil and gas supply while the world is transitioning to clean energy. Capturing

enduring productivity benefits from such resource-related tailwinds will likely depend on policy makers harnessing increased commodity earnings to fund sustainable infrastructure and enact health, education, and governance reforms.

Policy options to lift potential growth in LAC

In a scenario in which the largest 10-year improvements during 2000-21 in education outcomes, life expectancy, and female labor force participation for each country in LAC are repeated, and labor force participation among older workers rises modestly due to social benefit reforms, it is estimated that average annual potential output growth in the region in 2022-30 could increase by around 0.2 percentage point (figure 2.14).

A sustained investment boom could offer greater potential growth benefits. Raising investment growth over 2022-30 by its largest previous 10-year increase (per country between 2000 and 2021) could raise potential growth by an average of around 0.3 percentage point a year, via capital accumulation and improved potential TFP growth. To be durable, an investment boom would need to be underpinned by structural reforms to increase domestic savings and boost returns to private investment (for example, via improvements in competitiveness, infrastructure, and the diffusion of new technologies), rather than by a transitory rise in commodity prices, as was often the case in the past. Indeed, past analyses highlight the risks for LAC countries of conflating several years of higher commodity rents with improvements in potential output (Alberola et al. 2016).

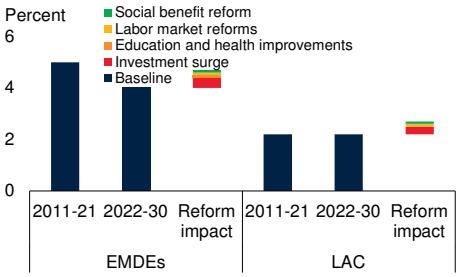
An investment drive focused purely on meeting the climate change-linked elements of the region's infrastructure-related Sustainable Development Goals (SDGs) by 2030 could also materially benefit potential output growth. It is estimated that investments to address climate change could raise LAC's annual potential growth by 0.1 percentage point. More climate-resilient infrastructure could also help mitigate a possible climate change-related reduction of 0.1 percentage point in annual potential growth resulting from increasingly frequent extreme weather events that damage capital stocks and erode labor productivity (OECD 2018). But the potential benefits of climate-smart investment go beyond mitigating bad outcomes. Many investments needed to help boost productivity directly can also aid climate change adaptation or mitigation. For example, more efficient irrigation systems would raise agricultural productivity as a first order consequence, but also increase the sector's climate resilience (World Bank 2022k). Increasing the contribution of renewables to the energy mix could also dampen an important source of volatility in the terms of trade of the region's energy importers, which could reduce the volatility of their growth. LAC may be the best positioned EMDE region to rapidly achieve the infrastructure- and climate-related SDGs because its existing energy mix is comparatively green (due largely to hydropower). This implies a smaller marginal investment requirement.

Most of the positive growth effects of the reforms assumed in the scenarios result from higher investment. Public investment in LAC tends to be constrained, however, by

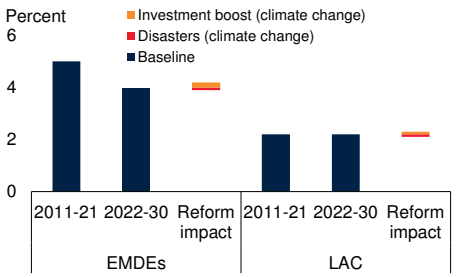
FIGURE 2.14 LAC: Policies to raise potential output growth

Potential growth in LAC could be boosted by improvements in education, healthcare, and female labor force participation, and by social benefit reforms. However, greater investment is likely to deliver the largest gains. LAC is generally more hampered than other EMDE regions by rigid labor markets and limited investment in innovation. In the public sector, policy making could become more transparent, while cuts in unproductive spending could free up resources for investment.

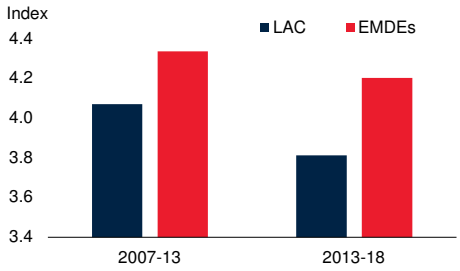
A. Potential growth under reform scenarios



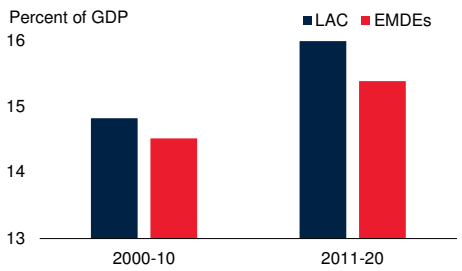
B. Potential growth effects from infrastructure investment and climate disasters



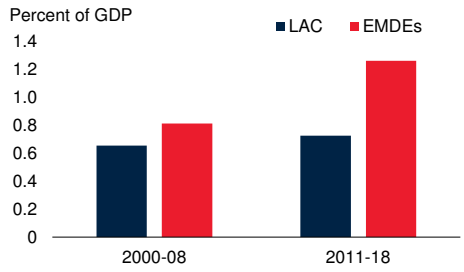
C. Labor market flexibility



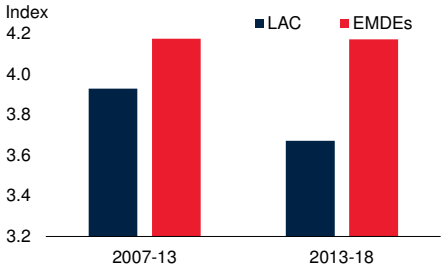
D. Government consumption



E. Research and development



F. Transparency of policy making



Sources: Haver Analytics; Penn World Tables; UN Population Prospects; World Economic Forum, Global Competitiveness Index; World Bank.

Note: EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-30 are forecasts.

A.B. Period averages of annual GDP-weighted averages. Potential growth estimates based on production function approach. Sample includes 53 EMDEs (16 from LAC). Methodology is described in chapter 1 and reform scenarios are described in chapter 5.

C.-F. Cross-period simple averages of annual GDP-weighted averages. Samples include: for C, 112 EMDEs (23 from LAC); for D, 53 EMDEs (11 from LAC); for E, 101 EMDEs (18 from LAC); for F, 112 EMDEs (23 from LAC).

limited fiscal space (Vashakmadze et al. 2017). In these circumstances, curtailing unproductive public spending to increase space for productive investment, or increasing the efficiency of public investment (for example, through additional use of public-private partnerships), could improve the quality of infrastructure, while avoiding potential distortions from increased taxation (IDB 2018). Improvements in transportation infrastructure could be especially effective in raising productivity in the region's urban environments, where there is little evidence of positive agglomeration effects, in contrast to advanced economies. High and increasing costs from congestion in many of the region's largest cities may lie behind this apparent lack of returns to urban scale (Ferreyra and Roberts 2018). Meanwhile, improving telecoms infrastructure, which is relatively cheap compared to meeting infrastructure investment gaps in other sectors, could help accelerate the adoption of new information and communications technologies in ways that can both raise firm productivity and result in more inclusive growth (Brichetti et al. 2021; Dutz, Alemida, and Packard 2018).

Gains from the reforms assumed in the scenarios will vary among countries depending on their specific characteristics and circumstances. In Mexico and several other Central American economies, for instance, female labor force participation is well below that of male participation. Measures to improve access to childcare and parental leave have been found to raise female labor force participation in LAC (Novta and Wong 2017). Moreover, since Central American economies have some of the highest child dependency ratios and worst education attainment records in LAC, this subregion would likely benefit significantly from investments in education and health care. In many countries in the region, as in other parts of the world, students from the poorest households have been found to be substantially less competent in reading and mathematics than those from the richest households (World Bank 2018a). The COVID-19 pandemic is likely to have further exacerbated these inequalities, given that learning losses have been acute among children from low-income families with less access to distance learning (World Bank 2022a). Improving skills absorption by poor students may therefore have outsized positive effects on future productivity, which could help to mitigate some of the inequality-increasing consequences of pandemic-related learning losses.

Reforms in several areas beyond the scope of the scenario analysis could also boost potential output growth by raising productivity growth. Labor markets in LAC have long been less flexible than in other EMDE regions. Reforms to deregulate labor markets, including regarding inflexible wage-setting processes, hiring and firing constraints, and aligning compensation with productivity, would likely pay productivity dividends. Improving educational quality could raise productivity generally; there is evidence of positive growth externalities from higher skill levels in Latin America (Ferreyra et al. 2017; Ferreyra and Roberts 2018). LAC has relatively high enrollment rates in tertiary education, which is heavily subsidized in many countries, yet a larger proportion of firms in LAC cite skills shortages as their biggest obstacle than in the average EMDE. This may reflect the distribution of subjects studied (the relative paucity of science, technology, engineering, and mathematics majors), low graduation rates, and

inadequate accountability in the university sector (World Bank 2021h). Beyond traditional education, active labor market policies to encourage the reskilling and reabsorption of workers could help mitigate a long-term trend in LAC of workers that are displaced out of high productivity industries transitioning into lower productivity work, thereby constraining overall labor productivity growth (Dieppe 2021).

Addressing the challenges associated with widespread informality could lift productivity (La Porta and Shleifer 2014; Ohnsorge and Yu 2021). Indeed, research has found that a drop of 1 percentage point in the informal share of the LAC economy has been associated with a 0.5 percentage-point narrowing of the gap between TFP in LAC and the United States (IDB 2013). Together with better-functioning labor markets, policy interventions that simplify business licensing and tax procedures and increase access to social security systems would also help reduce informality (Garcia-Saltos, Teodoru, and Zhang 2016; OECD 2017). At the same time, policy makers should be wary of tax and regulatory schemes that inadvertently encourage firms to stay small. Larger firms can, for example, face higher effective tax rates, which may discourage expansion. Meanwhile, schemes that favor smaller firms may result in excessive capital allocation to low-growth businesses. These factors may contribute to persistently low TFP growth (IDB 2018).

In addition, there are important opportunities to spur innovation in LAC, which underperforms other EMDE regions (World Economic Forum 2017). For example, policy-led efforts to ensure the education system encourages innovation, promote collaboration between firms, universities, and research institutes, and increase access to finance for innovation could all be beneficial (Vostroknutova et al. 2015). Creating incentives for firms to invest in internal research and development may boost productivity. Latin American firms that invest in R&D have been found to be better able to produce product innovations than those that do not, and firms that innovate are found to have significantly higher labor productivity (Crespi, Tacsir, and Vargas 2016). Incentivizing or funding more R&D from government budgets may be a worthy use of scarce fiscal space given evidence of large paybacks, and given that R&D spending in LAC is below EMDE averages and has fallen further behind in recent years (World Bank 2021h). It is also important to recognize the merits of scale regarding R&D investment. Multiple studies have documented that size is one of the best predictors of R&D spending by firms in the region (Alvarez and Grazzi 2018).

There are further productivity gains to be made from deepening trade integration. Despite several extra- and intra-regional trade agreements, LAC is less open to trade than most other EMDE regions (World Bank 2016). International linkages and integration into global value chains (GVCs) have been shown to increase firm productivity, but even the LAC economies most integrated into GVCs are not highly integrated by global standards (Dieppe 2021; Montalbano, Nenci, and Pietrobelli 2016; Steinwender and Shu 2018). LAC also has relatively low intra-regional trade intensity, partly because of sparse regional road and rail networks and mediocre logistical services. Improved physical networks, streamlined customs procedures, and other domestic trade facilitation measures, could substantially reduce trade costs (World Bank 2021e).

Reduced trade costs for manufacturing and services firms could help foster greater export diversification in LAC, where primary commodity exports tend to dominate. While greater diversification is not in itself a driver of productivity, it is likely to reduce output volatility, which is associated with stronger growth (Acharya and Raju 2020). Formal trade agreements could become more impactful through the inclusion of measures to harmonize regional standards and liberalize rules of origin restrictions (OECD/CAF/ECLAF 2018). Increased trade integration could lift productivity across sectors in LAC by increasing competition, and by providing opportunities for firms to specialize and take advantage of economies of scale. In the medium to long term, increased trade linkages can facilitate knowledge and technology transfer (Bown et al. 2017).

Many long-term productivity challenges in LAC can also be considered through the lens of low trust and related institutional weaknesses or poor governance. There is evidence that low trust feeds into institutional shortcomings and is associated with lower productivity and growth (Keefer and Scartascini 2022). Low trust in government may curtail the extent to which the public sector can effectively step in to correct market failures and address externalities. Weaknesses in judicial and legal processes may undermine the enforcement of contracts, discouraging investment, while high levels of violence in some countries in the region are an ongoing challenge for the building of stronger business environments. A lack of transparency in policy making may lead to perceptions that policy making is capricious or not geared to the public benefit. Entrenched social perceptions about trust and institutional integrity can take time to shift. Nonetheless, even modest additional commitments to increasing transparency and data availability could help to build trust in public authorities and public policy, while narrowing the scope for corruption and the erosion of institutional norms (Scartascini and Valle Luna 2020).

MIDDLE EAST and NORTH AFRICA

Potential output growth in the Middle East and North Africa is estimated to have halved between the 2000s and 2010s owing to a broad-based slowing of capital accumulation, total factor productivity growth (in economies dominated by extractive sectors and large public sectors), and labor force growth. Potential growth in the region is projected to remain lackluster in the remainder of this decade, with a further decline in the contribution of labor force growth to potential output growth offsetting an anemic improvement in total factor productivity growth. Reversing the slowdown in potential growth requires urgent reforms to kindle private sector-led growth.

Introduction

GDP growth has been uneven over the past two decades in the Middle East and North Africa (MNA). Growth was relatively rapid during the 2000s, supported by rising oil prices (figure 2.15).[24] But it slowed in the 2010s, mainly owing to the effects of political turmoil, most notably the 2011 Arab Spring revolutions in the Arab Republic of Egypt, Tunisia, Libya, and the Republic of Yemen; military conflicts in Iraq and the Syrian Arab Republic; the broader war on ISIS; the collapse in oil prices in 2014-16; and effects of the COVID-19 pandemic at the end of the period (Ianchovichina 2017). In 2022, growth suffered further from Russia's invasion of Ukraine and its repercussions.

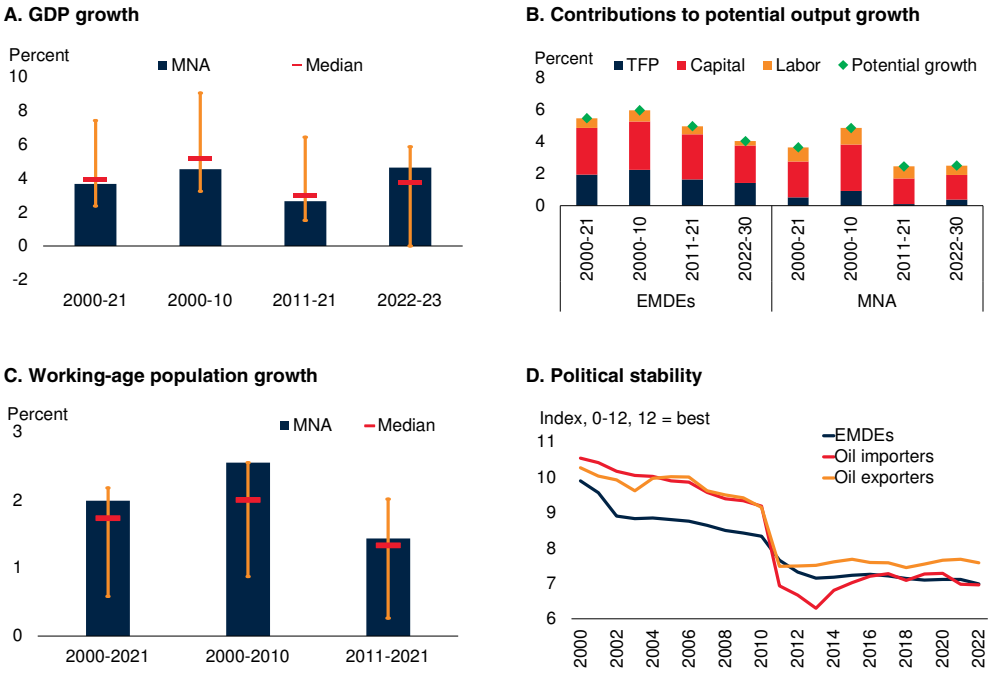
Potential output growth has been estimated for five countries in MNA, accounting for almost half of the region's GDP.[25] The estimates indicate that potential growth halved between the 2000s and 2010s, with the slowdown driven by broad-based decelerations in capital stock, in total factor productivity (in economies dominated by extractive sectors and large public sectors), and in working-age populations. The pandemic has further damaged these drivers. In 2020, the region's output contracted by 3.6 percent, mainly reflecting pandemic-related mobility restrictions on activity and a collapse in oil prices. The growth rebound in 2021 was insufficient to reverse the decline in output. Investment collapsed by over 6 percent in 2020 and rebounded by only 5.3 percent in

[24] For the purposes of this section, the 2000s are assumed to cover the period 2000-10, the 2010s the period 2011-21, and the 2020s the period 2022-30. The 2000s and 2010s are selected to ensure that the averages include both the global recession and its rebound. The 2020s are selected to cover projections.

[25] Estimates using the production function approach are available for Egypt, the Islamic Republic of Iran, Jordan, Morocco, and Tunisia.

FIGURE 2.15 MNA: Output growth and drivers of potential growth

Output growth in the region was markedly weaker in the past decade than in the preceding one, buffeted by political instability, a collapse in oil prices, low investment, conflict, and the pandemic. Potential growth was also affected by these developments and by a significant slowdown in working -age population growth. Political stability remains below the average in emerging and developing economies and weaker among oil-importing economies since the 2011 Arab Spring.



Sources: International Monetary Fund; Penn World Tables; PRS Group; UN Population Prospects; World Bank.
Note: EMDEs = emerging market and developing economies; MNA = Middle East and North Africa. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-23 and 2022-2030 are forecasts.
A.C. Bars show period averages of annual GDP-weighted averages. Markers show median GDP-weighted averages of the six EMDE regions; orange whiskers show max-min ranges.
B. Period averages of annual GDP-weighted averages. Estimates based on the production function approach. Sample includes 53 EMDEs, of which 5 are from MNA.
C. Working-age population refers to population ages 15-64. Sample includes 53 EMDEs (5 from MNA).
D. Based on the government stability subindex of the International Country Risk Guide. Unweighted average of 10 MNA oil exporters, 6 MNA oil importers, and 102 EMDEs.

2021. Human capital accumulation also suffered, with an average of about 8 percent of working hours lost in 2020-21, higher than the global average.

Potential output growth in the region is projected to remain lackluster in the remainder of this decade, at 2.5 percent a year on average. A reduction in the contribution of labor to potential growth is expected to be offset by an anemic improvement in total factor productivity (TFP) growth and stronger investment. Fixed capital accumulation is expected to account for almost two-thirds of potential output growth, with investment growth projected to be significantly stronger than in the 2010s when it was negative half

of the time. Human capital accumulation is projected to slow owing to weaker growth in the working-age population.

Reversing the slowdown in potential growth since the 2000s requires urgent reforms to kindle private sector-led growth and diversify economies. Most of the region's growth since the 1970s has relied on growth of employment rather than productivity, as well as the expansion of public sectors (ILO 2022b). This has left the region with a multitude of structural challenges, including large gender gaps in the workforce and education attainment, limited economic diversification, excessive state involvement in activity, armed conflicts, weak governance, and macroeconomic instability. Policy action to address these challenges could significantly boost potential and actual output growth. Thus, investment could be increased by reprioritizing public spending, ensuring a green transition while mitigating the effects of climate change, and enabling and incentivizing the private sector. Human capital accumulation could be raised by increasing access to education and work for women and the poor, improving worker skills, upgrading health systems, and reversing income losses caused by the pandemic.

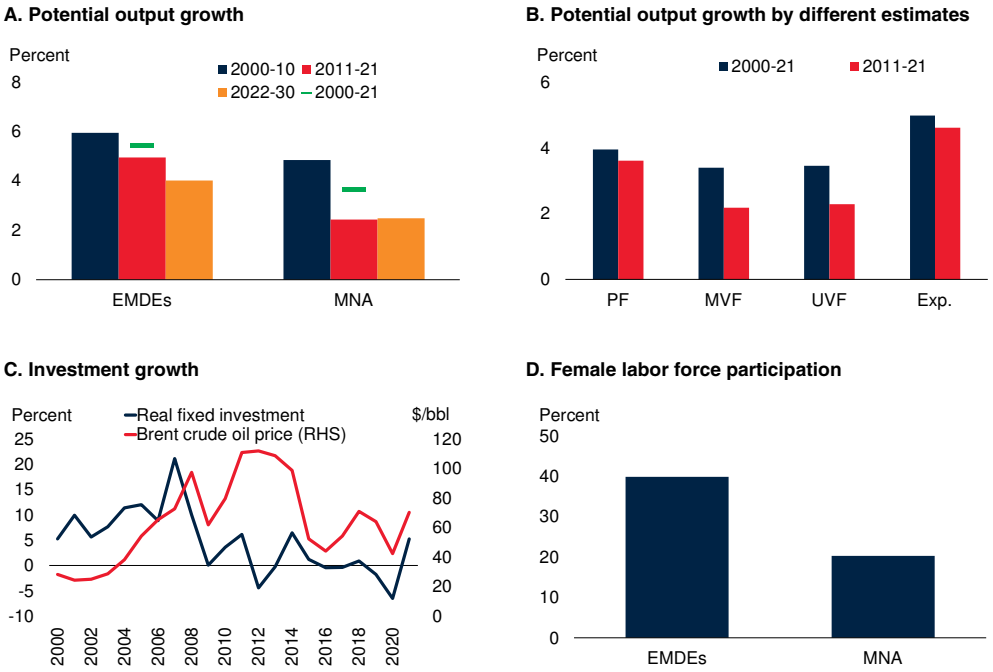
Evolution and drivers of potential growth in MNA

Output growth in the MNA region declined sharply from an average of 4.5 percent a year in the 2000s to about 2.6 percent a year in the 2010s. Analysis suggests that the slowdown was largely the result of a decline in the region's potential growth rate. Several approaches to estimating potential growth—through estimation of a production function, and the use of filters or data for long-term (five-year-ahead) growth expectations to identify trends—indicate that potential growth in the 2010s was lower than in the 2000s (figure 2.16). Based on the production function approach, potential growth is estimated to have slowed from 4.8 percent a year in the 2000s to 2.4 percent a year in the 2010s. On a per capita basis, the slowdown was even starker, from 3.4 percent in the 2000s to 0.8 percent in the 2010s. Although the literature on the subject is sparse, it supports this result, documenting a broad-based decline in potential growth since 2000 in the MNA region, in both oil exporters and oil importers. The literature also supports the finding that the decline has been more severe than for EMDEs in aggregate (Alkhareif, Barnett and Alsadoun 2017; IMF 2016, 2017c; Mitra et al. 2015).

The decline in potential growth in MNA in the past decade had several contributory factors, including high geopolitical tensions, volatile oil prices, limited economic diversification in many MNA countries, a predominant role of the state in many cases, and armed conflicts within the region. In terms of the production function framework, all major components of potential output growth—labor force growth, capital accumulation, and TFP growth—slowed between the 2000s and 2010s, with more than half of the slowdown in potential growth attributable to slower growth of the capital stock. Investment growth slowed from an annual average of about 9 percent in the 2000s to less than 1 percent a year on average in the 2010s. Among oil exporters, investment growth was depressed by the collapse in oil prices in 2014-16, while in several oil importers, increased political and economic uncertainty took its toll.

FIGURE 2.16 MNA: Potential output growth

After halving between 2000-10 and 2011-21, potential output growth in the region is expected to remain weak in the remainder of this decade. The slowdown in the past decade is a finding common to different methods of estimating potential growth. Real investment growth has been volatile and was negative in six of the years during 2009-21. Female labor force participation remains around one-fifth, significantly lower than in other emerging market and developing economies.



Sources: International Monetary Fund; Penn World Tables; UN Population Prospects; World Bank.
Note: EMDEs = emerging market and developing economies; MNA = Middle East and North Africa. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). A.B. Period averages of annual GDP-weighted averages.
A. Estimates based on the production function approach. Sample includes 53 EMDEs, of which 5 countries are from MNA region. Data for 2022-30 are forecasts.
B. MVF = multivariate filter; PF = production function approach; UVF = univariate filter (specifically, the Hodrick-Prescott filter). Expectations-based estimates ("Exp.") are potential growth proxied by five-year-ahead IMF *World Economic Outlook* growth forecasts. Details on the approaches are provided in chapter 1. Sample includes three economies (Jordan, Morocco, and Tunisia).
C. Based on growth rate of real fixed investment and Brent crude oil price.
D. Based on female labor force as a percentage of total labor force. Sample includes 155 EMDEs (19 from MNA) from 2012-21.

Countries afflicted by conflict or fragility suffered the outright destruction of capital (World Bank 2017c).

The second largest contributor to the slowdown in potential output growth in MNA was a decline in TFP growth, which turned close to zero in the 2010s. This has widened the region's productivity gap with advanced economies (Dieppe 2021). One source of the decline in TFP growth was the weakening of investment growth. Prior to the 2009 Great Recession, productivity growth in MNA was primarily supported by capital accumulation in oil-exporting economies. But this ended with the collapse of oil prices

in 2014-16. Other factors limiting TFP growth have been the dominance of commodity production sectors, inefficient investment, weak competition due to the large role of the state, and armed conflicts.

In the past decade, the contribution of labor force growth to potential output growth has declined mainly because of a precipitous slowdown in population growth, particularly in the member countries of the Gulf Cooperation Council (GCC). Labor force participation rates also declined, particularly among oil importers. The contribution of labor force growth to potential growth was also held back by the region's female labor force participation rates, which are among the lowest in the world. For example, women make up just under four-tenths, on average, of the populations of GCC economies and yet represent only about one-tenth of the labor force. Moreover, while educational attainment among both men and women improved in the past decade, the quality of education, as measured, for example, by primary school proficiency tests, remained lower than in most other regions (World Bank 2018b).

The pandemic did further damage to the drivers of potential growth. Fixed investment in 2021 was more than 10 percent lower than was expected prior to the pandemic, with negative and long-lasting consequences for the growth of the capital stock. Human capital has also been eroded by higher long-term unemployment, disruptions to education, and a deterioration of health outcomes. Pandemic-related school closures since 2020 have averaged 48 weeks in MNA, above the global average of 38 weeks. This outsized damage to human capital accumulation is likely to have undermined poverty reduction and impaired the lifetime earnings of many (Azevedo, Hasan, et al. 2021).

Potential growth prospects in MNA

Over the 2020s, potential output growth in MNA is expected to remain weak, at 2.5 percent a year, only marginally above its 2010s average annual rate of 2.4 percent. Per capita potential growth is expected to increase to 1.3 percent from 0.8 percent in the 2010s. This mainly reflects a tepid improvement in TFP growth, which is expected to offset a further projected decline in the contribution of labor force growth, in part due to projected changes in demographic structures. Population growth is expected to slow to 1.3 percent a year on average, down from growth of close to 3 percent a year on average in the two decades before the pandemic. The working-age share of the population is expected to rebound to its 2013 peak, after a decade of decline.

The outlook for potential growth is underpinned by recent progress in structural reforms, particularly in the GCC economies. These include the increased participation of women in the workforce, improvements in the business climate, and diversification of the economies of commodity-dependent countries. Outside the GCC economies, however, reform momentum has remained lackluster.

In Saudi Arabia, increasing female labor force participation and reforms to the Kafala sponsorship program for expatriate workers have created a strong foundation for improving potential productivity growth, particularly by improving skill matchings and

disseminating new knowledge. Female labor force participation has increased from 18.7 percent in 2017Q2 to 33.4 percent in 2022Q1, with about 350,000 women having entered employment over this period. Investment should benefit from the 2021 National Investment Strategy, which aims to expand the role of the private sector and increase foreign direct investment. The government has also undertaken reforms to improve the regulation and supervision of financial institutions (such as the law on the resolution of systemically important financial institutions and the law on strengthening anti-money laundering and combating the financing of terrorism) and the functioning and liquidity of debt and equity markets (IMF 2021b). Saudi Arabia has also introduced value-added taxes to promote the diversification of its economy and improve revenue mobilization—part of a broader GCC initiative, with implementation also in Bahrain, Oman, and the United Arab Emirates (UAE). Such broadening of the tax base can help ensure fiscal sustainability, make fiscal policy less procyclical, and increase funding for productivity-enhancing investments.

The UAE has also taken steps to encourage greater inclusion of women in the workforce, strengthen working arrangements for expatriates, and improve the business climate more broadly. In the wake of reforms, female labor force participation rates increased by about 15 percentage points in the five years to 2020, reaching 66 percent. In the labor market, the government in 2021 passed a new labor law that standardizes employment contracts, caps working hours, and aligns weekends with key trading partners. To diversify its economy, it introduced a 9 percent corporate income tax and value-added tax recently. To attract further foreign investment, a new commercial law allows full foreign ownership of companies, while a simplified trademarks law improves protection for existing trademarks. The UAE has made progress in diversifying its economy. For example, oil revenues fell from 69 percent of total government revenues to just 41 percent over the decade to 2020.

In the Arab Republic of Egypt, the implementation of macroeconomic stabilization policies and structural reforms since 2016 has helped to raise potential growth by more than 1.3 percentage points in 2021 from its trough in 2014. Macroeconomic stabilization measures have included the liberalization of the exchange rate regime and devaluation of the pound, as well as fiscal measures to stabilize public debt, including the introduction of a value-added tax, reductions in energy subsidies, and actions to mobilize revenue and decrease expenditure. Structural reforms have targeted business licensing and insolvency and have also included labor market reforms focused on women and youth. In response to these measures, the unemployment rate has dropped to its lowest level in nearly two decades, with increasing labor force participation rates. More recently the private sector has benefited from legal reforms that allow it to participate in infrastructure, services, and public utility projects.

In the Islamic Republic of Iran, the 2022 budget announced efforts to cap subsidies on basic goods imports, impose a tax on gasoline and petroleum, and sell state assets. Legal changes to the power of the central bank have also assisted in achieving financial stability objectives. But further structural reforms are needed to address widespread inefficiencies, stabilize fiscal spending and lower inflation, and remove significant price distortions.

Implicit subsidies, mainly in the energy sector, have recently accounted for more than 45 percent of GDP (World Bank 2021i).

The projections of potential growth in MNA are highly uncertain. There are some upside risks to the baseline projections. The region's relatively low female labor force participation and exceptionally high share of youth in the population (people younger than 25 years account for one-third of the population) indicate a large pool of potential new entrants to the labor market and consumer base. This, in turn, could substantially increase returns to investment and innovation, but it will hinge on whether the private sector is sufficiently vibrant and able to draw on a well-educated work force in flexible labor markets.

Risks to the baseline projections of potential growth, however, remain predominantly to the downside. While the war in Ukraine has provided a massive windfall to oil exporters, the longer-term benefits of this windfall depend on whether it is funneled into financing reforms and diversifying economies. For oil-importing economies in the region, the war in Ukraine may undermine longer-term growth prospects by raising the risk of social unrest and conflict, counteracting human capital gains through malnourishment and increased poverty, and increasing the likelihood of financial and balance of payments crises (Dieppe 2021; Hadzi-Vaskov, Pienknagura, and Ricci 2021; Kilic Celik, Kose, and Ohnsorge 2020; World Bank 2021e). More broadly, the pandemic could fragment global trade and investment networks, increase global uncertainty, and persistently increase borrowing costs, thereby limiting investment prospects. The pandemic remains an ongoing risk and could further destroy human capital and undermine investment if new variants appear that significantly disrupt activity and raise uncertainty.

Policy options to lift potential growth in MNA

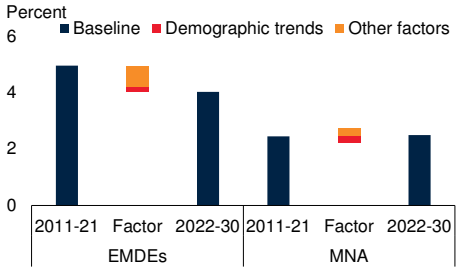
The region faces multiple impediments to faster potential growth, including high dependence on the production and export of commodities; widespread poor governance and ongoing political instability; wide gender gaps in the labor market; large and less productive public sectors; fragility and conflict; prolonged crises in some economies and high debt and rising crisis risks in others; the repercussions of the COVID-19 pandemic, and climate change. A major challenge for the region is the deep-seated structural impediments to private sector-led growth. These need to be tackled to enable job creation and substantial improvements in living standards.

The gains from reforms could be significant. Cross-country experience indicates that reforms of education and health systems and labor markets can raise potential growth. A scenario analysis applied to the MNA region suggests that labor market policies to raise the female labor force participation rate in each country by the largest 10-year improvement in MNA during 2000-21 could lift average potential growth by 0.1 percentage point a year during the remainder of this decade. Similar steps to address gaps in investment could yield a further boost of 0.3 percentage point a year (figure 2.17). If reforms are stronger than historical improvements in the region, which are

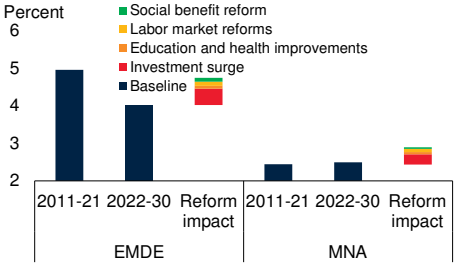
FIGURE 2.17 MNA: Policies to raise potential growth

The region could more than double its prospective potential growth rate by investing in climate adaptation and mitigation, investing in infrastructure, reforming labor markets and social benefits, and by boosting education. Policies to address rising climate risks are vital due to the rising number of climate events. Policies to diversify sources of growth in oil exporters could help to reduce their heavy dependence on fossil fuels for government revenue and exports.

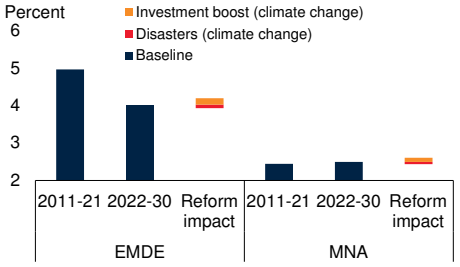
A. Potential growth and contributions



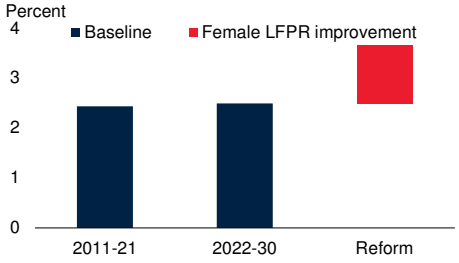
B. Reform scenarios



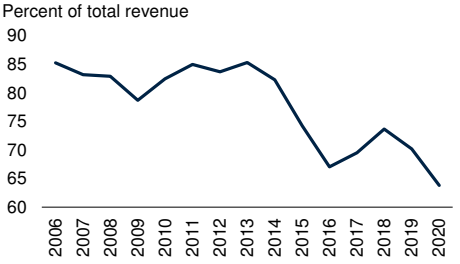
C. Climate change scenarios



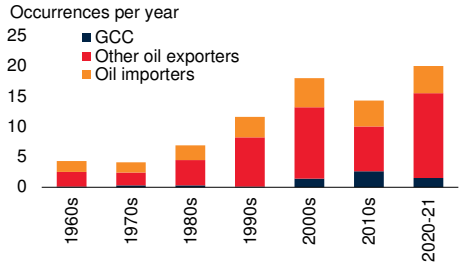
D. Female labor force participation scenarios



E. Share of oil revenue in oil exporters



F. Climate risk



Sources: EM-DAT database; Haver Analytics; Penn World Tables; UN Population Prospects; World Bank.
Note: EMDEs = emerging market and developing economies; MNA = Middle East and North Africa. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates) for the period 2011-21. Data for 2022-30 are forecasts.
A.-D. Period averages of annual GDP-weighted averages. Estimates based on the production function approach. Methodology is described in chapter 1 and reform scenarios are described in chapter 5.
A. Sample includes 53 EMDEs, of which 5 countries are from MNA. "Other factors" include trend improvements in human capital, and stable investment growth relative to its long-term average.
B. Sample includes 53 EMDEs (5 from MNA).
E. Unweighted averages of seven MNA economies.
F. GCC = Gulf Cooperation Council. Includes data for 19 MNA economies. Occurrences of natural disasters.

modest by comparison with the average EMDE, the gains could be substantially greater. Thus, if female labor force participation were raised to the EMDE average gradually over 2022-30—from 21 to 53 percent—potential growth would be raised by 1.2 percentage points a year. While this would be a major spike in female labor force participation, the recent increases in Saudi Arabia, from 20 percent in 2017 to 35 percent in 2021, show that sizable increases are possible over the course of a few years. Furthermore, if the region were to boost investment in climate change adaption and mitigation by 1.2 percent of GDP per year, potential growth could be raised by an additional 0.1 percentage point a year.

The region's potential growth could also be raised significantly by improving governance. Weak governance in the region has been found to crowd out private investment and discourage private-sector growth (Benhassine et al. 2009; Nabli 2007). Improved governance in the education sector, such as more structured measurement of results in training and educational programs, would enhance the matching of skills across workers and employers and could provide more, better-quality jobs in the private sector (Gatti et al. 2013). Weak governance is also reflected in perceptions of widespread corruption, which is a highly cited constraint on business activity in MNA in the World Bank's Enterprise Surveys. Corruption tends to discourage interactions between private firms and public authorities, and more corruption is associated with lower employment and productivity (EBRD, EIB and World Bank 2016). Strengthening legal frameworks, including areas like corporate governance and bankruptcy resolution, can alleviate constraints on legitimate market transactions.

Economies in the region remain heavily reliant on the production and export of primary commodities. The diversification of agriculture-dependent economies (Morocco) and oil-dependent economies (GCC economies, the Islamic Republic of Iran, Iraq) remains a top priority to increase economic stability and boost potential growth. Among the oil-exporting economies, oil revenue still accounted for about one-third of output, two-thirds of merchandise exports, and three-quarters of government revenue in 2019. With the world transitioning away from fossil fuels, the oil intensity of global output declined by about one-third in the two decades to 2019, and this trend will likely continue. Policies to promote diversification include measures to increase competition in product markets and avoid market concentration; measures that support the reallocation of economic resources to new activities; measures to lower trade costs and improve infrastructure and logistics; the rationalization and reduction of energy subsidies; and the liberalization of service trade and foreign direct investment (Dieppe 2021; Kose and Ohnsorge 2020).

Armed conflict poses significant threats to the lives and livelihoods of people, and they destroy human and physical capital. Breaking cycles of conflict can substantially improve growth prospects in fragile states. Close to half of conflicts globally, and one-third in MNA, are recurrences of past conflicts often over similar issues (Jarland et al. 2020). Countries where there is conflict have some of the widest gender gaps in education, labor force participation, and political participation. In the region's fragile economies,

the reconstruction investment needed to maintain adequate provision of health, education, electricity, and water and sanitation services remains a high priority (World Bank 2017c). In countries hosting refugees, these efforts need to be adapted to the structural changes that refugee crises have brought, such as through the adoption of more innovative financing mechanisms to fund higher demand for health service delivery (World Bank 2017d). Addressing fragility by creating opportunities for women can also support medium- and long-term development in these economies (Bakken and Buhaug 2020; World Bank and GDC 2020).

The COVID-19 pandemic may leave lasting scars on productivity and potential growth in the region if governments do not address such consequences as human capital losses, increased debt, and health care burdens (Dieppe 2021; Kilic Celik, Kose, and Ohnsorge 2020). To minimize losses to human capital and productivity, countries could increase investment in health care systems, and, in the field of education, increase investment in multiple ways of learning; improve the equity, adaptability, and resilience of education systems; increase surveillance and data collection to assess possible learning losses; and develop and implement policies to accelerate learning (UNESCO, UNICEF, and World Bank 2021; World Bank 2021j).

The ability of some economies to reverse the past decade's slowdown in potential growth is constrained by high government debt: public debt in MNA oil importers in 2021 was over 90 percent of GDP (World Bank 2021k). High debt can make it difficult to implement countercyclical policy, increase productive investment (including in human and physical capital), and boost private sector confidence. Policy reforms are needed to address high debt, mitigate its negative effects on economic activity, and reduce the likelihood of financial crises. These include implementing sound and transparent debt management frameworks, ensuring financial regulation and supervision promote sustainable debt accumulation in the public and private sectors, and progressing with governance reforms to minimize waste and corruption (Kose et al. 2021).

Climate change is likely to have devastating effects on lives and livelihoods in MNA, with natural disasters—including heatwaves and floods—already more frequent in recent decades. Over time, rising temperatures will reduce agricultural yields and growing areas and exacerbate existing water scarcity. This could undermine food security, forcing migration, lowering labor productivity, and raising the likelihood of conflict. By one estimate, crop yields in the region could fall by up to 30 percent if temperatures were to rise by 1.5-2 degrees Celsius relative to pre-industrial times and by almost 60 percent if they were to rise by 3-4 degrees (World Bank 2014).

Mitigation, adaptation, and a focus on a green and inclusive recovery in the post-pandemic world are key to ensuring sustainable future growth (Acerbi et al. 2021; IMF 2021c). Policies to limit climate change include repricing fossil fuels, for example through a carbon tax, to appropriately reflect costs to the environment. High energy subsidies in the region, accounting for 13 percent of government expenditure on average in 2021, could be rationalized, reduced, and replaced with targeted social spending to

protect the vulnerable from the resulting price rises. Many economies in the region have adopted plans to adapt to climate change in order to protect human and physical capital (Kuwait, Oman, Saudi Arabia, United Arab Emirates), including integrated water management actions, sustainable agriculture practices, reduced desertification, and early warning systems for natural disasters (IMF 2021c).

Country-specific reform agendas are essential to improve potential growth in the region. In Saudi Arabia, implementing the codification of legal practices is an important step in strengthening the legal system. Rationalizing state involvement in the economy, for instance by privatizing poorly performing state assets, could improve the allocation of capital and empower the private sector. This is particularly important in diversifying its economy away from fossil fuels. Labor market reforms should be considered to further increase the participation of women in the labor force. A law requiring the disclosure of assets, an effective anti-corruption strategy, and the efficient implementation of Vision 2030 reforms could all improve governance.[26]

Effective implementation of the UAE 2050 Strategy, with appropriately sequenced and timed reforms, and the UAE Green Agenda 2030 could help reverse declines in potential growth. Reforms include commercializing nonstrategic government-related entities, investing in education and training in emerging fields that assist in diversifying the economy, and further aligning national and expatriate labor laws and public and private wages.

In Egypt, maintaining the gains from previous structural and macroeconomic reforms is not assured, with further reforms needed to address persistent fiscal and external vulnerabilities, as well as structural impediments to growth. To further promote macroeconomic stabilization, reforms could focus on improving the transparency of fiscal reporting and debt management, rationalizing the central bank's subsidized lending schemes, and improving liquidity management to enhance monetary policy transmission. On structural policies, reforms are needed to further strengthen revenue mobilization (including through limiting tax exemptions and reforming real estate taxes), increasing the role of the private sector by rationalizing state ownership, reducing tariffs and non-tariff barriers, and enhancing the independence of regulatory authorities.

In the Islamic Republic of Iran, structural reforms are urgently needed to address widespread inefficiencies, the lack of fiscal sustainability, and price distortions. Further measures to raise government revenue—eliminating tax exemptions and improving tax compliance—and stabilize government expenditures are needed with a particular focus on subsidy reform. This would also assist in bringing down the high intensity of energy usage. Reforms to the monetary policy framework—a price stability mandate, greater central bank independence, rationalized lending operations, and stronger supervisory and resolution powers—could improve macroeconomic and financial sector stability.

[26] See Government of Saudi Arabia (2022) for more details on Vision 2030.

SOUTH ASIA

South Asia is the only EMDE region not to have suffered a decline in the growth rate of potential output in 2011-21 relative to the preceding decade. Its potential growth in the last decade was close to that of East Asia and the Pacific but faster than other EMDE regions. It continued to be bolstered by an expanding working-age population, a high investment rate, and productivity-raising shifts of resources away from agriculture and informal activity. The pace of potential growth is expected to remain robust in the remainder of the 2020s, and to be supported by all major growth drivers. However, there is still scope to boost the region's potential growth significantly through product and labor market reforms. These include measures to increase women's participation in economic activity, to accelerate investment in mitigating and adapting to climate change, and to expand investment in human capital.

Introduction

Economic activity in the South Asia region (SAR) rebounded strongly from the recession caused by the COVID-19 pandemic, expanding by 7.9 percent in 2021 after a drop of 4.5 percent in 2020. Output in the region is on track to grow by about 6.0 percent a year between 2022 and 2030, faster than the 2010s annual average of 5.5 percent and only moderately slower than growth in the 2000s (figure 2.18). This will make SAR the fastest growing emerging market and developing economy (EMDE) region in the remainder of this decade. SAR's robust growth performance and outlook reflect the region's high potential growth rate as demographic trends expand the working-age population, the investment rate remains elevated, and productivity growth continues to benefit from the shift of resources away from agriculture and informal activity.

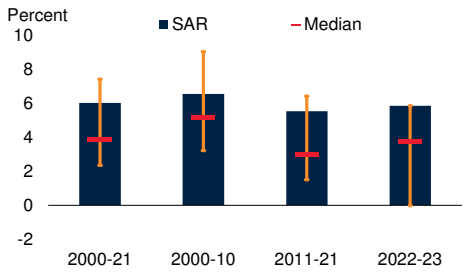
The COVID-19 pandemic massively disrupted the drivers of potential growth, and its impact on future potential growth is uncertain. The pandemic lowered investment in 2021 to about 9 percent below pre-pandemic projections, and this gap is expected to remain over much of the remainder of this decade, even with investment growing a little faster than its previous trend rate. The region was also affected by pandemic-related school closures, which were much more prevalent than the global average, as were lost working hours and job losses. In addition, SAR's exceptionally large informal sector was hard hit by the pandemic and the job and income losses to its participants may have had long-lasting negative effects on their productivity.

Taking into account these and other factors, SAR's potential growth is projected in the baseline to slow only marginally to 6.1 percent a year on average in the 2020s, from 6.2

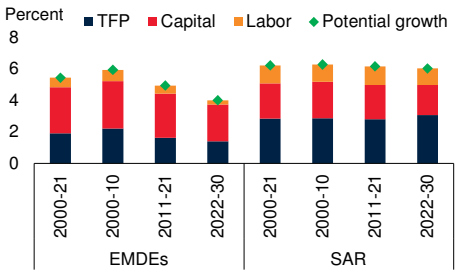
FIGURE 2.18 SAR: Output growth and drivers of potential growth

Output growth remained robust in South Asia over the last two decades and is expected to be the fastest growing emerging market and developing economy region in the remainder of this decade. Total factor productivity has contributed the most to maintaining robust potential growth. Investment growth has slowed from its breakneck pace in 2000-10. Secondary education attainment levels have improved but remain relatively poor.

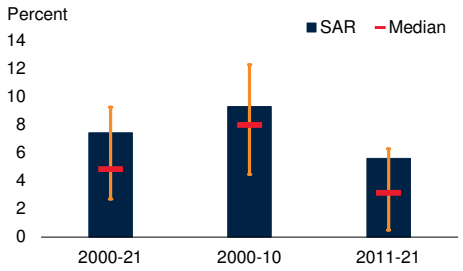
A. GDP growth



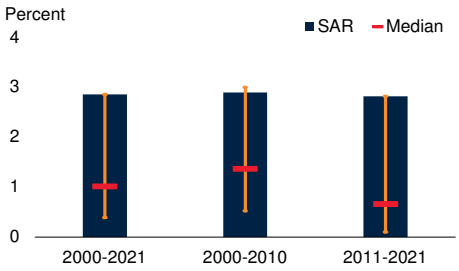
B. Contributions to potential growth



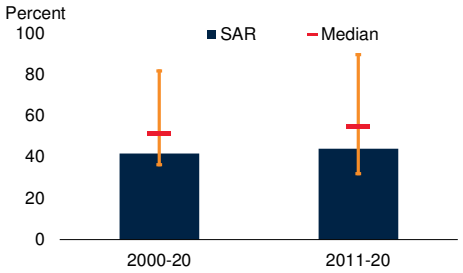
C. Investment growth



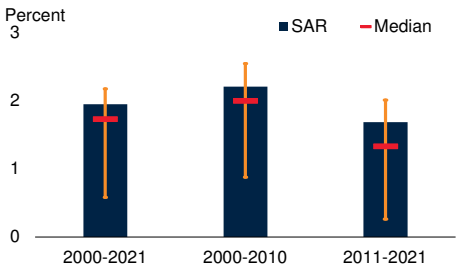
D. Potential TFP growth



E. Secondary education attainment



F. Working-age population growth



Sources: Haver Analytics; Penn World Tables; UN Population Prospects; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies; SAR = South Asia. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-23 and 2022-2030 are forecasts.
A.C.-F. Bars show period averages of annual GDP-weighted averages. Markers show median of GDP-weighted averages of the six EMDE regions. Orange whiskers show max-min range.
B. Estimates based on the production function approach. Sample includes 53 EMDEs, of which 3 economies are from SAR (Bangladesh, India, and Pakistan).
C.D. Sample includes three SAR economies (where potential growth estimate is available for both investment growth and TFP growth measures for the period 2000-21).
E. Period averages of simple annual averages. Percentage of population ages 25 and above that completed at least lower secondary education. Sample for SAR includes Bangladesh, Pakistan, and Sri Lanka.
F. Working-age population refers to population ages 15-64. Sample includes three SAR economies.

percent a year in the 2010s. Past and prospective potential growth has been estimated for four commodity-importing countries in SAR, which together account for close to 90 percent of the region's output. The projection of sustained, robust potential growth in the 2020s is based on projected contributions from all major drivers of growth. Investment growth is forecast to remain robust at above 6 percent a year, encouraged by the implementation of reforms that will also help generate productivity growth. Although population growth is expected to moderate, labor-force growth will be supported by stabilization of the participation rate after two decades of decline, an increase in the share of working age populations, and also by improvements in educational attainment. However, the outlook is uncertain, and downside risks prevail, especially regarding the lasting impacts of the pandemic and the consequences of a more prolonged war in Ukraine than assumed in the baseline.

To achieve faster sustained growth in the region than projected in the baseline scenario, it is necessary to address the structural factors that hinder growth. These factors include limited female participation in economic activity; high levels of informal economic activity, particularly in agriculture, which is characterized by low productivity; limited integration into global value chains; and lagging educational standards and attainment. Fewer than one-fourth of working-age women in SAR are in the labor force, although many more work in the informal economy; increasing female participation in the formal economy could significantly boost potential growth. Potential growth can also be increased by implementing other important reforms to enhance product and labor markets, accelerate investment in mitigating and adapting to climate change, and invest in human capital.

Evolution and drivers of potential growth in SAR

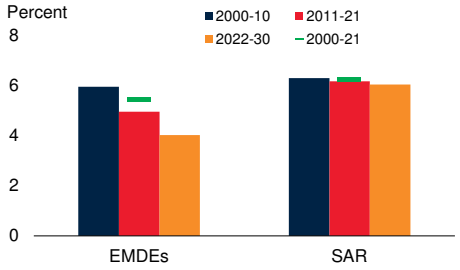
Potential output growth in SAR in the 2010s was broadly stable from the 2000s, at an annual average of 6.2 percent (figure 2.19). On a per capita basis, potential growth accelerated from 4.7 percent to 5 percent as population growth slowed. Potential growth peaked in 2007 and has since slowed in line with declines in the growth of the capital stock and the labor force. The country-level estimates incorporated in the regional average are broadly consistent with those obtained in other studies for the region. In the case of India, estimates of potential growth since 2010 have been in the range of 6-8 percent a year (Bhoi and Behera 2017; Blagrave et al. 2015; Mishra 2013; Rodrik and Subramanian 2004).

Contributions to potential output growth from capital, labor, and total factor productivity (TFP) are estimated to have been broadly stable in SAR over the past two decades. The largest contributor has been TFP growth, which was mostly unchanged between the 2000s and 2010s, partly reflecting continued sectoral reallocation of resources from agriculture into manufacturing and services (Dieppe 2021). TFP growth in 2000-21 in SAR was more than one-half higher than for EMDEs in aggregate, largely reflecting a greater contribution from sectoral reallocation. SAR's TFP growth also benefited from rising secondary schooling completion rates, although they increased

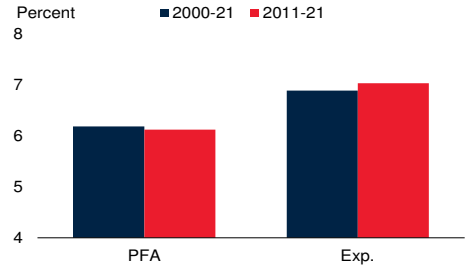
FIGURE 2.19 SAR: Potential output growth

Potential output growth in South Asia is expected to remain robust in the remainder of this decade and avoid the precipitous slowdown of other emerging market and developing economy regions. Total factor productivity growth has remained robust in SAR as productivity-enhancing sectoral reallocation of resources from agriculture has continued. The pandemic, and especially its impact on education, will continue to weigh on potential growth.

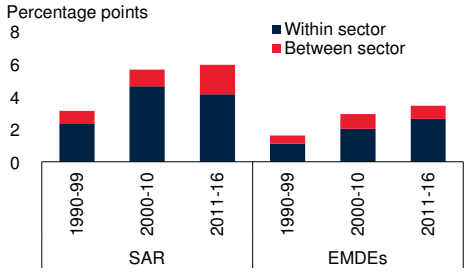
A. Potential output growth



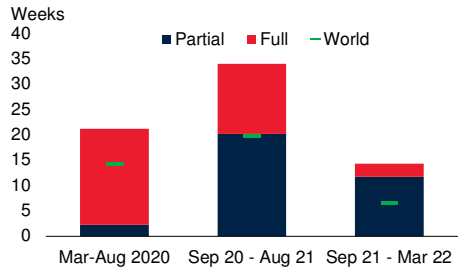
B. Potential output growth by different estimates



C. Within- and between-sector contributions to productivity growth



D. School closures



Sources: Asian Productivity Organization database; Groningen Growth Development Center database; ILOSTAT database; OECD Structural Analysis database; Penn World Tables; UN Population Prospects; UNESCO; World Bank; World Bank, Development Indicators database.

Note: EMDEs = emerging market and developing economies; SAR = South Asia. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates) for the period 2011-21. Data for 2022-30 are forecasts.

A.B. Period averages of annual GDP-weighted averages.

A. Estimates based on the production function approach. Sample includes 53 EMDEs, of which 3 economies are from SAR (Bangladesh, India, and Pakistan).

B. PFA = production function approach; Expectations-based estimates ("Exp.") are potential growth proxied by five-year-ahead IMF *World Economic Outlook* growth forecasts. Details on the approaches are provided in chapter 1. Expectations sample includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, and Pakistan.

C. Productivity is defined as real GDP per worker (at 2010 market prices and exchange rates). Sample includes 3 EMDE economies from SAR (India, Pakistan, and Sri Lanka) and 19 other EMDEs. Growth "within sector" effects show the contribution of initial real value added-weighted productivity growth rate of each sector, holding employment shares fixed. Growth "between sector" effects show the contribution arising from changes in sectoral employment shares. Median of country-specific contributions.

D. Unweighted averages. Data up to March 2022.

more slowly (by about 15 percentage points) than in all EMDEs between 2000 and 2021.

The second largest contributor to SAR's potential output growth in the past two decades has been capital accumulation, even though investment growth slowed from an average 9.3 percent a year in the 2000s to closer to 5.6 percent in the 2010s. There have also

been significant country differences, with continued strong investment growth in Bangladesh (over 8 percent a year over the last two decades), rising investment growth in Nepal, but slowing investment growth in India. Several factors have contributed to India's slowdown in investment growth, including heightened regulatory and policy uncertainties, delayed project approvals and implementation, continued bottlenecks in the energy sector, and reform setbacks (Anand et al. 2014). Large corporate debt overhangs and non-performing assets in the banking sector have weighed on credit and investment growth across the region.

The contribution of labor force growth to potential output growth in SAR remained strong over the last two decades, exceeding that in all other EMDE regions except SSA. The median labor force participation rate in SAR declined from 58 percent in 2000 to a trough of 56 percent in 2014, but has since increased marginally. Population growth slowed slightly between the 2000s and 2010s, averaging around 2 percent a year over the two decades. The region enjoyed a demographic dividend as the share of the working-age population continued to rise. Gains in education outcomes have been limited in the region. Secondary school completion rates in the region were around 40 percent in the 2010s. Moreover, the increase of 5 percentage points from the first decade of the 2000s was the second smallest increase among EMDE regions.

The COVID-19 pandemic disrupted life and undermined all three drivers of potential growth. It led to a contraction of over 10 percent in fixed investment in 2020, with only a partial reversal in 2021. Investment in 2022 is expected to remain 5 percent below the pre-pandemic trend, and this gap is expected to endure over much of the remainder of this decade. Human capital will have been eroded by lower participation rates, disruptions to education, and a deterioration in health outcomes. Pandemic-related school closures averaged 70 weeks in South Asia through March 2022—much higher than the global average of 41 weeks—and kept nearly 400 million children out of school (UNESCO and UNICEF 2021). This damage to human capital accumulation could undermine the pace of poverty reduction, significantly impair the lifetime earnings of many, and reduce upward social mobility across generations (Azevedo, Rogers, et al. 2021; World Bank 2021l, 2022b). The pandemic also had adverse effects on the informally employed—predominantly low-skilled, rural, female, and young workers—which accounted for 59 percent of total employment in 2010-18 in the region, significantly higher than in other EMDE regions (Ohnsorge and Yu 2021). Income losses were particularly severe in the services sector, given widespread informality and the limited ability of informal firms to access government support (Apedo-Amah et al. 2020; World Bank 2020f).

Potential growth prospects in SAR

Potential output growth in SAR is projected to average 6.1 percent a year between 2022-30, a slight slowdown from 6.2-6.3 percent a year in the 2000s and 2010s. This slowdown is less pronounced than in other regions and leaves potential growth well above that in other EMDE regions. Per capita potential growth is expected to rise slightly to 5.1 percent from 5.0 percent in the 2010s.

The forecast of continued solid potential output growth in SAR through 2030 is underpinned mainly by a projected recovery in TFP growth. This is partly due to the expected effects of assumed improvements in educational attainment, despite pandemic setbacks, as well as improvements in transport connectivity and agricultural productivity. Higher TFP growth is expected to largely offset a moderation in working-age population growth and a slightly smaller contribution from capital accumulation. Reform momentum in several economies is expected to help maintain the growth of TFP and potential output.

In India, which accounts for about three-fourths of SAR output, the focus of government spending has shifted toward infrastructure investment, labor regulations have been consolidated, underperforming state-owned assets are being privatized, and the logistics sector is being modernized and integrated. During 2019-20, several labor laws that presented long-standing barriers to growth were consolidated, rationalized, and simplified. They covered wages, social security, occupational health and safety, and industrial relations. The "Make in India" initiative, which began in late-2014, promotes investment and innovation, and the acquisition of skills to support workforce modernization. To boost international trade, the government has been modernizing and simplifying trade procedures through digitalization and infrastructure upgrades, and liberalizing services trade policies by raising foreign ownership limits (World Bank 2020g). The government has also taken steps to address the causes of past stress in the banking sector, including improving regulations and introducing a new bankruptcy law with a rule-based and time-bound resolution mechanism. The budget for 2021-22 has created a "bad bank" to acquire and resolve legacy non-performing assets, inject further capital into state banks, and increase foreign ownership in the insurance sector.

Other countries have also taken action to promote more conducive environments for private sector activity. In Pakistan, to improve macroeconomic stability, the functional and administrative autonomy of the central bank has been strengthened, government borrowing from the central bank has been prohibited, and price stability has been established as monetary policy's primary objective (World Bank 2022l). In Nepal, reforms are planned to improve governance and transparency, upgrade the tax system and improve spending efficiency, enhance public debt management, and strengthen financial regulation and supervision (IMF 2022b).

The baseline projection of SAR's potential growth is subject to significant uncertainty and risks, predominantly on the downside. The COVID-19 pandemic and the war in Ukraine are of particular concern as these shocks have put significant pressure on policy buffers, increased fiscal and financial sector vulnerabilities, and thereby heightened risks of financial crises (Dieppe 2021; Kilic Celik, Kose, and Ohnsorge 2020). In Sri Lanka, the two shocks, together with existing domestic vulnerabilities, led to a balance of payments and sovereign debt crisis in mid-2022. While policies to resolve this crisis are now being implemented, with the support of the international community, there are likely to be significant losses to the country's potential growth in the years ahead. Other economies in the region are at risk of similar crises given the size of potential shocks and

elevated fiscal and financial vulnerabilities. The risk of a global recession has also risen because of the two shocks, and this would damage the region's actual and potential growth. Future waves of the pandemic and the possibility of new variants could cause further disruptions to education and employment, and discourage investment, leading to further losses to potential growth. Meanwhile, the war in Ukraine has increased global uncertainty and could lead to a prolonged fragmentation of global trade and investment networks. Gains from further improvements in agriculture productivity, which explained two-thirds of agricultural output growth globally from 2001 to 2015, may also be at risk due to higher input costs and the fragmentation of trade and finance (Fuglie et al. 2020). Regarding upside risks to potential growth in SAR, the pandemic has accelerated technology adoption, which may promote future productivity gains (World Bank 2021m).

Policies to lift potential growth in SAR

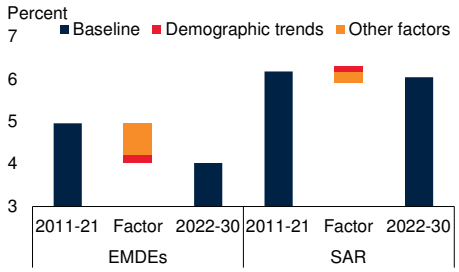
Additional structural reforms in SAR could significantly boost the growth of productivity, employment, and potential output. In a scenario in which the region's largest 10-year improvements during 2000-21 in investment growth, female labor force participation, education outcomes, and life expectancy are assumed to be repeated for each country in the region, it is estimated that SAR's annual potential growth rate in the remainder of this decade would be raised by 0.3 percentage point (figure 2.20). However, this underestimates the potential benefits of significant reforms. First, the region has made no progress in raising female labor force participation over the last two decades from around 30 percent. If it were to be raised over the remainder of this decade to the EMDE average of 55 percent, it is estimated that potential growth would be 1.2 percentage points higher. Second, investment in climate change adaption and mitigation of about 2.3 percent of GDP per year could boost potential growth by an additional 0.4 percentage point. While this scenario analysis indicates how reforms could raise SAR's potential growth in the years ahead, there are also other possible reforms to consider.

Labor productivity in SAR remains the lowest of all EMDE regions, in part reflecting high informality, the relatively large role of agriculture, and the region's limited integration into the global economy (Dieppe 2021). Policies to reduce informality include investing in human capital, increasing access to credit and public-sector support, and improving the business environment (Ohnsorge and Yu 2021; World Bank 2020f). Informal employment is particularly high among young, low-skilled, female, and rural workers, and policies for educating and training these groups can help their transition to formal employment. Greater access to credit for informal workers can also encourage formalization, while expanding access to microfinance and other services has been shown to increase investment and productivity among informal enterprises (ILO 2016). Gaining access to high-quality public services can also incentivize informal firms to become formal. Enhanced monitoring and enforcement of tax and other regulations could also discourage informality. In India, the introduction of a Goods and Services Tax in 2017 was designed partly to encourage formalization of activity.

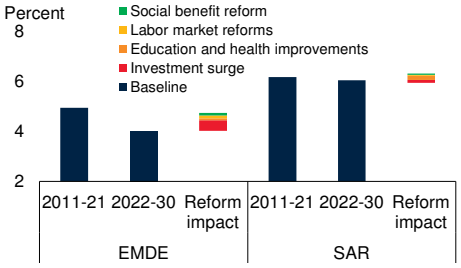
FIGURE 2.20 SAR: Policies to raise potential output growth

South Asia can achieve even faster potential growth than projected in the decade ahead by investing in climate mitigation and adaptation, and by improving its labor market and health outcomes. Agriculture remains a significant part of the economy and policies to raise its productivity can have a significant impact on overall productivity. The frequency of extreme weather events has increased over time and damage per event has risen.

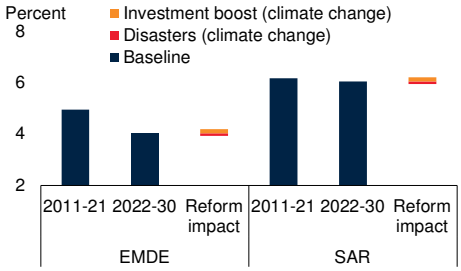
A. Potential output growth and contributions



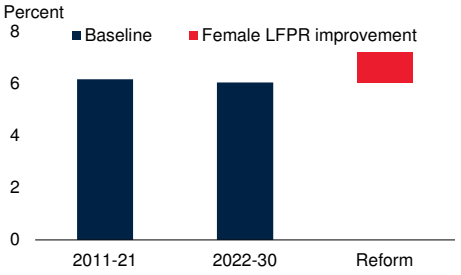
B. Reform scenarios



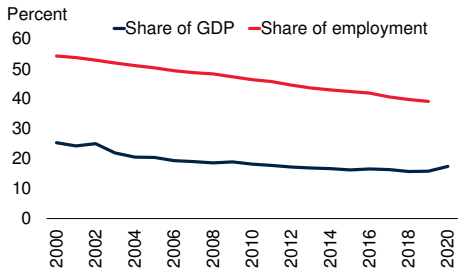
C. Climate change scenarios



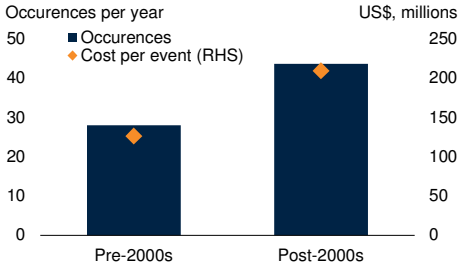
D. Female labor force scenarios



E. Share of agriculture sector



F. Climate risk



Sources: EM-DAT database; Penn World Tables; UN Population Prospects; World Bank; World Development Indicators database;
Note: EMDEs = emerging market and developing economies; SAR = South Asia. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates) for the period 2011-21. Data for 2022-30 are forecasts.
A.-D. Period averages of annual GDP-weighted averages. Potential growth estimates based on production function approach. Methodology is described in chapter 1 and reform scenarios are described in chapter 5.
A. Sample includes 53 EMDEs, of which 3 economies are from SAR region. "Other factors" include trend improvements in human capital, and stable investment growth relative to output growth.
B. Sample includes 53 EMDEs, of which 3 economies are from SAR region.
D. LFPR = labor force participation rate.
E. Sample includes eight SAR economies.
F. Based on data from 1980-2021. "Cost per event" in current 2021 US dollars. Occurrences of natural disasters.

Agriculture remains a large part of the economy in SAR, accounting for 18 percent of value-added and 42 percent of employment. Despite a three-fold increase in crop yields in the region over the last four decades, the average yield of cereal grains is still half that of East Asia (Fuglie et al. 2020). With two-thirds of the global extreme poor's livelihoods dependent on agriculture, with many of those in SAR, increasing productivity in this sector is especially important, with a large potential impact on economy-wide productivity. Policies to achieve this include increasing research spending on agriculture; measures to raise productivity on existing farms and promote the reallocation of resources to the most productive ones; measures to promote the adoption of new technologies; the expansion of training for farmers in the best available techniques; the development of financial products that meet the needs of farmers; and assisting in the transfer of excess labor from agriculture to other sectors (Fuglie et al. 2020).

Enhancing the region's integration into global value chains and promoting the diversification of exports could also boost productivity growth and private sector investment. In other regions, international trade integration has been associated with faster economic growth, but SAR lags behind them in regional as well as global integration of trade and investment flows (Pathikonda and Farole 2017). Closer trade and investment ties could be supported by closing infrastructure gaps, removing regulatory and other impediments to business, and promoting a shift toward higher value-added manufacturing (Lopez-Acevedo and Robertson 2016). The region's exports remain highly concentrated in a narrow range of products, which are often of relatively poor quality and less complex than those of peers (Lian et al. 2021). Policies to promote diversification of exports could focus on raising research and development spending, investing in infrastructure (including in digital technologies) and education, adopting new technologies, and increasing openness to trade.

There is significant room for improving SAR's business environment. In particular, reform priorities include improving government effectiveness and controlling corruption.

Additional steps to address corporate and banking sector balance sheet vulnerabilities in the region could lift credit growth and the growth of investment and potential output. Banks' high ratios of non-performing loans hold back the supply of credit. At the same time, high corporate debt hinders credit demand and investment, and parts of the corporate sector may require debt restructuring or even the exit of firms. Addressing the problem of so-called "zombie firms"—firms that are unable to cover interest payments from operating profits—could free up credit and resources for more productive uses (Banerjee and Hofmann 2022). In India, for example, 10 percent of non-financial firms, accounting for 10 percent of total bank credit, have been identified as zombies (Pattanaik, Muduli, and Jose 2022).

Greater investment in human capital may also help lift productivity, labor incomes, and potential output, including by fostering shifts of resources to higher value-added and

more innovative sectors (Aturupane et al. 2014). Policies in this area include measures to raise the participation of women in the workforce, increase access to higher and better education, and invest in vocational training programs. Improving women's access to economic opportunities—still far more limited in SAR than in other EMDE regions—remains a significant source of potential growth gains (Hsieh et al. 2019). Less than one-fourth of working-age women are in the labor force in SAR, compared to more than half in other EMDE regions (World Bank 2022m). Women's participation in the workforce can also bring complementary benefits, including improvements in the nutrition of children and associated increases in productivity.

Country-specific reform agendas are key to boosting potential growth in the region. For example, in Bangladesh, reforms could focus on strengthening trade competitiveness through tariff reform and implementation of the Bangladesh National Single Window and the Customs Modernization Strategic Action Plan (2019-22); increasing investment and FDI through the full operationalization of new economic zones; increasing investment in climate adaptation; and addressing the pandemic's impact on the financial sector, including by strengthening banks' relatively weak capital positions and exiting regulatory forbearance (World Bank 2022n).

In India, potential growth could benefit from accelerated implementation of an already ambitious reform agenda. Addressing the aftermath of financial sector distress could unlock significant growth. India has a less developed financial system than many of its peers, with a heavy state presence. To improve the sector's efficiency and depth, reforms could be undertaken to further rationalize the role of public sector banks, ensure a level the playing field in the banking sector, and promote the development of capital markets (World Bank 2020g). On infrastructure, the reforms suggested by the Task Force on the National Infrastructure Pipeline should be implemented, including improving project preparation processes, enhancing the capacity and participation of the private sector, improving contract enforcement and dispute resolution, and improving sources of financing.

In Pakistan, priorities to raise potential growth include improving macroeconomic stability (avoiding destabilizing boom-bust cycles), increasing international competitiveness, and promoting equity and inclusion (World Bank 2020h, 2022l). Other policies beneficial to growth could include strengthening insolvency arrangements and creditor rights, improving the financial viability of the energy sector, and strengthening revenue mobilization and spending efficiency to better fund growth-promoting public investment.

The outlook for potential growth in the remainder of this decade and beyond is highly dependent on repercussions of the COVID-19 pandemic and climate change. While the impacts of both are highly uncertain, they will be almost entirely negative, with risks that they could be severely adverse. Policies to address these challenges are key to ensuring sustainable growth.

Regarding the COVID-19 pandemic, policies need to focus on mitigating its impact, including on education and employment, as well as on improving resilience to future pandemics by investing in surveillance and the health sector. Pandemic-related closures have kept more than 400 million children out of school in 2020-21 in the region, indicating an urgent need for countries to take measures to minimize education losses. SAR also has a large digital divide, with only 12 percent of school-aged children (3-17 years old) having access to the internet at home, well below the 33 percent of children globally (UNICEF and ITU 2020). Besides efforts to close the digital divide, education policies should be pursued that develop information systems for large segments of the population, improve coordination across stakeholders to improve outcomes, and encourage innovation (World Bank 2018b). In the health sector, besides expanding current vaccination programs, countries could prepare for future waves of COVID-19 and future pandemics by investing in improving the procurement and distribution of vaccines; shifting resources and planning toward more preventative care for the vulnerable; creating more effective early warning systems; and promoting, though international cooperation, global solutions to this global problem with collective financing, mutual accountability, and strong multilateral systems (Global Preparedness Monitoring Board 2021; World Bank 2021l).

Climate change represents a significant threat to lives, livelihoods, and economic growth in the region, as in the rest of the world. Extreme weather events, including cyclones, floods, and droughts, have become more frequent in SAR, and the damage caused has become more costly. The region is one of the most vulnerable to climate change-induced increases in poverty, disease, and child mortality, with half its population living in areas expected to become climate hot spots (Amarnath et al. 2017; Hallegatte et al. 2016; Jafino et al. 2020; Mani et al. 2018). Mitigation and adaptation are key to ensuring sustainable growth in the future (Agarwal et al. 2021; World Bank 2022l). The region, which accounted for about 9 percent of global greenhouse gas emissions in 2018, can contribute to global mitigation efforts by incentivizing renewable energy sources, rationalizing and reducing subsidies on fossil fuels, and appropriately pricing carbon emissions through carbon taxes (Friedlingstein et al. 2022). The introduction of carbon taxes would both lower pollution and increase fiscal revenues to fund productivity-enhancing investments, but care should be taken to a minimizes their impact on vulnerable households. Adaptation, also necessary given the already changing climate, could be accelerated by quickly formulating and effectively implementing a comprehensive national adaptation plan. To date, only Sri Lanka has formulated and released such a plan.

SUB-SAHARAN AFRICA

Potential output growth in Sub-Saharan Africa (SSA) has been below the EMDE average since at least 2000. The effects of the COVID-19 pandemic and Russia's invasion of Ukraine have depressed it further, although not as much as in some other regions. This long period of anemic potential growth, with growth rates barely above the region's population growth, resulted in stagnant per capita potential output growth. Without economic reforms, potential growth in SSA is likely to weaken further over the rest of this decade, as labor supply growth moderates and capital accumulation wanes, especially in South Africa.

Introduction

Over at least the past two decades, output growth in Sub-Saharan Africa (SSA) has been consistently below the EMDE average. Although the region fared better during the 2008-09 global financial crisis than other EMDE regions, economic growth in many countries never returned to its 2000s average, as declining investment in extractive sectors, worsening security situations, rising public debt, and deepening poverty weighed on activity.[27] Over half of all SSA economies are expected to grow in 2022-24, but at a slower rate than in the 2010s, largely reflecting damage from the COVID-19 pandemic and the adverse effects of Russia's invasion of Ukraine on poverty and food security—two shocks that have further exacerbated underlying constraints on SSA's growth.

SSA's potential output growth has also been consistently below the EMDE average since at least 2000. The COVID-19 pandemic as well as Russia's invasion of Ukraine have depressed it further by adversely affecting fundamental drivers of potential growth, such as human and physical capital accumulation. In contrast to slowdowns in most other regions, potential growth in SSA in the 2010s was only slightly slower than in the preceding decade, although it remained barely above the region's population growth.

Without significant progress with reforms, actual and potential growth are likely to remain depressed across the region: it is projected that potential growth in SSA is likely to fall below 3 percent a year over the 2020s, with decelerating labor supply and slowing

[27] For the purposes of this section, the 2000s are assumed to cover the period 2000-10, the 2010s the period 2011-21, and the 2020s the period 2022-30. The 2000s and 2010s are selected to ensure that the averages include both the global recession and the subsequent rebound. The 2020s are selected to cover projections.

investment growth—especially in South Africa—expected to be only partly offset by a modest increase in TFP growth.[28]

Weaker potential growth would delay the reversal of pandemic-inflicted losses in per capita incomes and hinder poverty reduction in SSA. The world's extreme poverty is increasingly concentrated in SSA: nearly 60 percent of people living in extreme poverty live in the region (World Bank 2022a).[29] The COVID-19 pandemic reduced per capita incomes in SSA by nearly 5 percent in 2020, twice as much as in EMDEs more broadly, and caused widespread losses in learning and health outcomes (World Bank, UNESCO, and UNICEF 2021). Recent sharp cost-of-living increases caused by soaring food and fuel prices, largely resulting from the war in Ukraine, are pushing even more people into extreme poverty and acute food insecurity across the region. Boosting potential growth in SSA could substantially mitigate the damage arising from these developments.

The sharp deceleration of growth since 2019, triggered by the pandemic and steepened by Russia's invasion of Ukraine, increases the likelihood of SSA missing the Sustainable Development Goals (SDGs). Investment has fallen across most SDG sectors, worsening constraints in industries that were already weak prior to the pandemic, such as power generation, agriculture, and health (UNCTAD 2021a). The SSA region also remains one of the most vulnerable to climate change-induced disruptions to development prospects (Rozenberg and Fay 2019).

This multitude of challenges confronting SSA underscores the urgency of structural reforms to boost potential growth, including reforms that spur private investment, skills development, and female labor force participation. There are substantial opportunities to boost potential growth through investment in SSA food systems and green and resilient infrastructure, with benefits magnified through productivity-enhancing technology transfers. Comprehensive reforms to strengthen health care, labor force participation, education, and social protection could similarly be transformative, unlocking the region's underutilized potential human capital.

Evolution and drivers of potential growth in SSA

Potential output growth in SSA stood at 3.2 percent a year during the 2010s, only slightly below its average of 3.4 percent during the 2000s (figure 2.21). The experience of SSA contrasts with that of EMDEs as a whole, where potential growth during 2010s was a full percentage point slower than in the first decade of the 2000s.

The relative stability of potential output growth in SSA reflects two largely offsetting factors: a boost from a significant increase in public investment and a rise in the working-age share of the population being canceled out by a sharp deceleration in total

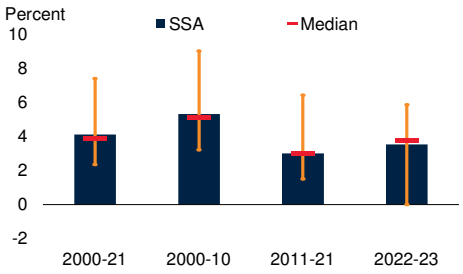
[28] This section draws on estimates of potential growth for 14 EMDEs in SSA, which together accounted for over a third of the region's GDP in 2021. Estimates are available for Benin, Burundi, Cameroon, Gabon, Kenya, Lesotho, Mauritania, Mauritius, Mozambique, Namibia, Niger, Senegal, South Africa, and Togo.

[29] Extreme poverty is measured as the number of people living on less than $2.15 using 2017 prices.

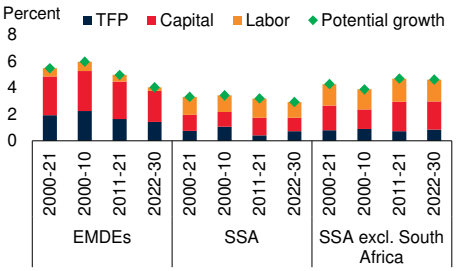
FIGURE 2.21 SSA: Economic growth and drivers of potential growth

GDP growth in Sub-Saharan Africa slowed sharply in the last decade as rising public debt, worsening security situations in some countries, and a drop in commodity prices curtailed investment and economic activity. Potential output growth in the region has been consistently below the EMDE average, partly as a result of weak investment growth in South Africa—the region's second largest economy.

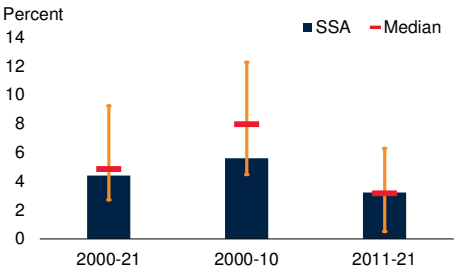
A. GDP Growth



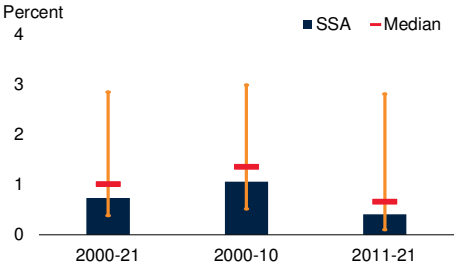
B. Contributions to potential GDP growth



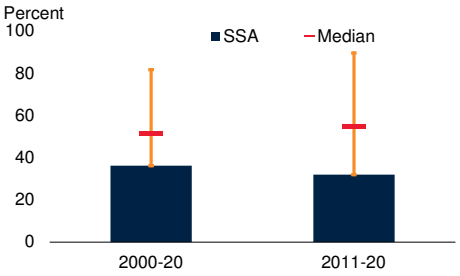
C. Investment growth



D. Potential TFP growth



E. Secondary education attainment



F. Working-age population growth

Sources: Penn World Tables; UN Population Prospects; World Bank; World Bank, World Development Indicators database.
Note: EMDEs = emerging market and developing economies; SSA = Sub-Saharan Africa. GDP weights are calculated using average real U.S. dollar GDP (at average 2010-19 prices and market exchange rates). Data for 2022-23 and 2022-30 are forecasts.
A.C.D.F. Bars show period averages of annual GDP-weighted averages. Markers show median of GDP-weighted averages of six EMDE regions; vertical lines denote range of regional averages.
B. Period averages of annual GDP-weighted averages. Estimates based on production function approach. Sample includes 53 EMDEs (14 from SSA).
C. D. Sample includes 14 SSA economies (where potential growth estimate is available for both investment growth and TFP growth measures for the period 2000-21.
E. Period averages of simple annual averages. Percentage of population ages 25 and above that completed at least lower secondary education.
F. Working-age population refers to population ages 15-64. Sample includes 14 SSA economies.

factor productivity (TFP). TFP in SSA decelerated sharply in the 2010s, and especially in 2015-19. During this period, following the collapse of commodity prices and a decline in investment in extractive industries, potential TFP growth reached its slowest rate since 2000. This slowdown in TFP growth in SSA and other EMDE regions during the pre-pandemic decade has been attributed in part to a slowdown in convergence to the technological frontier. After a rapid catch-up in the 2000s, convergence has slowed amid weaker inflows of foreign direct investment (FDI) and lagging capabilities to adopt frontier technologies (Kemp and Smit 2015; UNCTAD 2021b).[30]

More than many other EMDEs, the economies of SSA have continued to benefit from a young and growing labor force. The contribution of labor supply growth to potential output growth increased by about 0.2 percentage point a year between the 2000s and 2010s amid rapid expansion in working-age populations. Excluding South Africa, it increased slightly more as rising labor force participation accompanied rapid population growth. This contrasts with other EMDE regions, where population aging has dampened labor supply growth.

The weakening of SSA's potential growth in the past decade was mainly concentrated in South Africa, the region's second-largest economy. In fact, excluding South Africa, potential growth in the region accelerated from 3.9 percent a year during the 2000s to 4.7 percent a year during the 2010s—not far below the EMDE average of 5.0 percent—largely due to strong public investment. Excluding South Africa, the contribution of capital stock growth to potential output growth in SSA rose from 1.5 percentage points a year in the 2000s to 2.2 percentage points a year in the 2010s. This was driven by macroeconomic stimulus policies after the global financial crisis, public investment initiatives in non-resource-intensive countries, and rising FDI inflows in metal exporters. Efforts to improve the business environment supported private investment activity and investor confidence in many non-oil producing countries. Each year since 2012, SSA has been the EMDE region with the highest number of reforms to improve business climates (Devarajan and Kasekende 2011; World Bank 2019b). However, in oil exporters, which account for almost 40 percent of SSA output, investment growth and FDI inflows fell substantially in the aftermath of the 2011-16 global commodity price plunge (World Bank 2017a).

Since 2019, the COVID-19 pandemic and Russia's invasion of Ukraine have substantially weakened all major drivers of potential growth in SSA, even more than in the rest of EMDEs. Economic activity in most SSA economies is more concentrated than in many other EMDEs in sectors directly hit by the pandemic. Remote work, which often allows for a wide range of activities, is impossible in much of the region. And even in sectors where it is possible, many countries lack the infrastructure needed to switch to remote work during the COVID-19 lockdowns. Similarly, digital inequalities,

[30] During 2000s, potential TFP growth had strengthened because of improvements in health and education outcomes, as well as a decline in the share of the labor force engaged in agriculture and the associated reallocation of workers to higher productivity sectors (Abdychev et al. 2018; McMillan and Harttgen 2014).

lack of reliable internet, and power access limited the feasibility of remote learning in many SSA countries. As a result, learning losses from school closures have been more severe than in other EMDE regions and have disproportionately affected vulnerable households, deepening the learning crisis in the region (Angrist et al. 2021).

Several other structural features of the region's economies made SSA more vulnerable to slowdowns of potential growth. The sharp drop in commodity prices at the start of the pandemic severely reduced investment in extractive industries, particularly in oil-producing countries, compounding the adverse effect of delays in maintenance work due to mobility restrictions. The collapse of fiscal revenues and reorientation of government spending to pandemic relief measures took a major toll on public investment. Investment is expected to recover but could remain well below pre-pandemic trends.

In addition, SSA has the highest share of informality across all EMDE regions, with informal firms, especially those owned by women, hit particularly hard during COVID-19 lockdowns. Many informally employed workers, who were outside social protection nets, had to dispose of productive assets and deplete savings to cope with income losses and rising living costs, which further weakened their already low productivity.

Russia's invasion of Ukraine has sharply increased the number of vulnerable people because of surging domestic inflation and spreading food and fuel shortages, especially in SSA countries with already high levels of fragility. By increasing incidences of malnutrition and undernourishment, this is likely having a significant and lasting negative impact on human capital accumulation. In addition, because of deteriorating food affordability, many SSA governments are facing increased pressures to strengthen social protection and subsidize food and fuel at a time when fiscal space is already depleted. The resulting diversion of public funds from development projects, such as infrastructure investment, could delay progress toward other SDGs across the region. War-induced disruptions to global fertilizer and fuel supplies could also imperil sustained productivity growth in SSA agriculture, which already faces substantial risks due to the adverse impact of climate change (World Bank 2021n).

Prospects for potential growth in SSA

According to current baseline projections, potential output growth in SSA will continue to drift lower, to below 3 percent a year on average in the 2020s, with further slowdowns in capital accumulation and labor supply growth only partly offset by a modest increase in TFP growth.[31] This would be a less steep slowdown than in the average EMDE, mainly because of relatively fast population growth. Nevertheless, potential growth at this rate would mean that potential GDP per capita in SSA would rise by only 1.5 percent a year over the remainder of the 2020s, slowing the region's progress on poverty reduction and the reversal of pandemic-inflicted income losses.

[31] For a detailed description of the assumptions underlying this outlook, please see chapter 5.

Much of the weakness in the region's prospects for potential growth is accounted for by South Africa, which faces both slowing labor force growth and slower capital accumulation. Excluding South Africa, potential growth in the region would remain broadly steady at 4.6 percent a year on average during the 2020s, exceeding EMDE average potential growth by more than a half percentage point. In per capita terms, however, this would still be weak, averaging 2.5 percent a year over the remainder of the 2020s, compared to 3.5 percent a year for EMDEs as a whole.

The underlying contribution of SSA's capital stock is projected to moderate to 1 percentage point a year in the 2020s. For 11 of the 13 SSA countries in the sample that are commodity-exporting, private investment in the resource sector is expected to continue growing in response to high commodity prices. Although financing costs are rising across the region as global financial conditions tighten, continued access to concessional financing will allow public investment to remain robust in some countries, supporting progress toward development goals. In contrast to the rest of the region, investment growth in South Africa is expected to recover only moderately during the next decade because of such structural impediments as high unemployment, weak infrastructure and institutions, slow progress with reforms, elevated public debt, and deteriorating profitability of state-owned enterprises, especially in the power generation sector. Excluding South Africa, investment growth is expected to remain robust at around 5.9 percent a year.

This investment growth is also expected to support TFP growth across the region. In South Africa, a stronger record of innovation than in the broader region suggests that despite weaker investment growth than in other SSA economies, TFP growth may pick up in the reminder of the 2020s. South Africa is one of SSA's leaders in digital infrastructure and services and is therefore more prepared than the rest of the region to adopt frontier technologies, for example in information technology and digital finance (figure 2.22; World Bank 2017e, 2019c). For SSA as a whole, the contribution of TFP growth to potential output growth is expected to increase by about 0.3 percentage point a year. However, if South Africa is excluded, the contribution is expected to increase by only 0.1 percentage point a year.

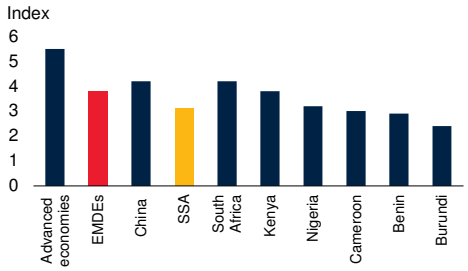
SSA is expected to experience a slower decline in fertility rates than other EMDE regions (Canning, Raja, and Yazbeck 2015). As a result, the youth dependency ratio (the population younger than 15 divided by the population aged 16-64) is projected to remain high and the share of the working-age population is projected to continue to rise at a similar rate to the pre-pandemic decade—except in South Africa, where slowing labor force growth is expected to dampen potential growth.

There are substantial risks that potential growth in SSA could slow in the period ahead by more than projected. These risks include the emergence and spread of infectious diseases, including new strains of COVID-19, which could further undermine improvements in health outcomes and disrupt the accumulation of human capital. SSA's high dependence on commodity exports—over 90 percent of the region's economies are commodity exporters—leaves the region particularly vulnerable to commodity price

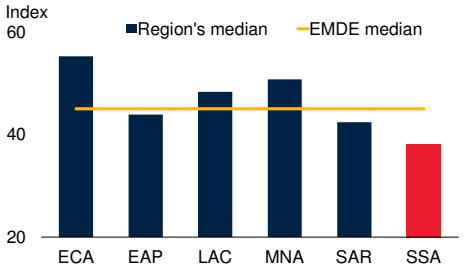
FIGURE 2.22 SSA: Obstacles to economic growth and reforms to accelerate potential growth

Many Sub-Saharan Africa economies have weak capacity to adopt frontier technologies and tackle climate change, and heavy reliance on commodity exports increases exposures to commodity price shocks and makes growth and investment more volatile. Absent a renewed push to accelerate structural reforms that address these challenges, potential growth in SSA could remain weak over the next decade. Given SSA's sizable investment and infrastructure gaps, encouraging private investment, including projects that enhance the region's resilience to climate change and natural disasters, could deliver a large and sustainable boost to potential growth in the 2020s.

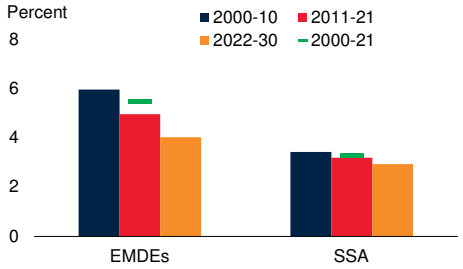
A. Networked Readiness Index



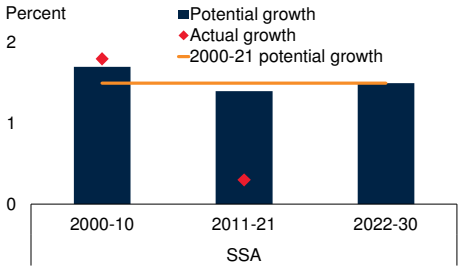
B. Climate change vulnerability and readiness index



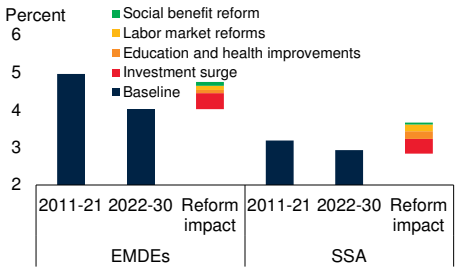
C. Potential GDP growth



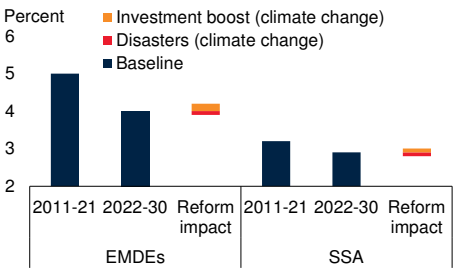
D. Per capita potential GDP growth



E. Reform scenarios



F. Climate change investment scenarios



Sources: Notre Dame Global Adaptation Initiative; Penn World Tables; Portulans Institute; UN Population Prospects; World Economic Forum; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Estimates based on production function approach. Data for 2022-30 are forecasts.
A. Portulans Institute Network Readiness Index estimates preparedness to benefit from emerging technologies and capitalize on the opportunities presented by the digital transformation; higher value indicates better readiness. Unweighted group averages.
B. The Notre Dame Global Adaptation Initiative index reflects vulnerability to climate change and other global challenges, combined with readiness to improve resilience. A higher value indicates lower vulnerability and/or better readiness. Sample includes 146 EMDEs; last observation 2019.
D.-F. Sample includes 53 EMDEs (14 from SSA). GDP-weighted averages (using average real U.S. dollar GDP at average 2010-19 prices and market exchange rates). Period averages.
E.F. Policy scenarios are described in chapter 5.

swings and resulting volatility of growth. High levels of public debt and weak fiscal revenue mobilization could further constrain much-needed investment in some countries, especially if access to international financial markets and donor support remains restricted. Violence and insecurity amid rising poverty and income inequality could slow reforms, including ones that improve investment climates. Productivity in agriculture may decelerate substantially if costs of farming inputs remain elevated for an extended period and investment in green and resilient infrastructure fails to pick up. Insufficient access to agricultural inputs may lead to more low-productivity subsistence farming, rendering regional food systems even more vulnerable to shocks, especially in countries where climate change has already depressed productivity in farming.

Many of these risks, however, can be mitigated through policy actions that promote sustained improvements in the fundamental drivers of potential growth.

Policy options to lift potential growth in SSA

Potential output growth in SSA could be increased by meeting the region's investment needs for climate adaptation and resilience, boosting human capital, and increasing labor force participation. For example, in a scenario in which the largest ten-year increases on record in each country in investment growth, education outcomes, life expectancy, and female labor force participation are assumed to be repeated, it is estimated that SSA's potential growth over the remainder of this decade could be boosted by about 0.8 percentage point a year, to an annual average of about 3.7 percent. Much of this boost would come from meeting investment needs, including investment in climate change mitigation and adaptation projects (figure 2.22).[32]

In a separate scenario representing increased investment in climate change adaptation and mitigation, it is assumed that all SSA economies increase investment to limit climate change to 2°C, and also to become more resilient to its effects. The scenario is based on the World Bank's Country Climate Development reports. The additional capital spending includes, for example, investment in resilient infrastructure, flood prevention, and renewable power generation, and is estimated at about 1.2 percent of SSA GDP per year in the 2020s. The estimated boost to potential growth is 0.1 percentage points a year over this period.

Although public investment in SSA picked up in the mid-2000s and reached a peak of 5.8 percent of GDP in 2014, this rate was well below the average in other EMDE regions (World Bank 2017f). Partly as a result, SSA still has substantial infrastructure investment needs. Furthermore, public investment fell sharply during the pandemic, reversing some of the progress in meeting these needs. Additional financing equivalent to 27-37 percent of SSA's 2022 GDP could be needed to return SSA to its pre-pandemic income convergence path by the mid-2020s (IMF 2021d). The region's annual infrastructure investment needs, the largest among all EMDE regions, are estimated at

[32] Please see chapter 5 for a detailed description of the assumptions.

over 9 percent of regional GDP—nearly four times higher compared to estimates of the actual infrastructure spending in SSA (Fay et al. 2019; Rozenberg and Fay 2019). In all likelihood, a substantial boost in private as well as public sector investment is needed to cover infrastructure gaps and accelerate capital accumulation. If the region's best ten-year investment growth rates were repeated, the boost to potential growth in the 2020s is estimated at about 0.4 percentage points.

Increasing public investment could boost output in the short term, including by spurring private investment (World Bank 2017f). Many countries in the region have little fiscal space to raise public spending because of elevated public debt, weak revenue mobilization, and current pressures to boost social protection in response to the cost-of-living increases. There is, however, scope to reallocate resources from less productive spending programs and improve domestic revenue mobilization. Tax revenues as a ratio to GDP are relatively low for most countries in SSA and could be increased through reforms, including broad-based consumption taxes, simplified tax design, and improved tax administration (Mabugu and Simbanegavi 2015). In many countries, reforms that improve business climates and promote economic diversification would also encourage private investment (including FDI) in non-resource sectors, broaden tax bases, and reduce vulnerabilities to fluctuations in commodity prices.

Rapid scaling up of infrastructure investment carries the risk that funds could be spent inefficiently. There is evidence that the institutions governing the life cycle of infrastructure projects are weaker in SSA than in other EMDEs regions. This can lead to poor project selection, inadequate enforcement of procurement procedures, and failure to complete projects, limiting the success of large public investment projects (Dabla-Norris et al. 2012). Strengthening the underlying institutional and governance capacities could play an important role in raising the efficiency of public investment in the region (Calderón, Cantú, and Chuhan-Pole 2018; Rajaram et al. 2014). Many SSA countries can greatly benefit from stronger institutions and reduced corruption. Structural reforms that address these issues would raise fiscal revenues and build the capacity to use public funds more efficiently. Improved governance would incentivize investment and job creation in the private sector, enhance developmental outcomes and support economic and social inclusion.

To meet infrastructure and investment needs, many countries will need to boost private investment, particularly in green and climate change adaptation projects. Over the past few decades, SSA economies have made substantial progress with reforms to improve the investment climate, including regulatory reforms. Nevertheless, there remains considerable scope for simplifying regulations and administrative procedures for starting a business, increasing the efficiency of the legal system, and reducing regulatory uncertainty. In addition, complementary reforms are needed to raise returns on private investment in many countries. These include increasing openness to trade, technological readiness, and policy stability. Reforms to improve security are urgently needed as well, especially in low-income countries (LICs). Persistently high levels of violence and insecurity, which are being exacerbated by social unrest caused by deteriorating living

standards, could have a significant and lasting adverse impact on potential growth (Hadzi-Vaskov, Pienknagura, and Ricci 2021).

Further improvements in education and health outcomes could bolster potential growth by raising labor force participation rates, enhancing human capital accumulation, and boosting TFP growth. Although the region has achieved significant improvements in these areas, much more remains to be done. In half of the countries in the region, fewer than 50 percent of young people complete lower-secondary education, and fewer than 10 percent go on to higher education (World Bank 2017g). In addition, learning outcomes have been generally poor, and gender disparities have remained significant at the secondary and tertiary levels (Oleyere 2015). Completion rates adjusted for the quality of learning outcomes in Africa are some of the lowest in the world—for example, just 10 percent of lower secondary students in SSA achieve a minimum proficiency level in mathematics (UNESCO 2019). Priorities vary depending on country circumstances, but they center on investing in effective teaching, ensuring access to quality education for the poor, and closing gender gaps (World Bank 2017g).

Investment in health and education is especially urgent considering the scale of learning losses during the pandemic. School closures due to COVID-19 social restrictions are likely to have a significant negative impact on long-term educational attainment across the region, as well as the earning and employment prospects of new labor market entrants. For example, in the aftermath of the 2015 Ebola outbreak, almost a fifth of girls in Sierra Leone never re-enrolled in schools (Bandiera, Buehren, Goldstein, et al. 2020). One estimate suggests that a loss of one year of schooling because of COVID-19 school closures translates into as much as three years of learning losses in the long term (Angrist et al. 2021).

Major health indicators show SSA is lagging. Average life expectancy in the region was 62 years in 2020—well below the average of over 70 years in other EMDE regions. SSA is disproportionally affected by the impact of infectious diseases. Building strong health systems, as well as setting up regional coordination mechanisms (to improve prevention, preparedness, and response to future pandemics), is critical for providing adequate health services.

Achieving the education and health improvements envisaged in the scenario analysis—that is, a rise in secondary school completion rates by 3.7 percentage points, tertiary completion rates by 0.4 percentage point, and life expectancy by 3 years—would raise potential growth by around 0.2 percentage point a year during 2020s.

The COVID-19 pandemic has also widened gender inequalities in SSA because women were employed disproportionately in the hardest-hit sectors, notably the informal economy. At about 64 percent, the labor force participation rate for women in SSA remains well below the 74 percent rate for men, indicating significant scope for increasing the number of women in the workforce. Raising female labor force participation in SSA is complicated by the prevalence of unpaid female labor, lack of

affordable childcare, as well as by gaps in educational attainment and restrictions in women's access to credit and rights to own and control assets (Seguino and Were 2015).

These challenges point to the need for policy and institutional frameworks to increase female labor force participation and promote female entrepreneurship. Reforms that remove obstacles to ownership rights, promote equal access to financial services, and expand the availability of childcare are critical for women's empowerment and gender equality (World Bank 2022o). If the female labor force participation rate increases by 2.5 percentage points, as assumed in the scenario analysis, it would raise potential growth in the region by around 0.2 percentage point a year in the 2020s.

In addition to the reforms captured in the scenario analysis, there are others that could pay significant dividends in terms of increased TFP (IMF 2022c). These include diversification efforts to reduce reliance on the resource sector, stronger property rights to encourage productivity-enhancing investment, and greater transport connectivity to spur competition and within-region integration. For example, estimates suggest that the full implementation of the African Continental Free Trade Area (AfCFTA) could lift 30 million people from extreme poverty by 2035 through trade facilitation and the removal of tariff and non-tariff barriers (World Bank 2020i). Across the region, there is substantial scope for raising productivity across many sectors and industries, including the formal sector, the agricultural sector, and the nonfarm informal sector, which could further boost the region's potential growth (Calderon 2021).

Many economies in SSA are striving to diversify away from natural resource exports, especially by taking steps to increase the competitiveness of manufacturing, which suffers from poor business environments, lack of infrastructure, and high unit labor costs (Bhorat and Tarp 2016). Along with increased human capital and the removal of trade barriers, improvements in transport and energy infrastructure would increase the competitiveness of the region and facilitate its integration into global and regional value chains (Abreha et al. 2020; Allard et al. 2016). AfCFTA could be a strong catalyst for many intra-African productivity-boosting infrastructure projects, including the expansion of road networks, which would substantially reduce intraregional transportation costs, especially for landlocked countries (UNCTAD 2021c).

The COVID-19 pandemic has accelerated the adoption in SSA of digital technologies, which could significantly improve productivity across firms, both formal and informal, and sectors, especially agriculture (World Bank 2021o). More widespread digitalization would require additional sizable investment in infrastructure and skills, which governments could facilitate by promoting competition, eliminating barriers to entry, removing restrictive licensing in the telecommunications industry, and avoiding taxes and regulations that constrain the expansion of service-providing industries.

Across the region, the share of the labor force working in the low-productivity agricultural sector remains high. Many countries have substantial scope for raising agricultural productivity, including by improving land titles; promoting new farming

techniques, including by increasing access to credit; and providing the infrastructure needed to connect farms to markets (Fuglie et al. 2020). In Ethiopia, for instance, public investments in irrigation, transportation, and power have led to a significant increase in agricultural productivity and incomes (Rodrik 2017). Improving productivity in agriculture, especially in LICs, is key to reducing food insecurity and extreme poverty across SSA.

TFP growth has accounted for about 60 percent of output growth in agriculture in EMDEs, and improvements in agricultural TFP have larger poverty-reducing effects than TFP growth in other sectors, especially in LICs where farming accounts for a big share of the economy (Fuglie et al. 2020; Ivanic and Martin 2018). Compared to other EMDE regions, agriculture represents a much larger share of output and employment in SSA, especially in the poorest countries. This increases the need for policies that promote the diffusion and adaptation of new technologies in farming, including public spending on research and development in agriculture, targeting improvements in yields; eliminating barriers to the adoption of new technologies by private firms; and enforcing business-friendly sanitary and phytosanitary standards.

In many countries in SSA, declines in the share of the labor force engaged in agriculture have been matched by increases in the share employed in the informal sector (Ohnsorge and Yu 2021). Raising productivity in the informal sector is therefore an important policy objective. Fostering a supportive regulatory environment, and promoting investment in basic infrastructure such as electricity, road networks, and information technology, are key reforms that could make the informal sector more dynamic, encourage formalization, and increase the contribution of the resources currently employed in the informal sector to the region's long-run economic growth (Bhorat and Tarp 2016).

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PART II

Investment: Time for a Big Push

[…] forward-looking policies generally involve investment in human, social, or physical capital.

Ben Bernanke, 2017

2022 Nobel Laurate in Economics,
Distinguished Senior Fellow, Brookings Institution,
and Former Chairman of the U.S. Federal Reserve Bank

Much […] will depend on the assets we leave to those who come after us. Some assets take the form of physical capital, such as infrastructure, or human capital, including health and education. But it has become ever clearer that opportunities for future generations depend critically on natural capital (water, air, land, forests, biodiversity, and oceans), and social capital (public trust, strong institutions, and social cohesion).

Nicholas Stern, 2019

IG Patel Professor of Economics and Government,
London School of Economics,
and Former Chief Economist of the World Bank

Education does not just enable individuals to improve their lot in life; it enriches an economy's human capital, which is vital to prosperity and social progress.

Jong-Wha Lee, 2019

Dean of the College of Political Science and Economics,
Korea University,
and Former Chief Economist of the Asian Development Bank

CHAPTER 3

The Global Investment Slowdown: Challenges and Policies

Investment growth in emerging market and developing economies (EMDEs) is expected to remain below its average rate of the past two decades through the medium term. This subdued outlook follows a decade-long, geographically widespread investment growth slowdown before the COVID-19 pandemic. An empirical analysis covering 2000-21 finds that periods of strong investment growth were associated with strong real output growth, robust real credit growth, terms of trade improvements, growth in capital inflows, and investment climate reform spurts. Each of these factors has been decreasingly supportive of investment growth since the 2007-09 global financial crisis. Weak investment growth is a concern because it dampens potential growth, is associated with weak trade, and makes achieving the development and climate-related goals more difficult. Policies to boost investment growth need to be tailored to country circumstances, but include comprehensive fiscal and structural reforms, including repurposing of expenditure on inefficient subsidies. Given EMDEs' limited fiscal space, the international community will need to significantly increase international cooperation, official financing and grants, and leverage private sector financing for adequate investment to materialize.

Introduction

As the COVID-19 pandemic began in 2020, emerging market and developing economies (EMDEs) had experienced a slowdown in real investment growth spanning much of the previous decade, from nearly 11 percent in 2010 to 3.4 percent in 2019. In EMDEs excluding China, investment growth tumbled more sharply: from 9 percent in 2010 to a mere 0.9 percent in 2019. The slowdown during the 2010s occurred in all EMDE regions, in both commodity-importing and commodity-exporting economies, and in a large share of individual economies.

In advanced economies, by contrast, investment growth was more sluggish but also more stable, hovering around its long-term average of 2 percent per year. Investment growth in advanced economies outpaced GDP growth during the 2000s and 2010s slightly, except for brief periods after the 2001 slowdown and 2009 recession. In contrast, in EMDEs, investment growth outpaced GDP growth by several percentage points in the 2000s but fell below output growth after 2013.

The pandemic triggered a severe investment contraction in EMDEs excluding China in 2020—a far deeper decline than in the 2009 global recession triggered by the global

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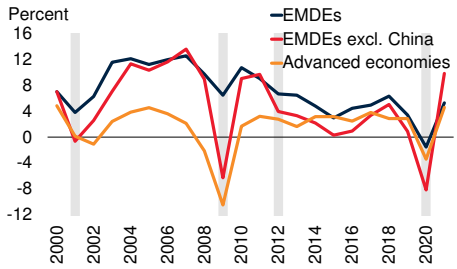
Note: This chapter was prepared by Kersten Kevin Stamm and Dana Vorisek, with contributions from Hayley Pallan and Shu Yu.

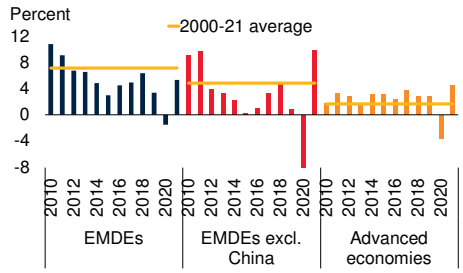
FIGURE 3.1 Investment growth

EMDEs experienced a broad-based slowdown in investment growth in the period between the 2007-09 global financial crisis and the COVID-19 pandemic in 2020. The pandemic-induced investment contraction in EMDEs excluding China in 2020 was historically large, and much sharper than in advanced economies. The investment growth slowdown in EMDEs during the 2010s reflected underlying trends in both commodity-exporting and commodity-importing economies and in the three largest EMDEs, especially China.

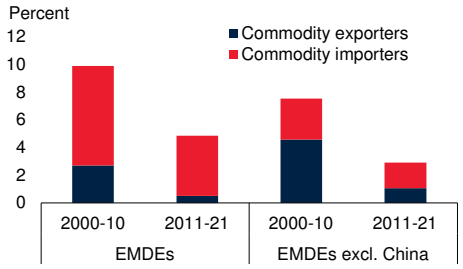
A. Investment growth



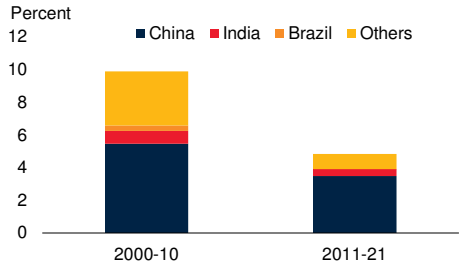
B. Investment growth relative to long-term average



C. Contribution to EMDE investment growth, by commodity exporter status



D. Contribution to EMDE investment growth, by country



Sources: Haver Analytics; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights. Shaded areas indicate global recessions (in 2009 and 2020) and slowdowns (in 2001 and 2012).
A.B. Sample includes 69 EMDEs and 35 advanced economies. Last observation is 2021.
C.D. Bars show the percentage point contribution of each country or country group to EMDE investment growth during the indicated years. Height of the bars is average EMDE investment growth during the indicated years. Sample includes 69 EMDEs.

financial crisis. EMDEs including China did not avoid an investment contraction in 2020, as they had in 2009 (figure 3.1.A). In advanced economies, however, investment shrank in 2020 by less than it had in 2009, buttressed by very large fiscal support packages and steep monetary loosening. After a sharp rebound in 2021, investment growth in EMDEs is projected to revert to a pace still below the average during the previous two decades. The medium-term investment growth outlook remains subdued, and has been downgraded substantially, along with the GDP growth outlook. This is due to the effects of the Russian Federation's invasion of Ukraine on commodity markets and supply chains, as well as historically high debt-to-GDP ratios and the sharp tightening of financing conditions as monetary policy responds to rising inflation.

Slowing investment growth is a concern because investment is critical to sustaining long-term growth of potential output and per capita income. Capital accumulation raises labor productivity, the key driver of the long-term growth of real wages and household incomes through capital deepening—equipping workers with more capital—and by incorporating productivity-enhancing technological advances.

Slowing investment growth has also held back progress toward meeting the Sustainable Development Goals (SDGs) and fulfilling commitments made under the Paris Agreement. Meeting these goals will require filling substantial unmet infrastructure needs, including growing needs for climate-resilient infrastructure and infrastructure that reduces net greenhouse gas emissions. Given limited fiscal space in EMDEs, scaling up investment will require additional financing from the international community and the private sector.

Against this backdrop, this chapter addresses four questions:

- How has investment growth evolved over the past decade, and how does the performance of investment during the 2020 global recession compare to previous recessions?
- What are the key factors associated with investment growth?
- What are the implications of weak investment growth for development prospects?
- Which policies can help promote investment growth?

Contributions. The chapter makes several contributions to the literature on investment. It is the first study to examine investment growth since the pandemic and Russia's invasion of Ukraine in a large sample of EMDEs. Second, since foreign direct investment (FDI) is a potentially critical source of technology spillovers and financing, this chapter reviews 62 studies since 1990 on the link between FDI, on the one hand, and output and aggregate domestic investment, on the other hand. Third, the chapter examines the likely medium- and long-term consequences of the damage to investment in EMDEs from the pandemic and the war in Ukraine, focusing on the effects on productivity, potential output growth, trade, and the ability to achieve the SDGs and climate-related goals. Fourth, the chapter provides fiscal and structural policy recommendations to revive investment growth, including measures to promote private capital mobilization and capitalize on new opportunities created by the pandemic.

Previous studies analyzing investment in EMDEs have tended to be either based on pre-global financial crisis data, confined to analysis of the global financial crisis, or focused on specific regions (Anand and Tulin 2014; Bahal, Raissi, and Tulin 2018; Caselli, Pagano, and Schivardi 2003; Cerra et al. 2016; Qureshi, Diaz-Sanchez, and Varoudakis 2015). Firm-level studies include Magud and Sosa (2015) and Li, Magud, and Valencia (2015). Investment weakness in advanced economies has been explored in Banerjee, Kearns, and Lombardi (2015); IMF (2015); Leboeuf and Fay (2016); Ollivaud,

Guillemette, and Turner (2016). This study updates and extends two previous studies of investment trends and correlates in a large sample of EMDEs (World Bank 2017; 2019b).

Main findings. The chapter presents five main findings. *First*, compared to the years following the global financial crisis, the investment recovery following the COVID-19 pandemic is proceeding more slowly. The slow recovery partly reflects the widespread impact of the pandemic on investment: investment contracted in nearly three-quarters of EMDEs during the pandemic. The effects of the pandemic and the war in Ukraine are expected to extend the prolonged and broad-based slowdown in investment growth in EMDEs during the 2010s. The slowdown occurred in all regions, in commodity-exporting and commodity-importing economies, and in private and public investment growth.

Second, empirical analysis in the chapter finds that investment growth in EMDEs over the past two decades is positively associated with output growth and, to a lesser degree, real credit growth and capital-flow-to-GDP ratios. Terms of trade improvements (for energy-exporting EMDEs) and investment climate reform spurts are associated with strengthening real investment growth. In contrast, in advanced economies, the most important correlate of investment growth is output growth, and other factors co-vary less strongly with investment growth than in EMDEs.

Third, investment growth in EMDEs in 2022 remained about 5 percentage points below the 2000-21 average, and by nearly 0.5 percentage points in EMDEs excluding China. For all EMDEs, projected investment growth through 2024 will be insufficient to return investment to the level suggested by the pre-pandemic (2010-19) investment trend. This investment weakness dampens long-term output growth and productivity, is associated with weak global trade growth, and makes meeting development and climate goals more challenging.

Fourth, a sustained improvement in investment growth in EMDEs requires the use of policy tools and international financial support, with appropriate prescriptions dependent on country circumstances. Macroeconomic policy can support investment in EMDEs in a variety of ways, including through preserving macroeconomic stability. Even with constrained fiscal space, spending on public investment can be boosted by reallocating expenditures, freeing resources by moving away from distorting subsidies, improving the effectiveness of public investment, strengthening revenue collection, and engaging the private sector to co-finance infrastructure and other investment projects. Structural policies also play a key role in creating conditions conducive to attracting investment. Institutional reforms could address a range of impediments and inefficiencies, such as high business startup costs, weak property rights, inefficient labor and product market policies, weak corporate governance, costly trade regulation, and shallow financial sectors. Setting appropriate, predictable rules governing investment, including for public-private partnerships (PPPs), is also important.

Fifth, a review of the literature since 1990 finds mixed evidence on the relationship between FDI and output growth but a mostly positive relationship between FDI and domestic investment. That said, several country characteristics, time period specifics, and features of FDI have influenced the relationship between FDI, output growth, and investment. Greenfield investment in upstream and export-intensive, non-primary sectors has tended to be more conducive to growth and investment. FDI also tended to raise growth and investment more in countries with better institutions, more skilled labor forces, greater financial development, and trade openness.

Data and definitions. In this chapter, investment refers to real gross fixed capital formation, including both private and public investment. Gross fixed capital formation includes produced tangible assets (for example, buildings, machinery, and equipment) and intangible assets (for example, computer software, mineral exploration, entertainment, and original writing or art) used for more than one year in the production of goods and services. Investment growth is calculated with countries' real annual investment at average 2010-19 prices and constant 2019 U.S. dollars as weights for 69 EMDEs and 35 advanced economies (table 3C.1). These economies have represented about 97 percent of global GDP since the mid-2000s. A decomposition of investment into type of use, such as buildings, transport equipment, and information and communications technology (ICT) equipment, is not possible due to limited comparable data for EMDEs. Data availability also prevents a separate econometric exploration of private and public investment.

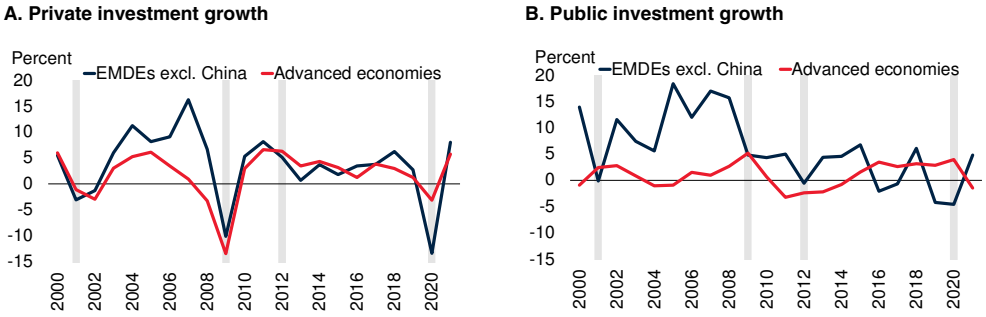
Trends and fluctuations in investment growth

After reaching historic highs in the lead-up to the global financial crisis, global investment growth slowed substantially in the 2010s, largely reflecting weakening investment growth in EMDEs, where it was widespread. In each year between 2012 and 2020, investment growth was well below the pre-global financial crisis (2000-08) average in over half of EMDEs. The slowdown during the 2010s occurred in both commodity-exporting and commodity-importing EMDEs, and in all EMDE regions and in each of the three largest EMDEs. This slowdown in EMDE investment growth in the decade before the pandemic happened alongside comparatively stable—albeit more sluggish—investment growth in advanced economies, occurred in most EMDEs, and involved slowdowns in both private and public components. Although investment growth in EMDEs remained above that in advanced economies, the difference in investment growth rates, especially in the second half of the decade, was much smaller than in the 2000s.

The investment contraction in EMDEs excluding China in 2020, the first year of the COVID-19 pandemic, was historically large, and far deeper even than during the global recession in 2009. The outlook for investment growth in EMDEs is weak and has been downgraded due to legacies of the pandemic and spillovers from the war in Ukraine, although the full effects of these events on investment remain unclear.

FIGURE 3.2 Private and public investment growth

Private and public investment growth in EMDEs excluding China were both weaker in the decade before the COVID-19 pandemic than during the years prior to the global financial crisis.



Sources: Haver Analytics; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies.
A.B. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights. Shaded areas indicate global recessions (in 2009 and 2020) and slowdowns (in 2001 and 2012). Sample includes 32 EMDEs excluding China and 11 advanced economies. Last observation is 2021.

Pre-pandemic slowdown

Several key features of investment growth in EMDEs during the pre-pandemic decade are evident. Investment growth in EMDEs fell from nearly 11 percent in 2010 to 3.4 percent in 2019. In EMDEs excluding China, investment growth tumbled more sharply: from 9 percent in 2010 to a mere 0.9 percent in 2019 (figure 3.1.A and B). The slowdown during the 2010s occurred in both commodity-exporting and commodity-importing EMDEs, and in all EMDE regions (figure 3.1.C; Vashakmadze et al. 2018). Slowing investment growth in China made a large contribution to the aggregate EMDE slowdown (figure 3.1.D). The slowdown was also observed in private and public investment growth, which grew at a slower pace in the 2010s than in the previous decade (figure 3.2.A and B).

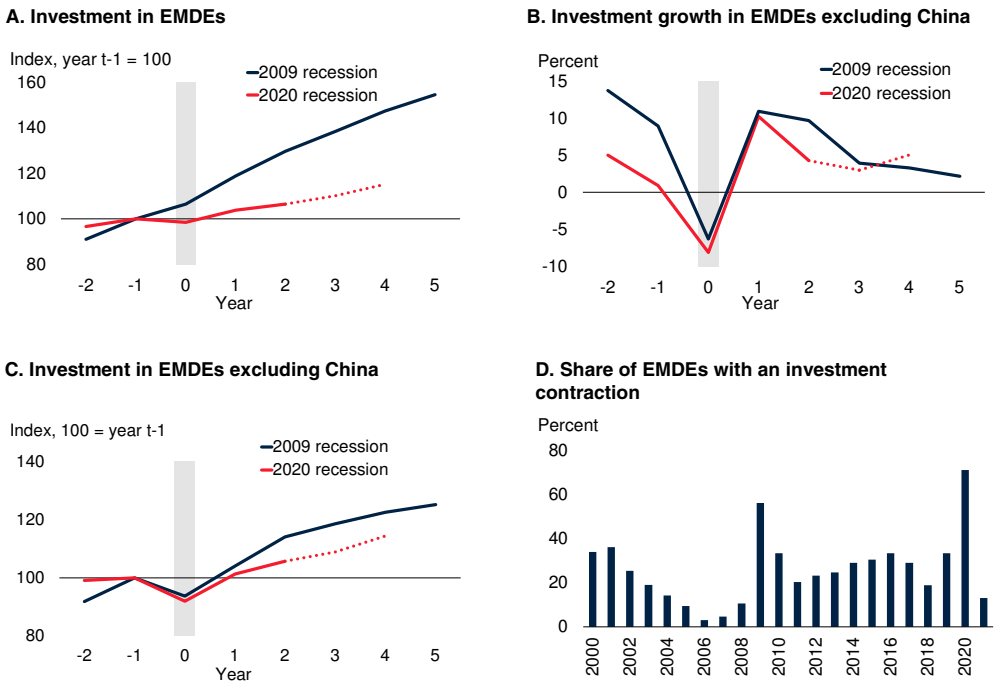
The slowdown in investment growth reflected international and domestic factors. For commodity-exporting EMDEs, a steep drop in oil and metal prices between mid-2014 and early 2016, and the associated deterioration in the terms of trade, were key factors.[1] In China, investment growth slowed following a domestic policy shift in 2010 toward more reliance on consumption and less reliance on investment and exports. Weak economic growth in advanced economies and high corporate leverage also generated investment-dampening spillovers to EMDEs during this period (Banerjee et al. 2020).

A moderate uptick in EMDE investment growth in 2016-18 reflected, in part, a pickup in the growth of global manufacturing output and trade (World Bank 2019b). The recovery was further supported by a rebound in oil and metal prices in 2017-18, which

[1] These issues are discussed in Kose et al. (2017); Stocker et al. (2018); and Vashakmadze et al. (2018). Several large commodity-exporting economies—including Brazil, the largest of these economies—experienced severe recessions during the commodity price collapse.

FIGURE 3.3 Investment around global recessions

Investment in EMDEs excluding China shrank by more than 8 percent in the pandemic-induced global recession of 2020, about 2 percentage points more than the drop during the global financial crisis. Due to the large number of EMDEs impacted by the 2020 global recession, the investment recovery is proceeding more slowly than the recovery after the 2009 global recession.



Sources: Haver Analytics; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights.
A.-C. On the x-axis, year zero refers to the year of global recessions in 2009 and 2020. Dotted portions of lines are forecasts.
A.-D. Sample includes 69 EMDEs.

encouraged capital expenditures in the commodity-dependent regions of Latin America and the Caribbean (LAC) and Sub-Saharan Africa (SSA). Public borrowing from China to finance infrastructure projects under the Belt and Road Initiative supported investment in countries in several regions, predominantly in East Asia and Pacific (EAP), Europe and Central Asia (ECA), and South Asia (SAR) (Council on Foreign Relations 2022; World Bank 2019b; chapter 4).

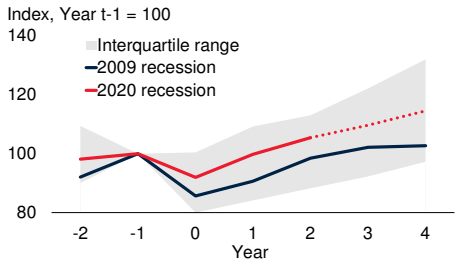
Collapse and rebound during the COVID-19 pandemic

The COVID-19 pandemic disrupted business operations and caused a spike in uncertainty. This resulted in a sharp contraction in aggregate investment in EMDEs, marking a departure from the previous global recession in 2009 when such a contraction was avoided (figure 3.3.A). EMDEs excluding China suffered an especially sharp investment contraction, of more than 8 percent—a deeper decline than in 2009. China

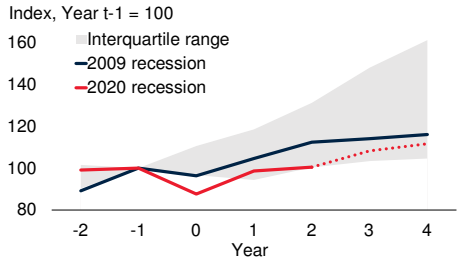
FIGURE 3.4 Median investment around domestic recessions and terms of trade shocks

The median decline in investment among EMDEs during the 2020 global recession was less severe than in 2009, and within the range of investment growth declines during domestic recessions. The median EMDE commodity exporter that experienced a terms of trade shock during the 2020 global recession saw a more severe investment contraction than in 2009, however, that was below the range of investment declines during other terms of trade shocks.

A. Median investment in EMDEs around domestic recessions



B. Median investment in EMDE commodity exporters around domestic terms of trade shocks



Sources: Haver Analytics; World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Dotted portions of lines are forecasts. Sample includes the 69 EMDEs that experienced a recession during that period.

A. On the x-axis, year zero refers to the year of national or global recession. Shaded area shows the interquartile range of investment for domestic recessions that occurred between 1979 and 2020, excluding the global recessions in 2009 and 2020,

B. On the x-axis, year zero refers to the year of national terms of trade troughs. Shaded area shows the interquartile range of investment for domestic terms of trade troughs that occurred between 1979 and 2020, excluding terms of trade shocks in 2009 and 2020. Data for 2009 and 2020 only include commodity-exporting EMDEs that also experienced a terms of trade trough in 2009 or 2020. Terms of trade troughs were identified using the Harding Pagan method, adjusted for annual data.

was a notable exception thanks to a large fiscal stimulus equivalent to about 6.5 percent of GDP (IMF 2021).

In EMDEs excluding China, investment shrank by about 2 percentage points more in 2020 than in the 2009 global recession, despite easier financial conditions and the provision of sizeable fiscal stimulus in many large EMDEs (figure 3.3.B and C). A key difference between the 2009 and 2020 decline in EMDE investment growth was the number of affected EMDEs. About 70 percent of EMDEs experienced an investment contraction in 2020, compared to 55 percent in 2009 (figure 3.3.D). Regionally, the investment contraction in 2020 was sharpest in Latin America and the Caribbean and South Asia, the regions where output also declined the most (chapter 4). Yet, while more EMDEs experienced a recession in 2020 than in 2009, in the median EMDE recession, the decline in investment was less severe in 2020 than in 2009, and the subsequent rebound more pronounced (figure 3.4.A). The terms of trade shock associated with the 2020 global recession, however, severely affected EMDE commodity exporters. The median EMDE commodity exporter saw a sharper decline in investment in 2020 than in 2009, with a shallower recovery (figure 3.4.B).

Investment in advanced economies also shrank in 2020, by 3.4 percent; however, this was far less than the 10.5 percent plunge in 2009. Unlike the aftermath of the 2009

financial crisis, the investment contraction in 2020 was dampened by massive fiscal and monetary stimulus, and there were much smaller disruptions in financial markets and in access to finance. By the end of 2021, investment in advanced economies had already exceeded projections made just prior to the pandemic, in January 2020. The post-2020 investment recovery in advanced economies also proceeded more quickly than the recoveries after other global recessions during the past two decades.

Macroeconomic backdrop

Slowing investment growth in EMDEs in the decade before the pandemic occurred in the context of a worsening global macroeconomic environment. Compared to 2002-07, the global economy was characterized in 2010-19 by slower output growth, lower commodity prices, lower and more volatile capital inflows to EMDEs, higher economic and geopolitical uncertainty, and a substantial buildup of public and private debt (Kose and Ohnsorge 2020).

Weak activity. Investment tends to respond, and respond more than proportionately, to economic activity, a phenomenon dubbed the accelerator effect (Shapiro, Blanchard, and Lovell 1986). EMDE per capita output growth slowed sharply in the decade following the global financial crisis, from 7.5 percent in 2010 to 3.9 percent in 2019. There was a roughly parallel growth slowdown in EMDEs excluding China—from 5 percent in 2010 to 1.6 percent in 2019. To the extent that the slowing of growth in EMDEs was more structural than cyclical or transitory, sluggish investment growth can also be expected to persist (Didier et al. 2015; World Bank 2022a). The sources of the slowdown in output growth varied across EMDEs, but they included lower commodity prices, spillovers from weak growth in major economies, weakening productivity growth, tightening financial conditions, and a maturing of supply chains that slowed global trade growth. A 1 percentage point decline in U.S. or euro area output growth has been found to reduce aggregate EMDE investment growth by more than 2 percentage points (World Bank 2017).

In China, growth slowed gradually as the economy was rebalanced from investment- and export-driven growth in manufacturing to consumption-driven growth in services. This transition reduced commodity demand and prices, with adverse spillovers to commodity-exporting EMDEs (Huidrom et al. 2020; World Bank 2016a). A 1 percentage point decline in China's output growth has been estimated to slow output growth in commodity-exporting EMDEs by about 1 percentage point after one year, with associated effects on investment growth (World Bank 2017).

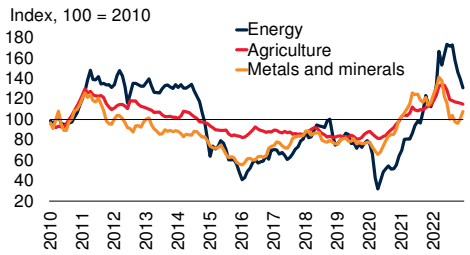
In advanced economies, output growth in the decade after the global financial crisis was generally weaker than in the decade before, despite unprecedented monetary policy stimulus and easy financing conditions. The euro area crisis was followed by a recession in 2012-13. Rising trade tensions, as well, hindered euro area growth prospects near the end of the decade (World Bank 2019a).

Adverse terms of trade shocks. Almost two-thirds of EMDEs are reliant on exports of energy, metal, or agricultural commodities. Most commodity prices (in U.S. dollar

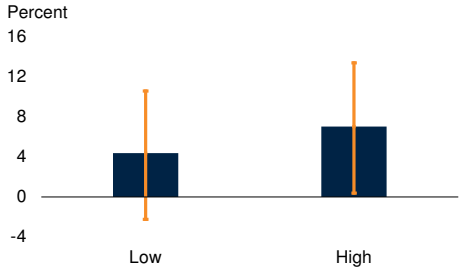
FIGURE 3.5 Commodity prices, terms of trade, and investment growth

The terms of trade of commodity exporters deteriorated between 2010 and 2019, reflecting steady declines in global energy, metals, and agricultural commodity prices between 2011 and 2016. EMDEs with higher terms-of-trade growth experienced higher investment growth over 2000-21.

A. Commodity prices



B. Investment growth in EMDEs with high and low growth in terms of trade, 2000-21



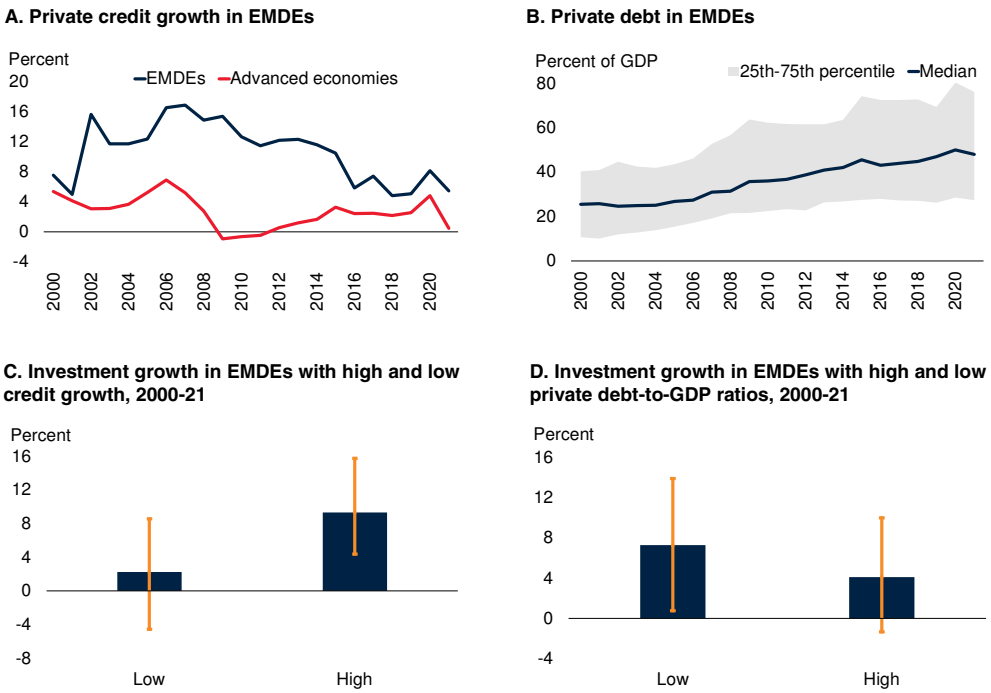
Sources: Haver Analytics; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies.
A. Energy index includes crude oil (85 percent weight), coal, and natural gas. Agriculture index includes 21 agricultural commodities. Metals and minerals index includes the six metals traded on the London Metal Exchange (aluminum, copper, lead, nickel, tin, zinc) plus iron ore. Prices indexes are calculated using commodity prices in nominal U.S. dollars. Last observation is December 2022.
B. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate annual terms of trade growth in the top and bottom third of the distribution, respectively. Difference in medians between "low" and "high" subsamples is significant at the 1 percent level. Sample includes 69 EMDEs.

terms) fell sharply from early-2011 peaks, with metal and energy prices plunging by more than 40 percent to troughs in 2016, followed by moderate recoveries in the following three years (figure 3.5.A). Surging U.S. oil production and a shift in OPEC policy in mid-2014 triggered an oil price plunge during 2014-16 that caused widespread disruptions in oil-exporting countries. By the end of 2019, energy prices were 21 percent below their 2010 levels, industrial metal prices 19 percent below, and agricultural commodity prices 13 percent below. As a result, the terms of trade of commodity exporters deteriorated by about 6 percent between 2011 and 2019, and those of oil exporters by 27 percent. EMDEs with lower terms-of-trade growth experienced lower investment growth during 2000-21 (figure 3.5.B).

Rapid private sector credit growth and debt overhang. After rising during most of the 2000s, annual growth of real credit to the private sector (from domestic and foreign financial institutions) in EMDEs began to retreat during the 2007-09 global financial crisis, and subsequently slowed further, from 11.5 percent in 2011 to a trough of 4.8 percent in 2016, before stabilizing at around 6 percent in 2019-21 (figure 3.6.A). Average credit growth in 2011-19 was highly uneven across EMDEs, however, with some countries experiencing credit surges despite overall downward trends. In contrast to the three decades before the global financial crisis, when around 40 percent of credit booms were accompanied or followed by investment surges within one or two years, credit booms since 2010 have been unusually "investment-less." Virtually none of the credit booms in EMDEs since the global financial crisis have been accompanied or

FIGURE 3.6 Credit growth, debt, and investment growth

Since 2011, weakening investment growth in EMDEs has been accompanied by slowing real credit growth to the private sector. EMDEs with slower credit growth experienced lower investment growth over 2000-21. Private sector debt has risen steadily, relative to GDP, in EMDEs over the past two decades. EMDEs with larger private debt-to-GDP ratios experienced slower investment growth during 2000-21.



Sources: Bank for International Settlements; Haver Analytics; IMF International Financial Statistics database; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies.
A. Private credit refers to real annual credit growth to the private sector. Lines show weighted averages with countries' real annual investment in constant U.S. dollars as weights. Sample includes 69 EMDEs and 35 advanced economies. Last observation is 2021.
B. Private debt refers to domestic credit to the private sector as a percent of GDP. Sample includes 71 EMDEs. Last observation is 2021.
C.D. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate years when annual credit growth (C) and private debt-to-GDP ratios (D) were in the bottom and top third of the distribution, respectively, during 2000-21. Difference in medians between "low" and "high" subsamples is significant at the 1 percent level.
C. Sample includes 69 EMDEs.
D. Sample includes 68 EMDEs.

followed by investment surges (box 3.1). In several countries, rapid credit growth instead fueled above-average consumption growth.

Despite slowing credit growth since the global financial crisis, the ratio of outstanding credit to GDP has risen steadily (figure 3.6.B). In the median EMDE, private credit as a share of GDP rose by 20 percentage points of GDP from 2000 to 2021, and by 27 percentage points in commodity-importing EMDEs. About four in ten EMDEs had private credit-to-GDP ratios exceeding 60 percent in 2021, up from one in ten in 2000.

BOX 3.1 Investment-less credit booms

Credit to the private sector has at times risen sharply in some emerging market and developing economies (EMDEs). But these credit booms have been unusually "investment-less." Virtually none of the credit booms since 2010 have been accompanied by investment surges of the kind that were common in earlier episodes. In 2020, private credit surged in 13 EMDEs, supporting private consumption during the pandemic, while investment fell notably below trend. The absence of investment surges during credit booms has tended to be followed by lower output growth once the credit booms unwound.

Introduction

Over the past decade, credit to the nonfinancial private sector from domestic and foreign lenders has risen rapidly in several emerging market and developing economies (EMDEs) while investment growth has slowed. In the past, credit booms have often financed rapid investment growth, with investment subsequently stalling. Against this background, this box addresses three questions:

- How has total investment, including both private and public investment, evolved during credit booms and deleveraging episodes in EMDEs?
- How often have credit booms been accompanied by investment booms?
- How has output growth evolved during credit booms and deleveraging episodes?

The results indicate that while investment often rose sharply during previous credit booms, this has not been the case for credit booms since 2010. In particular, none of the credit booms that occurred in 2020 were accompanied by investment surges. This pattern is cause for concern because, in the past, when credit booms were unwound and the boom was not accompanied by an investment surge, output growth has tended to slow more.

Data and definitions

Credit to the nonfinancial private sector consists of claims—including loans and debt securities—on households and nonfinancial corporations by the domestic financial system as well as external creditors. Annual credit data are available for 14 EMDEs for 1980-99 and 55 EMDEs for 2000-21. Data for the broadest definition of credit are sourced from the Bank for International Settlements (BIS) for 14 EMDEs from 1980 to 2021: Argentina, Brazil, China, Hungary, India, Indonesia, Malaysia, Mexico, Poland, Russia, Saudi Arabia, South Africa, Thailand, and Türkiye. For other EMDEs, where credit from the domestic

Note: This box was prepared by Shu Yu.

BOX 3.1 Investment-less credit booms (*continued*)

banking system remains the main source of credit (Ohnsorge and Yu 2016), annual data on claims by banks on the private sector, sourced from the IMF's *International Financial Statistics*, are used to proxy credit to the nonfinancial private sector. This increases the sample by another 41 EMDEs, mainly from 2000 onward. These additional EMDEs include Azerbaijan, Bahrain, Bangladesh, Bolivia, Botswana, Bulgaria, Chile, Colombia, Costa Rica, Côte d'Ivoire, Croatia, Egypt, Gabon, Georgia, Ghana, Guatemala, Honduras, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Mauritius, Mongolia, Namibia, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, the Philippines, Qatar, Senegal, Serbia, Sri Lanka, Tunisia, Ukraine, Uruguay, República Bolivariana de Venezuela, and Zambia.

A credit boom is defined as an episode during which the private sector credit-to-GDP ratio is more than 1.65 standard deviations above its Hodrick-Prescott (HP) filtered trend (that is, within the 90 percent confidence interval) in at least one year (Ohnsorge and Yu 2016; World Bank 2016b). An episode starts when the credit-to-GDP ratio first exceeds one standard deviation and ends when the ratio begins to fall. Conversely, a deleveraging episode is defined as an episode during which the private sector credit-to-GDP ratio is more than 1.65 standard deviations below trend in at least one year. The deleveraging episode starts when the credit-to-GDP ratio first drops more than one standard deviation below trend and ends when the ratio begins to climb.

Credit booms and deleveraging episodes are studied within a 7-year event window that covers their peak or trough years ($t = 0$), the three prior years, and the three subsequent years. In the sample used here, there have been 65 credit booms and 32 deleveraging episodes in 55 EMDEs. A typical credit boom lasts about 2 years, while an average deleveraging episode lasts about 2.5 years.

Investment behavior during credit booms and deleveraging episodes

Credit booms have typically been associated with rising investment. During the median credit boom over the past two to three decades, real investment grew by 1 percentage point of GDP above its long-term (HP-filtered) trend until the peak of the credit boom (figure B3.1.1.A). In one-quarter of previous credit booms, the real investment-to-GDP ratio dropped about 3.5 percentage points below its long-term (HP-filtered) trend during the two years after the peak. Investment swung sharply in the most pronounced credit boom and bust episodes. For example, during the Asian financial crisis of the late 1990s, investment contracted by an average of 35 percent in Indonesia, Malaysia, the Philippines, and Thailand in 1998 and expanded by 16 percent in 2000.

BOX 3.1 Investment-less credit booms (*continued*)

Similarly, investment growth slowed during deleveraging episodes. Real investment dropped below its long-term trend by about 2 percentage points of GDP during the last three years of the median deleveraging episode (figure B3.1.1.B). After the trough of a typical deleveraging episode, real investment growth bounced back and, within three years, rose near or slightly above its long-term trend.

Credit and investment booms together

Although investment growth tends to rise during credit booms, not all credit booms are associated with investment booms. For instance, Mendoza and Terrones (2012) document that the coincidence between investment booms and credit booms in EMDEs between 1960 and 2010 was about 34 percent (26 percentage points lower than the coincidence in advanced economies). The moderate coincidence of credit booms and investment booms may reflect credit booms that mainly fueled consumption (Elekdag and Wu 2013; Mendoza and Terrones 2012). In one-quarter of past credit booms, consumption rose above its HP-filtered trend by 3 percentage points of GDP during the peak of the credit boom (figure B3.1.1.C). Consumption on average fell below trend by about 1 percentage point of GDP in the median deleveraging episode (figure B3.1.1.D).

Following former studies and in parallel to credit booms, an investment surge is defined as an episode during which the investment-to-GDP ratio is at least one standard deviation higher (compared with 1.65 standard deviations higher for investment booms) than its HP-filtered trend. Similarly, an investment slowdown is defined as an episode in which the investment-to-GDP ratio is at least one standard deviation below its HP-filtered trend. [a]

Investment surges in advanced economies occurred more often with credit booms than in EMDEs, and the rise in investment was more rapid. In EMDEs, about one-third of credit booms were accompanied by investment surges or booms around the peak year of a credit boom (figure B3.1.2.A). More than 65 percent of investment surges that coincided with credit booms during the peak year qualified as investment booms in advanced economies, but only 56 percent of such investment surges turned out to be investment booms in EMDEs.

After the global financial crisis, the coincidence between credit booms and investment surges during the peak year of a credit boom dropped significantly (figure B3.1.2.B). In 2007, half of the EMDEs in a credit boom were also experiencing an investment surge, and two-thirds in 2008. However, from 2010 onward, there have been very few instances of simultaneous credit booms and

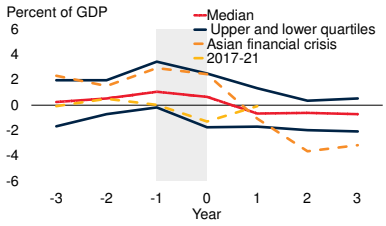
a. The results are similar when investment growth, instead of the investment-to-GDP ratio, is used.

BOX 3.1 Investment-less credit booms (*continued*)

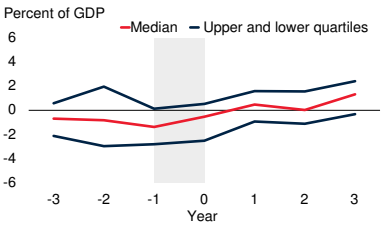
FIGURE B3.1.1 Investment and consumption growth during credit booms and deleveraging episodes

In EMDEs, in the median credit boom, investment grew by about 1 percentage point of GDP above its long-term trend until the credit boom peaked. Investment dropped below its long-term trend by about 1 percentage point of GDP before deleveraging episodes reached their troughs. Private consumption growth increases slightly during a credit boom.

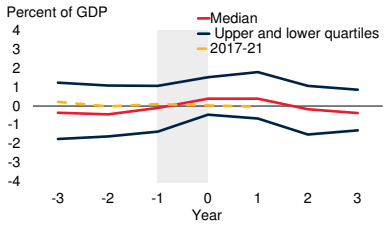
A. Investment around credit booms



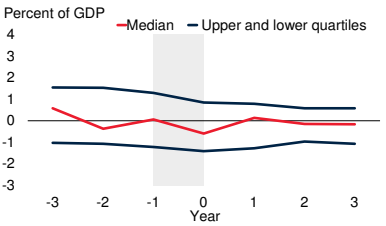
B. Investment around deleveraging episodes



C. Consumption around credit booms



D. Consumption around deleveraging episodes



Sources: World Bank; World Development Indicators database.

Note: Red lines show sample medians of the cyclical component of investment in percent of GDP (derived by Hodrick-Prescott filter); blue lines show the corresponding upper and lower quartiles. Shaded areas indicate credit booms. A credit boom is defined as an episode during which the cyclical component of the nonfinancial private sector credit-to-GDP ratio (using a Hodrick-Prescott filter) is more than 1.65 standard deviations above trend in at least one year. The episode starts when the cyclical component first exceeds one standard deviation above trend. It ends in a peak year ("0") when the nonfinancial private sector credit-to-GDP ratio declines in the following year. A deleveraging episode is defined as an episode during which the cyclical component of the nonfinancial private sector credit-to-GDP ratio (using a Hodrick-Prescott filter) is more than 1.65 standard deviations below trend in at least one year. The episode starts when the cyclical component first falls below one standard deviation. It ends in a trough year ("0") when the nonfinancial private sector credit-to-GDP ratio increases in the following year. To address the end-point problem of a Hodrick-Prescott filter, the dataset is expanded by setting the data for 2022-24 to be equal to the data in 2021 (2020 if data for 2021 is unavailable). The sample is for available data over 1980-2021 for 55 EMDEs.

A. The orange dashed line is the median of the six EMDEs (China, Indonesia, Malaysia, Mongolia, the Philippines, and Thailand) that were affected by the 1997 Asian financial crisis (1997 is t = 0). The yellow dashed line for 2017-21 (where t = 0 for year 2020) shows the sample median for the corresponding period.

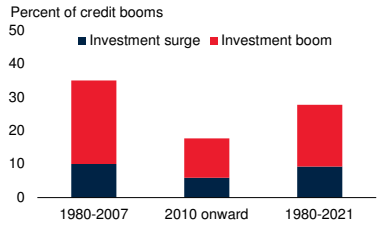
C. The yellow dashed line for 2017-21 (where t = 0 for year 2020) shows the sample median for the corresponding period.

BOX 3.1 Investment-less credit booms

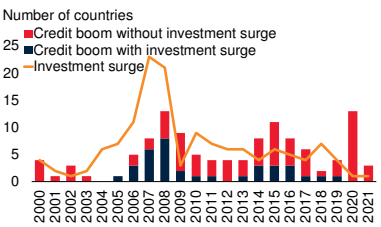
FIGURE B3.1.2 Coincidence between investment surges and credit booms

Before the global financial crisis, about one-third of all credit booms in EMDEs were accompanied by investment surges or booms around the credit boom's peak. Only one-sixth of credit booms since 2010 have been accompanied by investment surges or booms.

A. Investment surges during credit booms in EMDEs



B. Investment surges during credit booms in EMDEs



Sources: World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies. A credit boom is defined as in figure B3.1.1. An investment surge is defined as a year when the cyclical component of the investment-to-GDP ratio is larger than one standard deviation (for an investment boom, larger than 1.65 standard deviations) above the trend (using a Hodrick-Prescott-filter). An investment slowdown is defined as a year when the cyclical component of the investment-to-GDP ratio is at least one standard deviation below the trend (using a Hodrick-Prescott-filter). The sample is for available data over 1980-2021 for 55 EMDEs.
A. Investment surges during the peak year (t = 0) or the following year (t = 1).

investment surges, except in 2015. As the number of EMDEs in a credit boom increased from two in 2010 to seven in 2015, the number of EMDEs in investment surges dropped from nine to six.[b] In the years prior to the pandemic, the number of credit booms subsided, before rising again in 2020.

For the 13 countries experiencing credit booms in 2020 (Botswana, Brazil, Chile, Georgia, Honduras, Jamaica, Panama, Peru, the Philippines, Qatar, República Bolivariana de Venezuela, Türkiye, and Saudi Arabia), consumption as a share of GDP was about in line with the median during past credit boom episodes, while investment as a share of GDP was lower than in previous credit episodes (figure B3.1.1.A). Credit booms in 2020 seemed to support consumption during the pandemic rather than fueling investment surges as in some of the former credit booms (such as the 1997 Asian financial crisis).

Output during credit booms and deleveraging episodes

In general, output has expanded during credit booms, but by less than investment (Mendoza and Terrones 2012). On average, in the year before the median credit

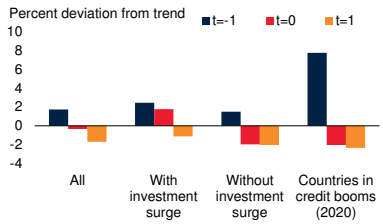
b. The six countries are Ghana, Côte d'Ivoire, Namibia, Oman, Saudi Arabia, and Zambia. The identification of Saudi Arabia is not supported by investment growth data.

BOX 3.1 Investment-less credit booms (*continued*)

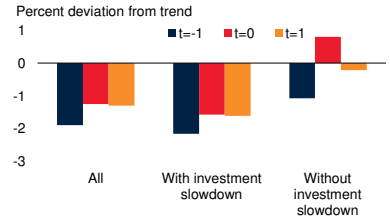
FIGURE B3.1.3 Output growth during credit booms and deleveraging episodes

In EMDEs during 1980-2021, output on average grew 2 percent above its trend during credit booms and fell 2 percent below trend during deleveraging episodes. Output growth during credit booms tended to be stronger when accompanied by investment surges. During deleveraging episodes, declines were deeper when accompanied by investment slowdowns.

A. GDP during credit booms



B. GDP during deleveraging episodes



Sources: World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies. Credit booms and deleveraging episodes are defined as in figure B.3.1.1. Investment surges and slowdowns are defined as in figure B.3.1.2. The sample is for available data over 1980-2021 for 55 EMDEs.

A. Bars show the group medians for cyclical components of GDP in percent deviation from its trend (derived using a Hodrick-Prescott filter) during all credit booms, credit booms with investment surge, credit booms without investment surge, and the credit booms for the four countries (China, Georgia, Jamaica, and Qatar) in 2020 over the three years around the peak year (t = 0).

B. Bars show group medians of the cyclical component of GDP in percent deviation from its trend (derived using a Hodrick-Prescott filter) during all deleveraging episodes, deleveraging episodes with investment slowdowns, and deleveraging episodes without investment slowdowns over the three years around the trough year (t = 0).

boom peaked over the whole sample period from 1980 to 2020, output increased, by about 2.5 percent above trend in the median country in cases when there was an investment surge. However, in cases when there was no investment surge, output was slightly lower than trend (figure B3.1.3.A). As credit booms unwound from their peaks, output dropped below trend by about 1 percent over two years in the absence of investment surges. However, when there were investment surges, output was slightly above trend. That a credit boom without an investment surge is more disruptive to output than a credit boom with an investment surge may reflect the absence of a boost to potential output from capital accumulation that could be provided by an investment surge. In countries that experienced credit booms in 2020, output peaked at nearly 8 percent above trend in the year before the peak of the credit boom, much higher than in past credit booms, before falling to 2 percent below trend in the peak year of the credit boom.

During the median deleveraging episode, output fell by almost 2 percent below trend in the year prior to the trough and remained below trend until two years

BOX 3.1 Investment-less credit booms (*continued*)

after the trough (figure B3.1.3). If the deleveraging episode was accompanied by an investment slowdown, the decline in output was sharper. In the median episode, it took three years for output to surpass its trend following the deleveraging trough.

Conclusion

Since 2010, numerous EMDEs have experienced periods of rapid private sector credit growth. In contrast to many previous episodes, however, these credit surges have in most cases not been accompanied by investment surges. This was particularly the case during the 2020 global recession, when credit-to-GDP ratios surged in 13 EMDEs to support private consumption while investment fell far below trend. Output growth in the leadup to the most recent credit booms has been higher than in previous episodes, but lower at the peak of the boom. During all credit boom episodes between 1980 and 2002, output suffered a larger downturn during the unwinding of the boom when credit booms occurred without investment surges.

High leverage can lead to financial stress, restrict future access to credit, and divert resources from productive investment (Banerjee and Duflo 2005; World Bank 2022b). EMDEs with lower credit growth and higher private debt-to-GDP ratios experienced slower investment growth during 2000-21 (figure 3.6.C.D).

Subdued and volatile capital inflows. While foreign direct investment (FDI) inflows to EMDEs have risen substantially over time, their growth has slowed since 2010, partly due to weak activity in advanced economies. Growth of non-FDI inflows has shown more resilience and volatility, reflecting investors' search for higher yields amid low interest rates in advanced economies, a shift from bank to nonbank flows, and increased interest from institutional investors (Cole et al. 2020; McQuade and Schmitz 2016). The global financial crisis led to a significant decrease in the average interest cost of outstanding government debt in advanced economies. In contrast, the average interest cost of outstanding government debt in EMDEs barely decreased due to persistently high risk premia and increased reliance on international borrowing, particularly in foreign currency and on nonconcessional terms (United Nations 2022). Nevertheless, compared to the period leading up to the global financial crisis (2000-07), there were twice as many sudden stop events in EMDEs in the years prior to the COVID-19 pandemic (2011-19). During sudden stops, non-FDI inflows tend to decline much more sharply and for longer than FDI flows (Eichengreen, Gupta, and Masetti 2018).

The literature has produced mixed findings on the link between FDI and investment (box 3.2). Although there is evidence that FDI has a positive relationship with economic

growth and investment, mainly in countries with well-developed financial markets, the literature has not found a consistent and significantly positive effect (Alfaro et al. 2004; OECD 2015). One possible explanation for the mixed evidence is that FDI crowds out domestic investment (Farla, de Crombrugghe, and Verspagen 2016).

Heightened uncertainty. Policy uncertainty increased in many EMDEs after the global financial crisis, owing to a variety of factors, including geopolitical tensions in Eastern Europe, security challenges and conflicts in the Middle East, and acute domestic political tensions in several EMDEs. While the effects of uncertainty on investment and output growth are clearly negative, their scale depends on the context. Studies have shown that the effects have been more pronounced in countries that have a lower tolerance for uncertainty or where uncertainty interacts with other constraints such as access to credit (Carrière-Swallow and Céspedes 2013; Hofstede 2001; Inklaar and Yang 2012).

Empirical analysis of investment growth

A panel regression analysis formalizes the role of macroeconomic factors in driving the investment weakness. Investment growth is estimated for 57 EMDEs covering 2000-21 as the dependent variable in a system generalized method of moments (GMM) panel regression, similar to Nabar and Joyce (2009). Drivers of investment growth, such as the marginal return to capital and risk-adjusted cost of capital, are proxied by real output growth, terms of trade growth, real private credit growth, the capital flow-to-GDP ratio, and a dummy variable for large improvements in the investment climate.

Correlates of EMDE investment growth

Real annual investment growth in EMDEs is found to be positively associated with real output growth, real credit growth, terms of trade improvements, increasing capital flow-to-GDP ratios, and investment climate reform spurts (annex 3A; tables 3C.2 and 3C.3). These results are consistent with other studies that find a wide number of the drivers of investment growth (G20 2016; IMF 2015; Libman, Montecino, and Razmi 2019). The importance of corporate borrowing as a driver of investment growth has also been found in other studies (Garcia-Escribano and Han 2015). The finding of a positive link between institutional quality, financial development, and investment growth is also in line with previous work (Lim 2014). While the coefficient of reform spurts is large and highly statistically significant, these events do not explain much of the variation in EMDE investment growth during 2000-21. On average, there were 0.8 investment profile reform spurts in the sample per year and the majority of these occurred before 2010.

For advanced economies, which did not experience a slowdown in investment growth during the decade prior to the pandemic, output growth is the most important covariate of the explained yearly variation in investment growth during 2000-21. Other factors, such as real credit growth and the ratio of capital flows to GDP, are much less correlated

with investment growth, while still significant.[2] Compared to EMDEs, investment growth in advanced economies is slightly more correlated with terms of trade, and less correlated with capital flows and real credit growth.

Using the results of the main regression for EMDEs to predict the contribution of the explanatory variables to investment growth shows that between 2000 and 2021, investment growth in EMDEs was primarily correlated with real output growth, followed by real credit growth (figure 3.7.A). Declining capital flow-to-GDP ratios contributed negatively to investment growth in commodity importers in multiple years since 2011, while energy exporting EMDEs experienced particularly low credit growth after 2015 (figure 3.7.C-D).

The contribution of terms of trade was more volatile and comoved strongly with investment growth in energy exporting EMDEs, particularly during periods of falling or rising oil prices in 2015-16, 2020, 2017-18, and 2021 (Stocker et al. 2018). The negative shock to the terms of trade of energy-commodity exporters may be viewed as having lowered investment growth by reducing the expected return to capital in the exporting sector (Bleaney and Greenaway 2001). In contrast, improving terms of trade did not significantly offset the factors that slowed investment growth in commodity importers, in part because the improvement was less pronounced than the deterioration experienced by commodity exporters.

In 2020-21, the output growth collapse and rebound generated even larger swings in investment growth. In energy exporters, these were amplified by terms of trade swings in the same direction. Low real credit growth did not compensate for the collapse in output in 2020 and then held back the recovery in 2021 both in commodity exporters and importers alike.

Investment prospects

After a robust rebound in 2021, investment growth is projected to average 3.5 percent per year in EMDEs, and 4.1 percent in EMDEs excluding China, in 2022-24, below the long-term (2000-21) average rates for both country groups (figure 3.8.A). Commodity-exporting EMDEs are projected to have lower investment growth rates than tourism-reliant EMDEs (figure 3.8.B). Investment growth is projected to be below the individual country trend of the past 20 years for about three-fifths of EMDEs for 2023 and 2024.

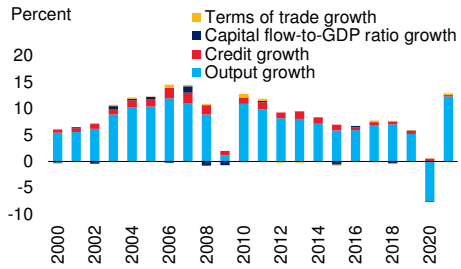
Following the global financial crisis, EMDEs excluding China returned to the investment level implied by the pre-crisis trend within two years (figure 3.9.A). China contributed materially to the recovery of investment in EMDEs, helping to raise investment above the level suggested by the pre-crisis trend by 2010 (figure 3.9.B). However, following the 2020 global recession, projected investment growth through

[2] At a significance level of 10 percent or better.

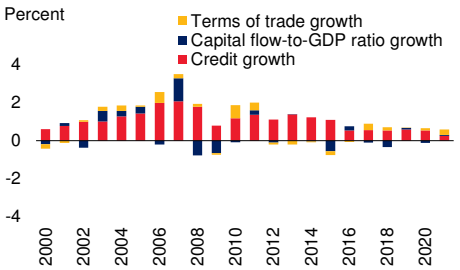
FIGURE 3.7 Estimated contribution of explanatory variables to predicted investment growth

The investment growth slowdown in EMDEs in 2011-19 reflected, on average, declining output growth and real credit growth. In commodity importers, worsening real credit growth and several years of falling capital flow-to-GDP ratios weighed on investment growth. In energy exporting EMDEs, terms of trade growth has been highly correlated with investment growth, as seen during the fall in commodity prices in 2015-16 and 2020 and the subsequent recoveries in 2017-18 and 2021.

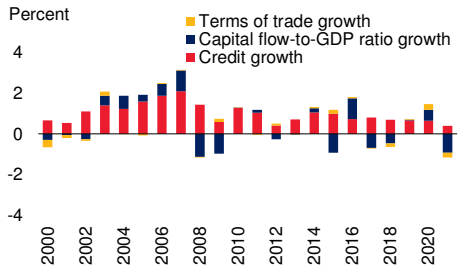
A. Drivers of investment growth in EMDEs



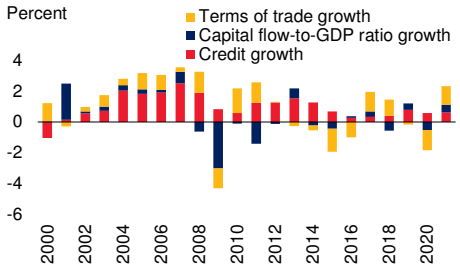
B. Drivers of investment growth in excess of GDP growth in EMDEs



C. Drivers of investment growth in excess of GDP growth in EMDE commodity importers



D. Drivers of investment growth in excess of GDP growth in EMDE energy exporters



Source: World Bank.

Note: EMDEs = emerging market and developing economies.

A.-D. Estimated impact of explanatory variables on investment growth in 57 EMDEs during 2000-21, based on the system generalized method of moments (GMM) estimation presented in the chapter. Bars show the contribution of each explanatory variable to predicted investment growth (defined, for each variable, as the coefficient shown in the regression results in column 1 of table 3C.2 multiplied by the actual value of the variable). For presentational clarity, the charts show only the four explanatory variables with the largest contributions to predicted investment growth. Panels B, C, and D highlight the smaller but still significant contribution to investment growth after accounting for output growth. Last observation is 2021.

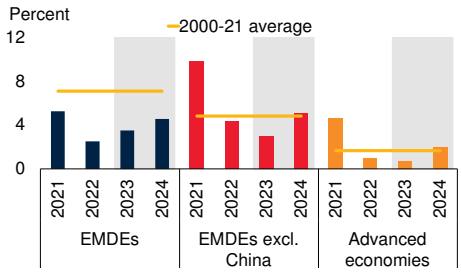
2024 in all EMDEs will be insufficient to return investment to the level suggested by the recent pre-pandemic trend from 2010-19 (the period between the highly disruptive 2009 and 2020 global recessions). This is partly due to the weakness of the investment recovery in China (figure 3.9.C). Investment in EMDEs excluding China is projected to return to its pre-pandemic trend by 2024, with the recovery after the global recession in 2020 taking two years longer than after the global financial crisis (figure 3.9.D).

The weak outlook for investment reflects several factors, and may deteriorate further if the global economy tips into recession (Guénette, Kose, and Sugawara 2022).

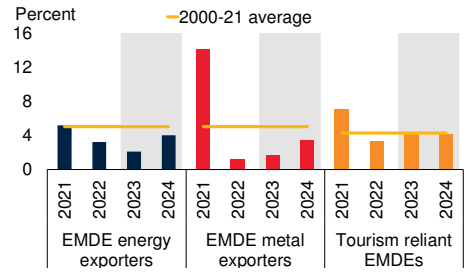
FIGURE 3.8 Investment growth outlook

Investment growth in EMDEs is projected to be below its 2000-21 average rate in 2023 and 2024. The war in Ukraine adds to downside risks relating to the pandemic and could further hold back investment growth.

A. Investment growth: short-term forecasts



B. Investment growth: short-term forecasts, by EMDE subgroup



Sources: Haver Analytics; United Nations World Tourism Organization; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Gray shading indicates forecasts.
A.B. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights. Sample includes 69 EMDEs and 35 advanced economies.
B. Sample includes 15 EMDE energy exporters, 9 EMDE metals exporters, and 14 tourism-reliant EMDEs.

Uncertainties about the post-pandemic economic landscape, the war in Ukraine, and elevated inflation and borrowing costs, may discourage investment for some time. Tighter financial conditions are limiting the fiscal support governments can provide to stimulate public investment (World Bank 2023). At the same time, the legacy of high corporate debt, at the highest level in decades in EMDEs, may constrain investment growth after the pandemic (Caballero and Simsek 2020; Stiglitz 2020). In China, investment growth is projected to remain well below the average of the past two decades: regulatory curbs on the property and financial sectors and continuing mobility restrictions related to the pandemic will both be restraining factors, in an environment of slower economic growth.

The globally synchronous nature of monetary (and fiscal) policy, while necessary to contain inflation and preserve creditworthiness, may compound the effects of tightening, creating potentially adverse consequences for investment. The empirical analysis in this chapter finds that slowing GDP growth and slowing credit growth are both associated with slower investment growth. Other empirical studies have found similar results. For example, in a study of a large sample of firms in 13 EMDEs, Borensztein and Ye (2018) find that while higher debt-service capacity was correlated with higher investment growth, when a firm's debt burden rose above a certain threshold, debt restrained investment.[3]

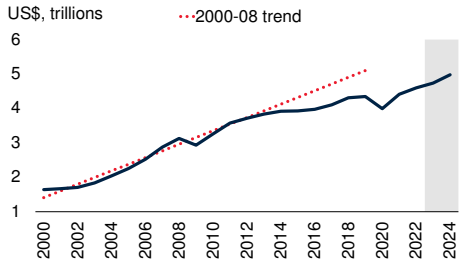
On the bright side, there is evidence that investment in digital technologies and sectoral reallocation has boosted productivity, at least in advanced economies, although it

[3] As described in annex 3A, the regression analysis tested for non-linear effects of credit growth and credit-to-GDP thresholds. The results were not significant at the aggregate country level.

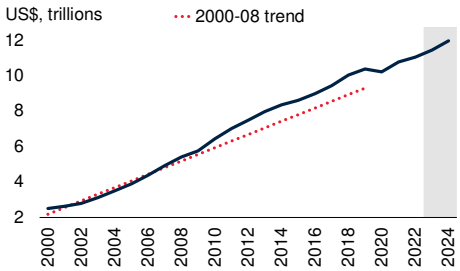
FIGURE 3.9 Investment compared to trend

Following the global financial crisis, China contributed materially to the recovery of investment in EMDEs, helping to raise investment above the level suggested by the pre-crisis trend by 2010. After the COVID-19 pandemic, China is expected to be a source of weakness for EMDE investment. In EMDEs excluding China, investment is projected to return to levels suggested by the pre-pandemic trend by 2024. Including China, EMDE investment will not return to trend.

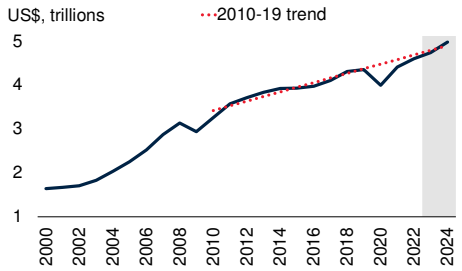
A. Investment in EMDEs excluding China compared to the trend before the global financial crisis



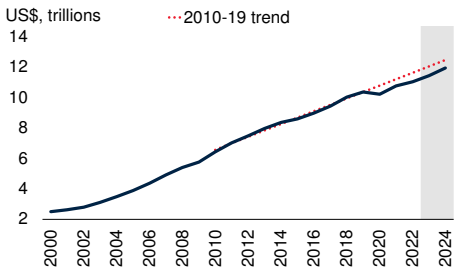
B. Investment in EMDEs compared to the trend before the global financial crisis



C. Investment in EMDEs excluding China compared to pre-COVID-19 trend



D. Investment in EMDEs compared to pre-COVID-19 trend



Sources: Haver Analytics; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Investment levels after 2022 are forecast. Trendlines are calculated using linear regression on investment levels during 2010-19 and 2000-08. Gray shading indicates forecasts. Sample includes 69 EMDEs.

remains to be seen how long-lasting these improvements will be (Criscuolo et al. 2021). Their positive effects on TFP in the first year of the pandemic appear to have been outweighed by negative factors in major advanced economies (Bloom et al. 2020).

Implications of weak investment growth

Weakening investment growth has lasting implications for global trade as well as for long-term output growth and EMDEs' ability to reach development and climate-related goals. The slowing of capital accumulation in EMDEs, and consequently of technological progress embedded in investment, implies slowing productivity growth and potential output, with adverse implications for EMDEs' ability to catch up with advanced economy per capita incomes.

Slower global trade growth. Investment tends to be more import-intensive than other components of demand, particularly through the trade in capital goods. Weakening

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs

Inflows of foreign direct investment (FDI) to emerging market and developing economies (EMDEs) have trended downward since the turn of the century, raising concern about negative macroeconomic implications. With that in mind, this box reviews the literature on FDI. Covering research since 1990, a literature survey concludes that there are mixed results on the correlation between FDI and investment as well as FDI and growth in EMDEs. Although the literature lacks consensus, there is broad agreement that initial conditions in host countries can be important for linking FDI to domestic investment and growth.

Introduction

Inflows of foreign direct investment (FDI) to emerging market and developing economies (EMDEs) as a share of GDP have slowed over the past decade (figure B3.2.1.A and B). The decline was broad-based, affecting commodity-exporting and commodity-importing EMDEs, and four of the six EMDE regions (figure B3.2.1.C and D).

Several reasons have been proposed for the decline. These have included the maturation of global value chains and tightening FDI regulations.[a] In the 2010s, global value chain formation stagnated after two decades of rapid expansion (Qiang, Liu, and Steenbergen 2021). In addition, in the midst of the global financial crisis, a number of countries imposed restrictions on FDI after many years of FDI liberalization around the world (Sauvant 2009). During the COVID-19 pandemic, barriers to FDI were also raised in both advanced economies and EMDEs, although, in EMDEs, an even larger number of measures were introduced to lower such barriers (figure B3.2.1.E). Over the past decade, barriers to FDI have generally been higher in EMDEs than in advanced economies, regardless of the sector receiving the FDI (figure B3.2.1.F). If geopolitical tensions intensify and lead to a further retrenchment in global value chains, it is possible that many EMDEs will face a prolonged period of FDI weakness.

Slowing FDI inflows, FDI restrictions, and frequent changes to them, raise concerns about the effects on aggregate investment and output growth in these economies. Slowing FDI may also impede productivity-enhancing "collateral" benefits (Kose et al. 2009). With more FDI, countries may benefit from pressure for stable macroeconomic policies, financial development, and stronger institutions. However, the strength of the relationship between FDI and

Note: This box was prepared by Hayley Pallan.

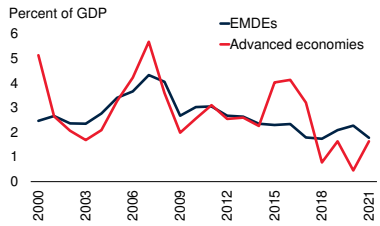
a. U.S.-China trade tensions since 2018 appear not to have led to a considerable decline in FDI in China yet, largely due to the presence of global value chains in capital-intensive industries (Blanchard et al. 2021).

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

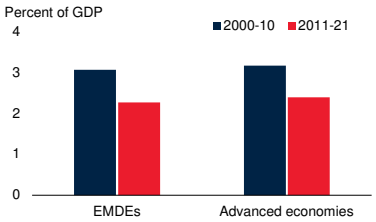
FIGURE B3.2.1 Trends in FDI since 2000

FDI inflows as a share of GDP have declined in the past decade. The slowdown was broad based, occurring in EMDEs and advanced economies, in commodity exporters and importers, and in most regions. FDI policies tend to be more restrictive in EMDEs than advanced economies. Since 2020, both groups of countries have increased barriers to FDI, although EMDEs have eased FDI restrictions simultaneously.

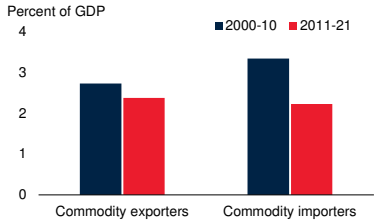
A. FDI inflows



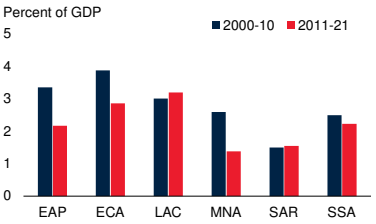
B. FDI inflows, by decade



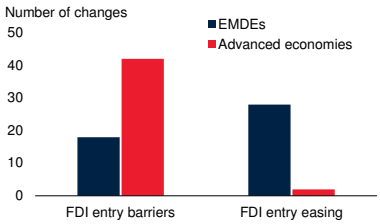
C. FDI inflows to EMDEs, by commodity exporting status



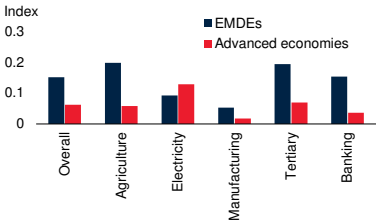
D. FDI inflows to EMDEs, by region



E. FDI barriers and easing measures, 2020-22



F. FDI restrictions index, by sector, 2010-20



Sources: OECD FDI Restrictiveness Index; United Nations Conference on Trade and Development; World Bank; World Bank FDI Entry and Screening Tracker.

Note: FDI is net FDI inflows (percent of GDP). EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; FDI = foreign direct investment.

A. Last observation is 2021.

A.-D. Sample includes 36 advanced economies and 139 EMDEs. Bars show GDP-weighted annual averages of FDI during 2000-10 and 2011-21, respectively (B-D).

E.F. Number of FDI entry barriers and FDI entry easing policies, during 2020-22, including 24 advanced economies and 22 EMDEs (E). Bars show averages during 2010-20, including 32 advanced economies and 51 EMDEs (F). The indexes range from zero (no restrictions) to one (complete restrictions).

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

investment or growth remains a long-standing matter of debate, with mixed findings in the literature.

Correlations between FDI inflows and investment and FDI inflows and output growth have been weak, less than 0.3 and 0.1, respectively, during 1970-2020, with variation depending on the time period and country characteristics (figures B3.2.2 and B3.2.3). These correlations are somewhat lower in countries with better developed financial systems, possibly because of greater consumption smoothing afforded by financial development. And conversely, the correlations are somewhat larger in countries with high trade openness, better institutions, or a more skilled labor force, suggesting complementarities between these factors and FDI that can amplify growth dividends.

Against this backdrop, this box surveys prior empirical studies on FDI to address two questions:

- What is the link between FDI and investment?
- What is the link between FDI and output growth?

The box documents that the literature has found mixed evidence on the relationship between FDI and output growth but a mostly positive relationship between FDI and investment. FDI tended to raise growth and investment more in countries with better institutions, more skilled labor forces, greater financial development and openness and when FDI was directed at manufacturing rather than the primary sector or services.

The remainder of the box reviews 62 studies of FDI, of which 25 pertain to investment and 37 to output growth, covering up to 150 countries and using data for 1960-2018.[b] These studies were selected based on two criteria: They include EMDEs in the empirical analysis and they focus on the macroeconomic implications of FDI received in host economies. More than 80 percent of the studies are cross-country, and more than 65 percent of these cross-country studies use exclusively EMDE samples.

Findings of the literature on FDI and investment

The majority of the studies (60 percent) find a positive, statistically significant correlation between FDI and investment, sometimes called "crowding in" (figure B3.2.4.A; Ang 2009a; Kamaly 2014). This consensus is generally found regardless

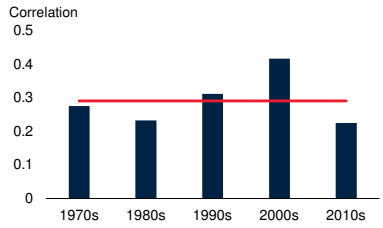
b. A separate strand of research on outward FDI finds that by investing abroad, home country firms may benefit from greater and more diversified growth opportunities (Arndt, Buch, and Schnitzer 2010; Desai, Fritz Foley, and Hines 2009; Hejazi and Pauly 2003; Herzer and Schrooten 2008).

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

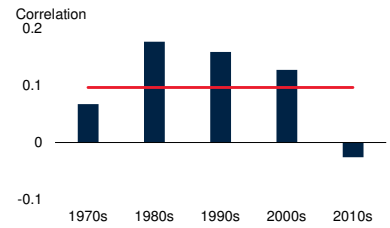
FIGURE B3.2.2 Correlation of FDI, investment, and growth in EMDEs

Since the 1970s, the correlation between FDI and investment and between FDI and growth has been positive in almost all decades. However, the strength of the correlation has been inconsistent over time.

A. Correlation between FDI and investment



B. Correlation between FDI and growth



Source: World Bank.
Note: FDI is net FDI inflows as percent of GDP. EMDEs = emerging market and developing economies; FDI = foreign direct investment.
A.B. Bars show the pooled correlation between FDI and gross fixed capital formation (percent of GDP) or between FDI and GDP per capita growth (percent). The red horizontal line shows the aggregate correlation for the period 1970-2020. All correlations are computed using a constant sample of 71 countries. All positive correlations are statistically different from zero.

of whether the empirical analysis includes data prior to 1990. However, papers that include data after 2009 generally find mixed results.

Another 30 percent of studies on FDI and investment find mixed effects, and only two each find a negative effect or no effect. Mixed effects are recorded in the survey if a paper finds a combination of positive, negative, or no effects. One of the studies finding no effect is based on subnational data for China; the other uses a predominantly Latin American and Caribbean country sample between the 1970s and 2000s. The two studies finding outright negative effects employ Generalized Method of Moments techniques to avoid endogeneity or seek to identify long-run relationships, in contrast to other studies that rely mostly on OLS regressions (Eregha 2012; Morrisey and Udomkerdmongkol 2012).

The strength of the relationship between FDI and investment, which is mostly positive, depends on country characteristics, initial conditions, and types of FDI (figure B3.2.4.B). Initial conditions important for investment include financial development and institutions in the host economy.

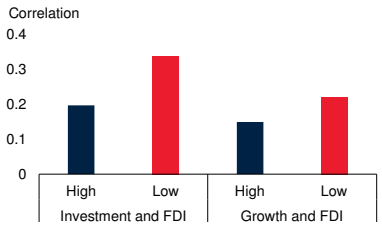
- *Financial development.* The positive link between FDI inflows and domestic investment is stronger when countries have higher levels of financial

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

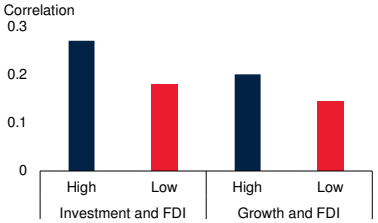
FIGURE B3.2.3 Correlation of FDI, investment, and growth in EMDEs by host country conditions

Correlations between FDI and investment or FDI and output growth are generally stronger in EMDEs with lower financial development, higher trade openness, better human capital, and stronger institutions.

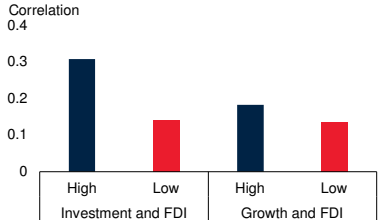
A. Correlation, by financial development



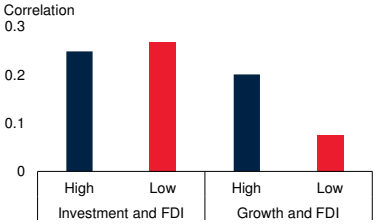
B. Correlation, by trade openness



C. Correlation, by human capital



D. Correlation, by institutions



Sources: PRS Group's International Country Risk Guide; World Bank.
Note: FDI is net FDI inflows (percent of GDP). EMDEs = emerging market and developing economies; FDI = foreign direct investment.
A.B. Bars show the pooled correlation between FDI and gross fixed capital formation and between FDI and GDP per capita growth for countries with high (greater than the 75th percentile blue bars) and low (lower than the 25th percentile, red bars) levels of financial development or levels of trade openness. Financial development is measured as private credit as share of GDP. Trade refers to trade as a share of GDP. Differences between country groups are not statistically significant.
C.D. Bars show the pooled correlation between FDI and gross fixed capital formation and between FDI and GDP per capita growth, for countries with high (blue bars) and low (red bars) levels of human capital or institutions. For human capital, high refers to pupil-to-teacher ratio less than the 25th percentile; and low refers to pupil-to-teacher ratio greater than the 75th percentile. For institutions, high refers to countries above the median and low refers to countries below the median of the investment profile index in the PRS Group's International Country Risk Guide. Differences between country groups are not statistically significant.

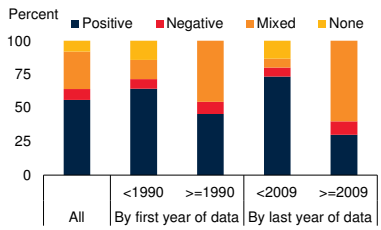
development (Jude 2019). FDI may have served as a catalyst for economic activity when domestic firms had access to sufficient financing to invest in expansions. On the other hand, low financial development may hinder investment. In contrast, in the two decades after the collapse of the Soviet Union, financial development appears to have been associated with a weaker correlation between FDI and investment in Europe and Central Asia (Mileva 2008).

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

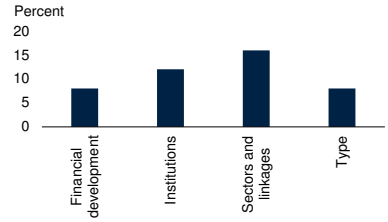
FIGURE B3.2.4 Summary of empirical studies of FDI and investment in EMDEs

The literature mostly finds a positive relationship between FDI and investment, especially when using samples starting before the 1990s or ending prior to 2009. The strength of the relationship between FDI and investment depends on country characteristics and the features of FDI.

A. Findings on the relationship between FDI and investment



B. Studies on FDI and investment that account for initial conditions and type of FDI



Sources: World Bank, based on 25 studies: Agosin and Machado (2005); Ahmed et al. (2015); Al-Sadig (2013); Amighini, McMillan, and Sanfilippo (2017); Ang (2009a); Arndt, Buch, and Schnitzer (2010); Ashraf and Herzer (2014); Borensztein, De Gregorio, and Lee (1998); Bosworth, Collins, and Reinhart (1999); Chen, Yao, and Malizard (2017); Eregha (2012); Ha, Holmes, and Tran (2022); Jude (2019); Kamaly (2014); Lautier and Moreaub (2012); Makki and Somwaru (2004); Mileva (2008); Mody and Murshid (2005); Morrissey and Udomkerdmongkol (2012); Ndikumana and Verick (2008); Nguyen (2021); Pels (2010); Tang, Selvanathan, and Selvanathan (2008); Wang (2013); and World Bank (2017).

Note: EMDEs = emerging market and developing economies; FDI = foreign direct investment.

A. Bars show share of papers that find statistically significant positive, negative, mixed, or missing relationships between FDI and investment. The shares of results are also shown by restricting papers based on the start date of their empirical analysis (before and after 1990) and the end date of their empirical analysis (before and after 2009).

B. Bars show the share of surveyed papers on FDI and investment that find a statistically significant role for specific initial conditions, as shown along the x-axis. "Sectors and linkages" refers to different effects of FDI on investment depending on the sector of FDI (that is, manufacturing or services). "Type" refers to different effects of FDI on investment depending on whether FDI is greenfield or mergers and acquisitions.

- *Institutions.* The positive relationship between FDI and investment is found to be stronger in countries with better institutions (as measured by the World Bank's Country Policy and Institutional Assessments) or competitiveness (Mody and Murshid 2005; Nguyen 2021). Political stability is shown to dampen the negative relationship between FDI and domestic investment (Morrissey and Udomkerdmongkol 2012).
- *Sectors and linkages.* FDI is associated with more investment when it is occurs in the manufacturing sector, directed to sectors that mainly source inputs domestically, or in sectors that are export-oriented (Amighini, McMillan, and Sanfilippo 2017; Ha, Holmes, and Tran 2022). These categories of FDI may encourage investment through foreign firms purchasing domestic inputs, foreign firms selling domestic firms cheaper inputs, or helping local firms

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

integrate in global value chains. FDI is associated with less investment when it is directed to sectors that mainly compete with domestic producers (Ha, Holmes, and Tran 2022). The latter would occur when foreign firms reduce demand for domestic inputs, as they are replaced by FDI inputs, resulting in less investment by local firms no longer in demand.

- *Type.* FDI can take the form of mergers and acquisitions or greenfield investment. Since mergers and acquisitions primarily involve a transfer of ownership, the net impact on domestic investment is unclear. In contrast, greenfield investment directly injects new capital in host countries and is associated with more domestic investment (Ashraf and Herzer 2014; Jude 2019). While greenfield FDI tends to create more investment overall, the effect is strongest in the long run (Jude 2019). Greenfield FDI include capital-intensive start-up activities and it take times to observe their direct benefits and spillovers.

Findings of the literature on FDI and output growth

The evidence on the relationship between FDI and output growth has been mixed, with a positive relationship identified more often in samples starting after 1990 than in samples covering earlier years (figure B3.2.5.A).[c] Only one study used using long-term cointegration methods for a pre-1990 sample and identified a statistically significant negative relationship between FDI and output growth in 44 EMDEs between 1970 and 2005 (Herzer 2012). The broader mixed findings may reflect reverse causality running from growth to FDI, third factors driving both FDI and growth, or heterogeneity across time periods and country samples. Several studies have attempted to disentangle the direction of causality and control for a comprehensive set of other factors.

As in the literature on FDI and investment, the strength of the relationship between FDI and output growth depends on initial conditions in host countries, and on types of FDI (figure B3.2.5.B). Such initial conditions included country characteristics, such as financial development, the quality of institutions, human capital, and the extent of integration with the global economy.

- *Financial development.* The association between FDI and output growth is stronger in countries with more developed financial systems, in part because domestic firms in those countries are able to finance expansions that allow them to supply multinationals (Alfaro et al. 2004; Azman-Saini, Law, and Ahmadi 2010; Bengoa and Sanchez-Robles 2003; Hermes and Lensink

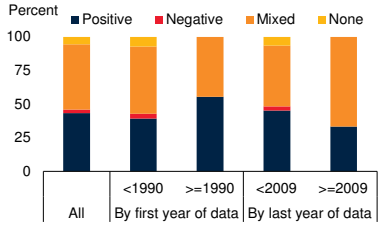
c. This is consistent with findings from a review of the literature before the global financial crisis (Kose et al. 2009).

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

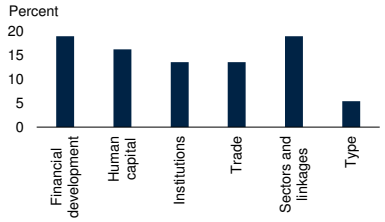
FIGURE B3.2.5 Summary of empirical studies of FDI and growth in EMDEs

The literature mostly finds a mixed relationship between FDI and output growth, especially when using samples starting before the 1990s. The strength of the relationship between FDI and growth depends on country characteristics and the features of FDI.

A. Findings on the relationship between FDI and output growth



B. Studies on FDI and output growth that account for initial conditions and type of FDI



Sources: World Bank, based on 37 studies: Alfaro (2003); Alfaro and Charlton (2013); Alfaro et al. (2004); Alguacil, Cuadros, and Orts (2011); Ali and Asgher (2016); Ang (2009b); Aykut and Sayek (2007); Azman-Saini, Law, and Ahmad (2010); Balasubramanyam, Salisu, and Sapsford (1996); Benetrix, Pallan, and Panizza (2022); Bengoa and Sanchez-Robles (2003); Blanchard et al. (2016); Borensztein, De Gregorio, and Lee (1998); Busse and Groizard (2008); Carkovic and Levine (2005); Chakraborty and Nunnenkamp (2008); Choe (2003); Chowdhury and Mavrotas (2006); Cipollina et al. (2012); De Mello (1999); Driffield and Jones (2013); Gao (2004); Hansen and Rand (2006); Harms and Méon (2018); Hermes and Lensink (2003); Herzer (2012); Kohpaiboon (2003); Lee and Chang (2009); Luu (2016); Makki and Somwaru (2004); Mehic, Silajdzic, and Babic-Hodovic (2013); Nair-Reichert, and Weinhold (2001); Osei and Kim (2020); Prasad, Rajan, and Subramanian (2007); Romer (1993); Wang (2009); and Wang and Wong (2011).

Note: EMDEs = emerging market and developing economies; FDI = foreign direct investment.

A. Bars show share of papers that find statistically significant positive, negative, mixed, or missing relationships between FDI and growth. The share of results are also shown by restricting papers based on the start date of their empirical analysis (before and after 1990) and the end date of their empirical analysis (before and after 2009).

B. Bars show share of papers on FDI and growth that find a statistically significant role for specific initial conditions, as shown along the x-axis. "Sectors and linkages" refers to different effects of FDI on growth, depending on the sector of FDI (that is, manufacturing or services). "Type" refers to different effects of FDI on growth depending on whether FDI is greenfield or mergers and acquisitions.

2003). Since the financial and capital account liberalizations of the 1990s, however, the link between financial development and growth has weakened (Benetrix, Pallan, and Panizza 2022). This weakening may reflect threshold effects in the rapid financial system growth that followed liberalizations. For example, there appears to be a private credit-to-GDP threshold above which the relationship between FDI and growth is no longer positive, possibly because of an increased incidence of financial crises (Osei and Kim 2020).

- *Human capital.* The positive link between FDI and output growth is stronger in countries with a higher-skilled workforce, possibly because these countries are better equipped to absorb the productivity-enhancing new technology

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

that typically accompanies FDI (Bengoa and Sanchez-Robles 2003; Borensztein, De Gregorio, and Lee 1998; Romer 1993; Wang and Wong 2011). Since the 2000s, however, the amplifying role of human capital in the relationship between FDI and output growth appears to have diminished (Benetrix, Pallan, and Panizza 2022). [d]

- *Institutions.* Strong institutions, as measured by indices of business regulation and freedom from government intervention, are associated with a stronger positive link between FDI and output growth or a dampened negative link (Alguacil, Cuadros, and Orts 2011; Driffield and Jones 2013; Herzer 2012). Conversely, excessive regulation is associated with a weaker link between FDI and output growth (Busse and Groizard 2008).
- *Trade.* Trade openness and global integration are associated with a stronger link between FDI and output growth (Balasubramanyam, Salisu, and Sapsford 1996; Kohpaiboon 2003; Makki and Somwaru 2004). However, in countries that rely heavily on primary sector exports, FDI and growth are found to be negatively correlated (Herzer 2012).
- *Sectors and linkages.* FDI in the manufacturing sector is found to be positively correlated with output growth, while FDI in other sectors has no significant correlation, or even negative correlation (Ali and Asgher 2016; Aykut and Sayek 2007; Chakraborty and Nunnenkamp 2008; Wang 2009). FDI in high-tech, capital-intensive, and high-skill industries is associated with high output growth (Alfaro and Charlton 2013; Cipollina et al. 2012). Conversely, FDI in the primary sector, which tends to have few linkages to other domestic sectors, is not associated with greater output growth (Alfaro 2003).
- *Type.* Greenfield FDI is found to have a positive effect on output growth (Harms and Méon 2018), while mergers and acquisitions are associated with lower output growth (Luu 2016).

Conclusion

As summarized in a review of 62 studies, the literature has found mixed evidence on the relationship between FDI and output growth but there is mostly a positive relationship between FDI and investment. That said, several country

d. These recent results may reflect the strong ties between global value chains and FDI (Adarov and Stehrer 2021; Qiang, Liu, and Steenbergen 2021). For example, Antràs (2020) explains that global value chains may lessen the prerequisites for a country to receive FDI because some segments of global value chains in developing countries require less skills than high value-added segments.

BOX 3.2 Macroeconomic implications of foreign direct investment in EMDEs (*continued*)

characteristics, time period specifics, and features of FDI have influenced the relationship between FDI, output growth, and investment. Greenfield investment in upstream and export-intensive, non-primary sectors tends to be more conducive to growth and investment. FDI also tended to raise growth and investment more in countries with better institutions, more skilled labor forces, greater financial development, and trade openness.

Policies can aim to encourage types of FDI or, more broadly, improve the country-level conditions that make FDI more growth-enhancing. These policies include, for example, efforts to invest in education for a higher-skilled workforce capable of absorbing new technologies. Limiting trade restrictions can help countries attract, and benefit from, FDI related to global value chains, as EMDE country segments of global value chains typically produce inputs that are used in other parts of the production process or goods for sale elsewhere, which need to be exported to final consumers. Countries can also support financial development to attract FDI. In the long run, improving institutions and ensuring political stability can help generate growth- and investment-enhancing FDI inflows. Furthermore, investment promotion agencies have been found to have a positive effect on attracting FDI to targeted sectors (Harding and Javorcik 2011).

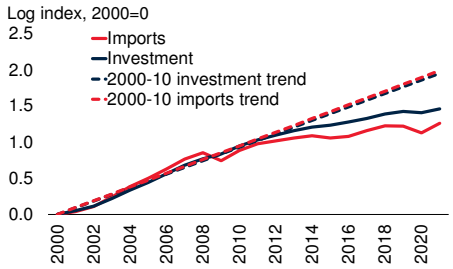
investment growth, therefore, contributed to the slowdown of trade before the pandemic (figure 3.10.A and B; Bobasu et al. 2020; IMF 2016; World Bank 2015a). Capital goods imports by EMDEs tend to embody efficiency-enhancing technology transfers (Alfaro and Hammel 2007). Hence, the slowdown in such transfers may also have contributed to slowing EMDE productivity growth. The global investment weakness was further accompanied by a pullback in cross-border investment by multinational companies, which accounts for one-third of global trade (Lakatos and Ohnsorge 2017). This slowdown occurred at the same time as, and may have been partly due to, the implementation by several countries of additional regulatory measures and nontariff barriers, such as restrictions on FDI and limitations on foreign purchases in public procurement (chapter 6).

Global trade also propagates a pickup or slowdown in investment growth across countries (chapter 6; Freund 2016). Trade can facilitate more efficient allocation of capital goods, in turn improving overall productivity and rates of return on capital, thus encouraging investment (Mutreja, Ravikumar, and Sposi 2014). For example, the marginal product of capital does not vary much between low- and high-income countries, and EMDEs where the relative prices of investment goods are high, compared to consumption prices, will tend to have lower real investment rates (Caselli and Feyrer 2007; Hsieh and Klenow 2003). Countries engaged in deepening trade integration have seen the price of investment goods fall relative to the prices of consumption goods,

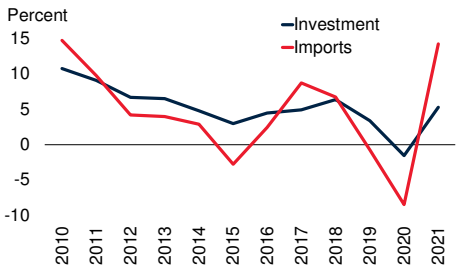
FIGURE 3.10 Slowdown in growth of investment and trade

The investment growth slowdown in EMDEs after the global financial crisis was accompanied by a downturn in the growth of imports. Both imports and investment fell below their 2000-10 trend, and were further lowered by the COVID-19 pandemic.

A. EMDE investment and imports



B. EMDE investment and import growth



Sources: Haver Analytics; World Bank; World Development Indicators database.
Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation.
A. Levels of real gross fixed capital formation and imports.
B. Aggregate investment growth is calculated with real annual investment in constant U.S. dollars as weights.

especially between 2005 and 2011, thus boosting investment rates (Lian et al. 2019). Indeed, trade openness has been found to be positively correlated with capital accumulation (Alvarez 2017; Sposi et al. 2019; Wacziarg and Welch 2008).

The deep global recession of 2020, together with pandemic-related lockdowns, led to a collapse of global trade in 2020. The subsequent recovery in trade was hampered by continuing supply and shipping bottlenecks, weak demand, and continued pandemic-related mobility clampdowns in some countries. The war in Ukraine has further slowed global trade growth by disrupting commodity markets, logistics networks, and supply chains (Ruta 2022).

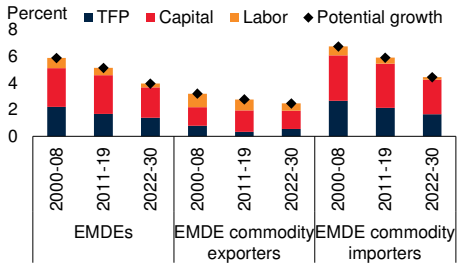
Slower potential output growth. The prospect that investment growth will remain weak in the medium term raises fundamental concerns about the economic health of EMDEs, and about meeting the infrastructure needs of expanding and urbanizing populations in many EMDEs. Before the COVID-19 pandemic, potential output growth—the rate of growth achievable at full capacity utilization and full employment—had already slowed in EMDEs (Kilic Celik, Kose, and Ohnsorge 2020; World Bank 2018). Projected low investment growth in the medium-term will further weaken potential output growth through 2030. This will result in capital accumulation contributing, on average, 0.6 percentage points a year less to EMDE potential growth in 2022-30 than in 2011-19. However, filling physical capital investment needs could partially offset the projected slowdown in potential growth during 2022-30 (chapter 1; figure 3.11.A; World Bank 2021a).

Weaker investment growth leads to weaker potential output growth by lowering total factor productivity (TFP) growth. In contrast, increased investment often involves the

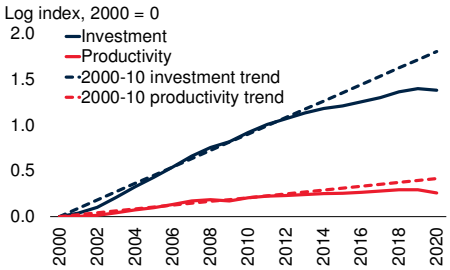
FIGURE 3.11 Growth of investment, productivity, and potential output

EMDEs with low investment growth also tend to have low total factor productivity (TFP) growth. Fluctuations in investment growth in EMDEs between 2000 and 2020 are mirrored in fluctuations in TFP growth. Slowing investment and TFP growth have lowered potential growth in EMDEs, especially in commodity-importing EMDEs, among which China has an outsized weight.

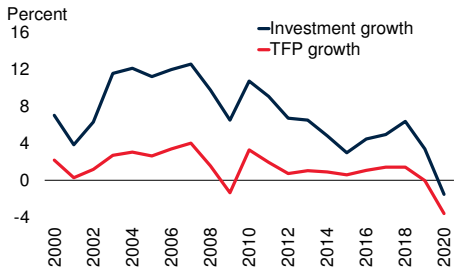
A. Potential output growth



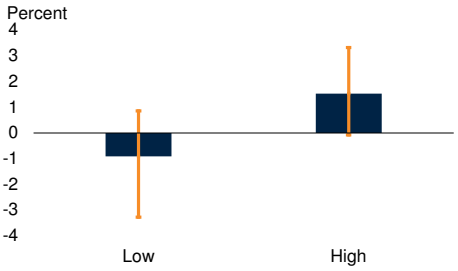
B. EMDE investment and total factor productivity



C. Investment and total factor productivity growth in EMDEs



D. Total factor productivity growth in EMDEs with high and low investment growth, 2000-20



Sources: Dieppe (2021); Haver Analytics; International Labour Organization; Penn World Tables; UN World Population Prospects; World Bank.

Note: EMDEs = emerging market and developing economies; TFP = total factor productivity.

A. Potential output growth based on production function estimates. Sample includes 53 EMDEs.

B.C. Total factor productivity is derived from labor productivity (output per worker) by adjusting for human capital and capital deepening; see Dieppe (2021). Investment refers to gross fixed capital formation. Investment growth and TFP growth are calculated with countries' real annual investment in constant U.S. dollars as weights. Sample includes 69 EMDEs.

D. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate years when annual investment growth was in the bottom and top third of the distribution, respectively, during 2000-20. Difference in medians between "high" and "low" subsamples is significant at the 1 percent level. Sample includes 69 EMDEs.

adoption of productivity-enhancing technologies, including in the investment goods sector itself (Colecchia and Schreyer 2002; Hsieh and Klenow 2007; OECD 2016a). Weaker investment and TFP growth can also be a symptom of market distortions that subsidize investment by less productive firms (Restuccia and Rogerson 2008). Alongside slowing investment growth, TFP growth in EMDEs slowed in the decade prior to the pandemic to 1.2 percent per year in 2010-19, on average, from 2.3 percent per year in 2000-08 (figure 3.11.B and C). EMDEs with low investment growth tend to also have low TFP growth (figure 3.11.D). The slowdown happened despite evidence of somewhat faster cross-country technology absorption from countries at the productivity frontier (Comin and Ferrer 2013; Moelders 2016). Along with investment growth, TFP

growth in EMDEs is projected to remain weak during the next decade (chapter 5). Weak TFP growth would also be reflected in slower labor productivity growth—the key driver of long-term of growth in real wages and household incomes (Blanchard and Katz 1999; Feldstein 2008).

The pandemic generated another major hit to productivity. Taking into account the impacts of the pandemic on the accumulation of physical and human capital and slowing TFP growth, potential output growth in EMDEs is estimated to drop to about 4 percent per year in 2022-30, from an estimated 5.1 percent per year in 2011-19 (chapter 5).

Slower progress toward the SDGs and climate goals. Achieving the SDGs and climate-related goals requires increasing investment in EMDEs. Raising infrastructure investment is especially important, following several years of subdued public infrastructure investment growth in EMDEs before the pandemic (Foster, Rana, and Gorgulu 2022; Vorisek and Yu 2020). Meeting greenhouse gas emissions reduction commitments, advancing the clean energy transition, and capping the rise in temperature is expected to require an investment in infrastructure and other adaptations of several trillion U.S. dollars per year (table 3C.5; Black et al. 2022; IEA 2021a,b; IPCC 2022; Songwe, Stern, and Bhattacharya 2022). For a partial set of EMDEs, building resilience to climate change and putting countries on track to reduce emissions by 70 percent by 2050 is estimated to require investment of 1 to 8 percent of GDP annually between 2022-30, with higher investment needed in LICs (figure 3.12.A; World Bank 2022c).[4] Similarly, the increase in spending needed to achieve the SDGs (relative to GDP) will be much larger for LICs than for the average EMDE (Gaspar et al. 2019). Substantial additional financing from the global community and the private sector will be needed to close investment gaps.

To achieve the SDGs related to infrastructure (electricity, transport, water supply and sanitation) and infrastructure-related climate change preparation (flood protection, irrigation) in low- and middle-income countries, an average investment of $1.5-$2.7 trillion per year (4.5-8.2 percent of these countries' combined annual GDP) during 2015-30 is required. This investment is mostly needed for transport and electricity (Rozenberg and Fay 2019), depending on policy choices and the quality and quantity of infrastructure services, with variance across regions (figure 3.12.B). The 4.5 percent of GDP estimate anticipates investment in renewable energy; transport and land-use planning resulting in denser cities and less expensive, more reliable public transport and development of reliable railway systems for freight; and deployment of decentralized technologies such as minigrids and water purifications systems in rural areas. Gaps in investment relative to the levels needed to reach the health-related SDGs also remain substantial (Stenberg et al. 2017; UNCTAD 2014).[5] Likewise, investment in education

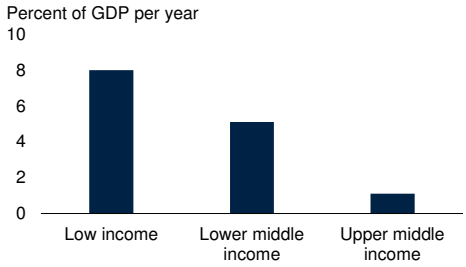
[4] The range of 1-10 percent is for all countries with Country Climate and Development Reports as of late 2022.

[5] Stenberg et al. (2017) estimate that meeting the health-related targets under SDG 3 in low- and middle-income countries would require about $370 billion (1.9 percent of GDP) of additional spending per year through 2030, mostly for health workers, infrastructure, and health equipment.

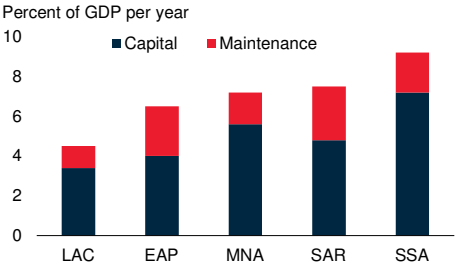
FIGURE 3.12 Investment needs related to climate goals and the Sustainable Development Goals (SDGs) in EMDEs

Continued weak investment growth will make filling large investment gaps related to climate and development goals in EMDEs more challenging.

A. Additional investment needs for a resilient and low-carbon pathway, 2022-30



B. Average investment needs in infrastructure sectors related to SDGs, by region



Sources: Rozenberg and Fay (2019); World Bank (2022c); World Bank.
Note: EAP = East Asia and Pacific; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
A. Bars show the annual investment needs to build resilience to climate change and put countries on track to reduce emissions by 70 percent by 2050. Depending on availability, estimates include investment needs related to transport, energy, water, urban adaptations, industry, and landscape. In some Country Climate and Development Reports, especially those for low-income and lower-middle-income countries, estimated investments include development needs, especially those linked to closing the infrastructure gaps—such as solar mini grids to provide energy access—and cannot be considered entirely "additional" to pre-existing financing needs.
B. Bars show average annual spending needs on electricity, transport, water and sanitation, flood protection, and irrigation during 2015-30. Country sample includes low- and middle-income countries, as defined in the technical appendix of Rozenberg and Fay (2019).

is vital to achieving schooling-related SDGs, closing education achievement gaps created by the pandemic, and supporting long-term income growth (Barro 2013; Psacharopoulos et al. 2021).[6]

Investment in infrastructure has multiple potential benefits. For one, it appears to be inversely correlated with income inequality in EMDEs. The channels through which infrastructure investment lowers income inequality and poverty can be direct, for example by employing low-income households or providing services at lower cost and better quality, or indirect, for example by lowering trade costs in stimulating economic growth.[7] Investment in climate-related resilience and adaptation, as well as mitigation, is central to eliminating extreme poverty and achieving the SDGs. Such investment is perhaps most crucial in low-income and high-poverty countries, which are particularly vulnerable to the impact of climate change and increasingly frequent adverse weather

[6] Psacharopoulos et al. (2021) estimate that lifetime losses in incomes from school closures during the COVID-19 pandemic will amount to 0.8 percent of global GDP per year over the next 45 years. Barro (2013) finds that 1 additional year of male upper-level schooling can raise GDP growth by 1.2 percentage points per year. Jones (2003) theoretically shows how educational attainment can be interpreted as an investment rate.

[7] Calderón and Servén (2014) review multiple channels through which infrastructure investment affects the poor; Ferreira (1995) and Getachew (2010) discuss the role of public infrastructure investment and Madeiros, Ribeiro, and do Amaral (2021) the role of infrastructure investment; and Maliszewska and van der Mensbrugghe (2019) examine the role of infrastructure investment in lowering trade cost and generating opportunities for the poor.

events on agriculture, energy generation and usage, and water availability (World Bank 2022c). Green infrastructure and the adoption of environmentally sustainable technologies can support faster growth in the long term, while also mitigating climate change (OECD 2020; Strand and Toman 2010). Improving and expanding access to infrastructure can enhance productivity (Bizimana et al. 2021; Calderón, Moral-Benito, and Servén 2015; Perez-Sebastian and Steinbuks 2017). Public investment in infrastructure has also been found to create jobs, especially in LICs (Moszoro 2021).

Policies to promote investment growth

EMDEs' investment needs—to bolster resilience to climate change, smooth the transition away from growth driven by natural resources, improve social conditions, and support long-term growth of output and per capita income—are substantial. The urgent need to ramp up investment in EMDEs is clear. The challenges demand a multi-pronged strategy featuring a variety of fiscal and structural measures to boost public and private investment growth, with the specific priorities differing by country circumstances.

Fiscal and structural policy, especially over the medium and long term, can make a substantial dent in filling large investment needs in EMDEs. It is also clear that the multilateral institutions will need to assist EMDEs in financing their investment needs. Yet constrained fiscal space and the limited resources of multilateral development banks mean that the private capital mobilization has become vital to filling investment needs (Bhattacharya and Stern 2021; United Nations 2019; World Bank 2022h).

It is critical to design policies that can stimulate investment with lasting benefits while discouraging opportunistic behavior, and to focus on high quality investment projects (G20 2019). Successfully leveraging private sector capital to boost investment requires a set of policies to balance the risks, costs, and returns of investment projects, and overcoming common obstacles to private investment, such as poor business conditions, insufficient project pipelines, and underdeveloped domestic capital markets.

Two areas with strong growth potential are investment in digital capabilities and the clean energy transition. The pandemic created new opportunities for the adoption of digital infrastructure in commerce and governance, while energy market volatility due to Russia's invasion of Ukraine and an increasingly urgent need to meet climate goals have made the development of clean, renewable, and affordable energy sources a priority.

The pandemic also underscored the need for investing in health and education. Healthier individuals are more productive, better at creating and adapting to new technologies, and inclined to invest more in education (Aghion, Howitt, and Murtin 2011). They also have a longer life expectancy and are likely to save more, which feeds back into investment (Zhang, Zhang, and Lee 2003). Investing in education is necessary not only to make up for the effect of lost schooling on future earnings, but also to explore how new approaches to learning and digitalization can reduce inequality in

education in EMDEs, provided the appropriate underlying conditions, including the necessary infrastructure, are in place (Bashir et al. 2021; Muñoz-Najar et al. 2021; Wilichowski et al. 2021). In the long term, investment in education is needed to spur research and development, and ultimately, innovation.

Fiscal policy

Public investment in infrastructure, education, and public health systems can be paid for in several ways. First, funding can be raised through government borrowing, including through counter-cyclical fiscal stimulus programs during economic downturns. The extended low interest rate environment in the decade or more before 2022 offered an opportunity for many governments to borrow for investment projects, with limited risks to long-term fiscal sustainability (OECD 2016b). With debt burdens now at historically high levels and financing costs rising with global interest rates, however, EMDEs have limited capacity for expansionary fiscal policy financed by increased borrowing. Countries that are in or near debt distress can focus on fiscal sustainability in the short-term to free fiscal resources for investment while taking care to protect spending on essential health, education and other social programs (Glassman et al. 2023; World Bank 2022b).

Second, increased public investment can be financed by increasing revenues or cutting other expenditures. Revenues could be increased by strengthening tax administrations, broadening tax bases, or raising tax rates. Revenue-to-GDP ratios are particularly low in South Asian and Sub-Saharan Africa (World Bank 2015b, 2016b). Even without tax rate increases, efforts to remove exemptions, tighten tax administration, and broaden tax bases could yield revenue gains that increase resources to finance public investment projects. Measures that have proven successful in the past include the adoption of digital payments, taxpayer and property registration, and monitoring compliance (Okunogbe and Santoro 2021).

Expenditures could also be reallocated toward growth-enhancing investment from expenditures that are less productive or less clearly aligned with policy priorities. For example, eliminating distortive agriculture and fossil fuel subsidies would free sizable funds for investment in renewable energy, health, education, and targeted social safety net programs, even in fiscally constrained EMDEs (World Bank 2022d). Similarly, identifying inefficient spending on high-cost medicines and other health expenditures for which lower-cost alternatives are available offers large spending efficiency gains (Glassman et al. 2023). For commodity-exporting economies, well-implemented fiscal rules and stabilization funds allow governments to use windfall gains earned when commodity prices are high to smooth government investment and expenditures during economic downturns or when commodity prices are low. Pro-cyclical fiscal policy in commodity-exporting countries has been found to worsen the depth of economic downturns (World Bank 2022a). Counter-cyclical fiscal rules need to also take into account spending on health, education and other social safety net expenditures which are often discretionary even in countries that implemented fiscal rules (Glassman et al. 2023).

Third, within an existing envelope of public investment spending, it may be possible to improve spending efficiency and increase the benefits to growth (Buffie et al. 2012). For example, medium-term budget frameworks can improve spending predictability while greater transparency of expenditures and independent spending evaluations can generate incentives to improve efficiency. Better coordination between different levels of government can reduce duplication and inconsistencies (Mandl, Dierx, and Ilzkovitz 2008; St. Aubyn et al. 2009). Limiting contractual and institutional risks related to public-private partnerships in infrastructure can reduce contingent liabilities, while careful monitoring of state-owned enterprises can limit the need to inject fiscal resources into these companies (Dappe et al. 2022; Dappe, Melecky, and Turkgulu 2022). In some countries, there is also capacity to improve budget execution of planned public investment (World Bank 2022e).

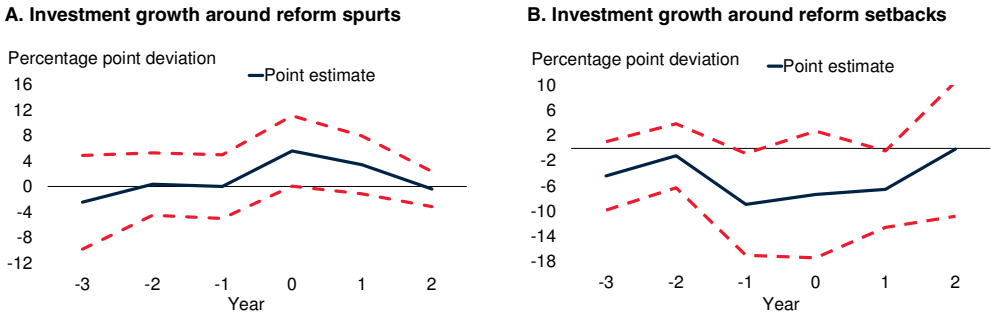
Engaging the private sector to co-finance infrastructure and other investment projects can limit the use of fiscal resources and diversify risks. EMDEs can also boost private capital mobilization through the use of syndicated loans, guarantees, and credit enhancement and disaster risk management instruments. Multilateral institutions have been engaged in offering all of these products to EMDEs in recent years, easing the challenges borrowers in these counties face when seeking financing from investors (World Bank 2022h, 2022i). Although private investors require adequate returns to compensate them for the risk they take on, they can improve the efficiency of infrastructure investment by contributing necessary skills and operational experience

For EMDEs, boosting public investment can have large benefits in terms of output because multipliers tend to be large (Izquierdo et al. 2019). Few studies estimate the fiscal multipliers of infrastructure investment in EMDEs, but the existing literature suggests that investment in green and digital infrastructure may have high multipliers (Vagliasindi and Gorgulu 2021). With the right conditions, public investment can boost private investment. A positive effect on private investment from public investment is more likely in the presence of falling trade barriers and privatization efforts, especially if the stock of infrastructure is low, and if access to credit is not constrained (Bahal, Raissi, and Tulin 2018; Erden and Holcombe 2005).

Fiscal policy can also support private investment indirectly. Prospects for growth of demand and output play a major role in private investment decisions. To the extent that a growth slowdown in EMDEs is cyclical, counter-cyclical fiscal stimulus can help raise private investment during and after a downturn, assuming there is policy space (Cerra, Hakamada, and Lama 2021; Huidrom, Kose, and Ohnsorge 2016). However, expansionary fiscal policy can also crowd out private investment, thereby hindering economic growth. If increased government borrowing, through the pressure it puts on credit markets or through reactions of the central bank, leads to increases in interest rates and domestic currency appreciation, the cost of financing will increase and reduce a country's international competitiveness. For example, high levels of public investment in China after the global financial crisis initially boosted economic growth but also saddled cities with large amounts of public government debt (Huang, Pagano, and

FIGURE 3.13 Investment growth around reform spurts and setbacks in EMDEs

In EMDEs, investment growth increased around reform spurts. Reform setbacks were associated with a significant decrease in investment growth.



Sources: International Country Risk Profile; World Bank.
Note: EMDEs = emerging market and developing economies. Sample includes 60 EMDEs from 1984-2022. Reform spurts and setbacks are defined in annex 3B. Solid lines show the increase in investment growth around a reform spurt (panel A) or setback (panel B) at year = 0 relative to the countries not experiencing a reform spurt or setback. Dashed lines show the 95 percent confidence interval.

Panizza 2020). This increase in local public debt tightened financial conditions and lowered private investment by local manufacturing firms. Conversely, reducing fiscal deficits can, in some circumstances, boost private investment (Essl et al. 2019).

Monetary policy also has a role in supporting the growth of private investment, primarily by establishing an environment of low and stable inflation over the medium term, which will foster confidence in macroeconomic stability (World Bank 2022f). Monetary policy can also play a countercyclical role through its management of interest rates and credit growth. This can support investment growth when activity is weak and inflation is low, while also restraining investment when the economy is overheating.

Structural policy

Structural reforms of many types can reduce constraints to investment and ultimately boost investment growth. The empirical results in this chapter suggest that investment climate reform spurts and higher real credit growth have been associated with stronger investment growth (annex 3A). This positive impact is also apparent in a panel regression of investment growth on large spurts and setbacks in investment climate reforms among 60 EMDEs during 1984-2022 (figure 3.13.A). Reform spurts are associated with significantly higher investment growth—by about 6 percentage points, on average. The impact of reform setbacks is more mixed (figure 3.13.B; annex 3B).

Reforms that improve the business and regulatory climate can enable investment increasing the willingness of investors to extend long-term financing to domestic firms, thus reducing roll-over risks and, if financing is put toward infrastructure or research

and development, yielding returns over decades. Business environment reforms can also amplify the positive effects of investment, such as less informality and more job creation.[8] Informal firms are both less productive and capital intensive than formal firms (IMF 2019; Ohnsorge and Yu 2021). Structural reforms that encourage entry of informal firms into the formal sector can therefore raise investment and potential output growth, particularly in countries where informal firms are prevalent. Reducing business startup costs has been linked to higher profitability of incumbent firms, and greater investment in information and communications technology. Stronger property rights can encourage business and real estate investment. Labor and product market reforms that increase firm profitability can encourage investment. In countries where access to finance is constrained, measures to promote financial deepening could boost investment, although risk indicators must be monitored to avoid financial instability (Kiyotaki and Moore 2005; Sahay et al. 2015).

Addressing climate change and building a resilient and reliable energy infrastructure requires structural reforms that encourage private investment participation and lower barriers of access for the private sector. In many EMDEs, governance and institutional reforms are necessary to improve and unify the often fragmented regulatory and institutional environment, including regional cooperation in, for example, electricity trade. Unpredictable regulatory and policy risk is one of the reasons that the cost of capital for solar energy producers is two to three times higher in EMDEs (excluding China) than in advanced economies (IEA 2022).

EMDEs have made significant progress in establishing robust policy frameworks for renewable energy and energy efficiency since 2010, but the gap with regulatory frameworks of advanced economies is still large, especially for LICs (ESMAP 2020). Medium-term policy targets and development plans can lower the policy uncertainty holding back private investment (World Bank 2022b). For energy-importing EMDEs, Russia's invasion of Ukraine has underscored the energy security benefits of relying on a diversified mix of energy inputs, transitioning to clean energy sources, and improving the energy efficiency of buildings and production processes (World Bank 2022g).

Setting appropriate, predictable rules relating to investment decisions can boost investment and help avoid potential pitfalls. Using firm-level data, Gutierrez and Philippon (2017) find that when firms invest less than would be expected based on their market performance, two-thirds of this shortfall is explained by corporate governance and industry concentration. Improvements in the planning and allocation of investment and in the implementation of public investment management systems, including reforms that resolve problems of asymmetric information and moral hazard, can enhance the benefits of infrastructure investment. This can be achieved, for example, through the establishment of a sound legal and institutional setting, robust appraisal

[8] For the linkages between reform measures and investment growth, see Andrews, Criscuolo, and Gal (2015); Calcagnini, Ferrando, Giombini (2015); Corcoran and Gillanders (2015); Field (2005); Munemo (2014); Reinikka and Svensson (2002); Schivardi and Viviano (2011); and Wacziarg and Welch (2008).

systems, and effective procurement and monitoring systems (Gardner and Henry 2021; Kim, Fallov, and Groom 2020). For EMDEs where PPPs for infrastructure investment are common, a robust PPP governance structure can limit fiscal risks and avoid opportunistic renegotiations (Dappe, Melecky, and Turkgulu 2022; Engel, Fischer, and Galetovic 2020). A robust PPP regulatory framework is especially critical in LICs, where related reforms are lagging (World Bank 2020a).

Developing digital and technological infrastructure can be an important driver of investment growth. Policies to stimulate private and public investment include closing the rural access gap to broadband networks, aligning regulations with international standards, implementing regulation that encourages competition, ensuring price affordability for consumers, and educating the workforce in ICT relevant skills (OECD and IDB 2016). Between 2003 and 2018, new high-speed undersea internet connections to Africa, in the presence of a reliable electricity supply, increased FDI flows into the technology and financial sectors and expanded the size of investment projects (Mensah and Traore 2022). In Nigeria, the expansion of mobile broadband internet led to an increase of consumption by covered households, lower poverty rates, and raised labor market participation (Bahia et al. 2020). Multilateral institutions have a role to play in assisting EMDEs develop a pipeline of projects of interest to investors.

In many EMDEs, underdeveloped and illiquid domestic financial markets limit investment, especially for small- and medium-sized firms (World Bank 2015c). Compared to advanced economies, banks extend less credit to the private sector as a share of GDP in EMDEs. This access gap to credit is largest for loans with long maturities (United Nations 2022). Development of domestic capital markets in EMDEs encompasses not only improving financial institutions but also developing private markets for equity and debt. Policies to expand financial intermediation and access to credit include lowering information asymmetries (for example on the credit worthiness of debtors), building the legal infrastructure for contract enforcement to lower collateral requirements, providing partial credit guarantees to intermediaries to mitigate specific risks and market failures, developing a digital infrastructure to lower market access costs for firms and small financial institutions, and establishing disclosure rules for asset allocation and investment decisions (United Nations 2022; World Bank 2022h).

Local currency equity and debt markets facilitate the entry of institutional investors, such as pension funds and private equity firms, which have a higher risk tolerance and allow firms to access financing in EMDEs with a less-developed financial intermediation infrastructure (United Nations 2022). Development of these markets can be supported by multilateral development banks through the use of innovative products such as catastrophe bonds as well as blue and green bonds, provision of liquidity in local currency in the most illiquid capital markets, as well as assistance and advice to governments on building the necessary regulatory and institutional framework (World Bank 2015; World Bank 2022h). Risk indicators must be monitored to avoid financial instability, as domestic capital markets are developed, however (Kiyotaki and Moore 2005; Sahay et al. 2015).

Trade-related reforms, such as simplifying border procedures, eliminating unnecessary duties and improving trade-related transport infrastructure, could help increase trade flows, with associated benefits for investment (chapter 6; Breton, Farrantino, and Maliszewska 2022). Lowering uncertainty related to at-the-border trade costs and committing to current or reduced tariff levels as well as other non-tariff barriers will decrease trade costs and encourage investment. These reforms should be accompanied by high-quality and well-maintained infrastructure, such as ports and airports (World Bank 2021b). In some EMDEs, lower barriers to cross-border trade finance would help close the trade finance gap and support trade growth (IFC and WTO 2022).

Membership in trade and integration agreements, such as the most recent African Continental Free Trade Area, solidifies reforms, which should benefit a country's investment climate, particularly if such agreements boost integration into global value chains and help lower the cost of tradable investment goods (machinery and equipment), for which EMDEs still face significantly higher costs than advanced economies (Lian et al. 2019). These reforms should include standardization of inspection and labeling requirements, which add significant costs to trade even if tariffs are low (Moïsé and Le Bris 2013). Lower trade barriers can integrate participating economies in regional and global value chains, while investment, intellectual property rights, and competition protocols aim to increase cross-border investments (Echandi, Maliszewska, and Steenbergen 2022; World Bank 2020b).

In the long term, many commodity-exporting EMDEs need to diversify their economies so that terms of trade shocks are less likely to impact investment decisions. This can be done by, for instance, moving production up the value chain or building infrastructure that promotes the growth of activity outside the natural resource sector. EMDEs will also increasingly need to develop policies to offset the investment-dampening effects of population aging (Aksoy et al. 2019; Zhang, Zhang, and Lee 2003).

Conclusion

Investment growth slowed during the decade prior to the pandemic. On an aggregate level, the investment collapse in EMDEs in 2020 (including or excluding China) was larger than in the global recession in 2009, and the return to the pre-recession trend is expected to take longer. The slowdown of investment growth in EMDEs during the decade prior to the pandemic and the subdued prospects for investment growth in the medium term can be observed, to varying degrees, in all six EMDE regions. Chapter 4 explores investment trends and policies needed to boost investment in each of the six EMDE regions.

The empirical analysis in this chapter finds that strong real output growth, robust real credit growth, terms-of-trade improvements, growth in capital inflows as a share of GDP, and investment environment reform spurts are associated with strengthening real investment growth. For advanced economies, where investment growth was much lower than in EMDEs during the 2010s but also more stable, output growth is found to be the most important correlate of investment growth during 2000-21.

At a time when investment growth is projected to be sluggish in most EMDEs, fiscal space for expansion of public investment is limited, and borrowing conditions are much tighter than during the long period of easy credit in the decade prior to the pandemic. Policy makers will need to identify innovative ways to fill unmet investment needs. Meeting climate goals and SDG targets, and supporting long-term growth requires sound fiscal policies, including debt sustainability, as well as targeted investment and reforms.

The sequencing and implementation of these reforms should reflect country-specific circumstances. For example, in countries in acute fiscal stress, the priority may be to improve spending efficiency in public investment. In countries with anemic private investment, the priority may be business climate reforms, including robust competition policy, to foster private investment. In countries with large foreign direct investment, the priority may be to improve human capital to ensure that such foreign direct investment is growth-enhancing.

Fiscal policies include increasing spending efficiency, implementing counter-cyclical fiscal rules, and strengthening tax administration and revenue collection. Fiscal policy to boost investment will need to be complemented by additional financing from the international community and the private sector. Structural reforms are needed to crowd in private investment, such as lowering tariffs and non-tariff barriers to trade, improving the business climate, and putting in place predictable rules such as governance structures that enable PPPs. Public and private investment can both play important roles in boosting long-term growth prospects by supporting productive sectors or expanding infrastructure (including digital, transportation, and electricity infrastructure), improving health sector outcomes, and improving and expanding education. The need for investment in education is particularly significant in view of the impact of school closures during the pandemic.

Future research on investment could focus on several areas. One is to identify the policies most likely to boost public and private investment growth, and thereby the growth of output and per capita incomes. Promising research questions relate to the relative effectiveness of various institutional reforms in raising investment growth, and the quantitative benefits of investments in infrastructure and ICT (Libman, Montecino, and Razmi 2019; Mensah and Traore 2022). Public infrastructure investment has been found to stimulate structural transformation and productivity (Perez-Sebastian and Steinbuks 2017).

Human development is strongly correlated with income per capita and economic growth. Countries with higher income levels tend to have not only a larger share of workers in the formal sector, where wages are typically higher than in the informal sector, but also a larger share of jobs that provide health care benefits, job stability, and good working conditions (Hovhannisyan et al. 2022). These job quality attributes improve access to health care, allow households to send their children to school, and minimize the chance of experiencing catastrophic expenditures. Yet, within countries, there is often large heterogeneity in the quality of jobs across sectors of the economy

(ILO 2008 and 2013; OECD 2015). Identifying sectors and structural reforms that increase investment opportunities with the highest likelihood of providing good quality jobs will help close the education and health gaps to achieve the SDGs.

Another underdeveloped area of research is understanding the role of intangible investment (for example, intellectual property) in driving growth and productivity. Related questions will become increasingly important as EMDEs transition to knowledge- and technology-based economies. Data limitations, however, especially in EMDEs, are hindering progress (Crouzet et al. 2022). The international community could support national statistical agencies in EMDEs to improve their capacity to measure and collect data on intangible investment.

ANNEX 3A Determinants of investment growth: Empirical framework

Framework. Investment decisions are based on the expected marginal return of capital and the risk-adjusted cost of financing the investment. While public investment decisions may also involve other considerations, private investment accounts for the majority of investment in EMDEs, about three-quarters of total gross fixed capital formation.

Therefore, investment is modelled as the level of investment I chosen such that the marginal return on capital (MPK) equals the cost of capital, which is the sum of the risk-adjusted real interest rate r and the rate of depreciation of capital δ, absent binding constraints:

$$MPK = r + \delta$$

As a result, investment I also depends on the determinants of the marginal product of capital—especially total factor productivity TFP and the existing stock of capital K. Since investment decisions are about the expected future returns to capital, the cost of capital also includes a risk premium π:

$$I = I(TFP, K, r, \pi, \delta)$$

A higher cost of capital—whether due to higher risk premia or higher risk-free real interest rates—would reduce investment, whereas higher productivity, lower depreciation, or a low capital stock would raise it.

To proxy these factors, the regression includes real output growth, terms of trade growth, real credit growth, change in capital flows as a percent of GDP, and a dummy for investment reform spurts. As exports are included in GDP, output growth also captures trade growth beyond the impact through terms of trade.

Data sources. Real investment growth is calculated from real gross fixed capital formation taken primarily from Haver Analytics and, for countries or years not available in Haver Analytics, from the World Bank's World Development Indicators (WDI) or *Global Economic Prospects* (GEP) for 2021. Real output growth is taken from the World Bank's GEP. Real credit growth to the private sector and the credit-to-GDP ratio in the robustness section are taken from the Bank for International Settlements and supplemented with data from the International Financial Statistics (IFS) published by the International Monetary Fund (IMF). Credit growth proxies both depth of the financial sector as well as the cost of financing investment, since data on comparable financing cost for a sufficiently large number of countries over the past two decades is not available. Terms of trade are from WDI and, for 2021, from the GEP. Capital flows are calculated using data on the sum of FDI, portfolio flows, and changes in external bank liabilities from the IFS. Missing data for all three flow variables are imputed by taking the average of adjacent years. This imputation is limited to at most two consecutive missing observations per economy. Reform spurts are calculated using the Investment Profile Index taken from the PRS Group's International Country Risk

Guide (ICRG). Reform spurts are defined as a two-year increase in the index above two times the standard deviation of the country-specific index. The data set includes a panel of 57 EMDEs and 31 advanced economies and covers the period from 1999 to 2021. The regression starts in 2000 and allows for lagged variables.

Methodology. The analysis estimates the correlates of investment growth in 57 EMDEs for the period 2000-21 in a system generalized method of moments (GMM) framework, with the third to sixth lag used to instrument the differenced equation and second lags for the level equation. These GMM-type instruments are used for output growth, real credit growth, growth in capital flows, and terms of trade growth. The econometric framework is similar to that of Nabar and Joyce (2009). However, the focus in this chapter is on investment growth—a critical component of overall output growth (ultimately, the source of rising living standards)—rather than changes in the investment-to-GDP ratio, which would only capture changes in investment growth relative to output growth. Use of investment growth is in line with recent studies on advanced economies and individual EMDEs.[9] The results are shown in table 3C.2. The sample is unweighted to avoid a small number of EMDEs dominating the results (China and India, for example, account for a large share of total EMDE investment). Lastly, the terms of trade, real credit growth, and capital flow variables exclude the top and bottom 1 percent of observations in the entire sample to deal with outliers. Standard errors are clustered at the country level.

Robustness. Table 3C.3 details a range of robustness checks. The regressions are robust to using OLS with fixed effects instead of system GMM (to account for the initial level of capital, for example). Further, when dividing capital flows into its components, the change of FDI flows is not significant, but the changes in portfolio and bank flows are. The credit-to-GDP ratio is not significant once China is excluded from the sample, and credit growth does not exhibit non-linear behavior. The regression is also robust to adding advanced economies to the sample (excluding Ireland, Malta, and Singapore, as these countries are large outliers for capital flows). Further robustness checks in the system GMM specification include controlling for various institutional quality variables from ICRG, time fixed effects, as well as the relative price of capital from Penn World Table 10. These additional variables were not significant while the main results are generally robust. Only the coefficient on terms of trade becomes insignificant when global trend variables are included. The subsamples of commodity-importing EMDEs and commodity-exporting EMDEs are too small to generate significant results.

[9] Banerjee, Kearns, and Lombardi (2015); Barkbu et al. (2015); Bussière, Ferrara, and Milovich (2016); and Kothari, Lewellen, and Warner (2015) cover advanced economies. Anand and Tulin (2014) covers India.

ANNEX 3B Investment growth and reforms

Values in figure 3.13 are based on a panel data regression in which the dependent variable is real investment growth. A spurt (setback) is defined as a two-year increase (decrease) above (below) two times the country-specific standard deviation of the investment profile index, a component of the International Country Risk Guide (ICRG) published by the PRS Group. The sample spans 60 EMDEs over 1984-2022. Overall, there are 44 reform spurt events and 10 reform setback events.

In the regression, t denotes the end of a two-year spurt, and s the end of a two-year setback. The coefficients are dummy variables for spurts and setbacks over the $[t-3, t+2]$ or $[s-3, s+2]$ window around these episodes (table 3C.4). In figure 3.13, "reform" at time t refers to the two-year change from $t-2$ to t. All coefficients show the investment growth differential of economies during an episode compared to those that experienced neither improvements nor setbacks. All estimates include time fixed effects to control for global common shocks and country fixed effects to control for time-invariant heterogeneity at the country level.

ANNEX 3C Tables

TABLE 3C.1 Economies in the investment sample

Emerging market and developing economies (EMDEs)			Advanced economies
East Asia and Pacific	**Latin America and the Caribbean**	**South Asia**	Australia
Cambodia *	Argentina	India *	Austria
China *	Belize	Nepal *	Belgium
Indonesia	Bolivia	Sri Lanka *	Canada
Malaysia *	Brazil		Croatia
Mongolia	Chile	**Sub-Saharan Africa**	Cyprus
Philippines *	Colombia	Benin	Czech Republic
Thailand *	Costa Rica	Botswana	Denmark
Vietnam *	Dominican Republic *	Burkina Faso	Estonia
	Ecuador	Côte d'Ivoire	Finland
Europe and Central Asia	El Salvador *	Equatorial Guinea	France
Albania *	Guatemala	Ghana	Germany
Armenia	Honduras	Kenya	Greece
Belarus *	Jamaica *	Mali	Hong Kong SAR, China
Bulgaria *	Mexico *	Mauritius *	Iceland
Hungary *	Nicaragua	Mozambique	Ireland
North Macedonia *	Panama *	Namibia	Israel
Poland *	Paraguay	Niger	Italy
Romania *	Peru	Nigeria	Japan
Russian Federation	Uruguay	Rwanda	Korea, Rep.
Türkiye *		Senegal	Latvia
Ukraine	**Middle East and North Africa**	South Africa	Lithuania
	Algeria	Tanzania	Malta
	Bahrain	Togo	Netherlands
	Iran, Islamic Rep.	Uganda	New Zealand
	Kuwait		Norway
	Lebanon *		Portugal
	Morocco *		Singapore
	Oman		Slovak Republic
	Saudi Arabia		Slovenia
	United Arab Emirates		Spain
			Sweden
			Switzerland
			United Kingdom
			United States

Source: World Bank.
Note: * indicates EMDE commodity importers. Each EMDE is classified as a commodity importer or commodity exporter. An economy is defined as commodity exporter when, on average in 2017-19, either (1) total commodity exports accounted for 30 percent or more of total exports or (2) exports of any single commodity accounted for 20 percent or more of total exports. Economies for which these thresholds were met due to reexports were excluded. When data were not available, judgment was used. This taxonomy results in the classification of some well-diversified economies as importers, even if they are exporters of certain commodities (for example, Mexico).

TABLE 3C.2 Correlates of investment growth

Dependent variable: real investment growth (percent)	(1) EMDEs	(2) Advanced economies
Real GDP growth (percent)	1.807***	1.699***
	(13.66)	(16.85)
Real credit growth (percent)	0.132***	0.060**
	(3.22)	(2.25)
Terms of trade growth (percent)	0.095*	0.127***
	(1.95)	(3.07)
Investment climate reform spurt	6.970*	0.638
	(1.78)	(0.31)
Change in capital flows (percent of GDP)	0.218**	0.060***
	(2.15)	(3.42)
Constant	-2.854***	-1.231***
	(-5.30)	(-5.95)
Observations	1,024	625
Number of economies	57	31

Source: World Bank.
Note: Results of a panel system GMM regression for 57 EMDEs and 31 advanced economies during 2000-21. Column (1) denotes the baseline regression for EMDEs. Column (2) shows the regression for advanced economies (excluding Malta, Ireland, and Singapore, as these countries are large outliers for capital flows). Real GDP growth, real credit growth, terms of trade growth, as well as change in capital flows are treated as endogenous. Standard errors are clustered at the country level. T-statistics in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

TABLE 3C.3 Correlates of investment growth robustness

Dependent variable: real investment growth (percent)	(1) EMDE excl. China	(2) Split capital flows	(3) Credit to GDP ratio excl. China	(4) Real credit growth squared	(5) Nominal credit growth	(6) Global
Real GDP growth (percent)	1.839***	1.840***	1.979***	1.855***	1.854***	1.743***
	(14.04)	(12.73)	(17.58)	(14.06)	(13.85)	(19.29)
Real credit growth (percent)	0.132***	0.148***		0.102		0.102***
	(3.28)	(3.32)		(1.60)		(3.16)
Terms of trade growth (percent)	0.084*	0.092*	0.116**	0.084*	0.086*	0.091*
	(1.75)	(1.78)	(2.25)	(1.87)	(1.75)	(1.85)
Investment climate reform spurt	7.834*	3.165*	8.173**	6.384*	7.701*	4.375*
	(1.87)	(1.83)	(2.01)	(1.82)	(1.99)	(1.80)
Change in capital flows (percent of GDP)	0.219**		0.195**	0.226**	0.203**	0.132***
	(2.16)		(2.05)	(2.14)	(2.17)	(3.55)
Change in FDI flows (percent of GDP)		0.102				
		(0.91)				
Change in portfolio flows (percent of GDP)		0.343**				
		(2.60)				
Change in net liabilities of financial corporation (percent of GDP)		0.076***				
		(2.90)				
Change in credit-to-GDP ratio (percent of GDP)			0.123			
			(1.38)			
Real credit growth squared				-0.000		
				(-0.20)		
Nominal credit growth					0.089**	
					(2.32)	
Constant	-2.861***	-3.049***	-2.509***	-2.719***	-3.221***	-2.056***
	(-5.34)	(-5.79)	(-4.72)	(-5.46)	(-5.23)	(-6.15)
Observations	1,002	948	1,022	1,024	1,037	1,649
Number of economies	56	57	56	57	57	88

Source: World Bank.

Note: Results of a panel regression for 56-57 EMDEs and 31 advanced economies during 2000-21. Number of economies varies based on data availability. Columns (1) to (5) are variations of the system GMM regression in column (1) of table 3C.2. Column (1) excludes China from the sample. Column (2) separates capital flows into the three components. Column (3) replaces real credit growth with the change in the credit-to-GDP ratio, excluding China. Column (4) tests for non-linearity of real credit growth. Column (5) replaces real credit growth with nominal credit growth. Column (6) estimates the baseline for a global sample of 31 advanced economies (the sample excludes Malta, Ireland, and Singapore, as these economies are large outliers for capital flows) and 57 EMDEs. All additional control variables in columns (1) to (5) are assumed to be endogenous. Standard errors are clustered at the country level. T-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

TABLE 3C.4 Investment growth around investment climate reform spurts and setbacks

Dependent variable: real investment growth (percent)	
t-3	-2.460
	(3.752)
t-2	0.385
	(2.501)
t-1	0.014
	(2.550)
Period t of reform spurt	5.577**
	(2.815)
t+1	3.417
	(2.320)
t+2	-0.393
	(1.403)
s-3	-4.395
	(2.772)
s-2	-1.163
	(2.592)
s-1	-8.891**
	(4.129)
Period s of reform setback	-7.323
	(5.137)
s+1	-6.490**
	(3.108)
s+2	-0.098
	(5.438)
Observations	1,854

Source: World Bank.
Note: The regression includes time and country fixed effects. t indicates the period of the significant reform spurt, and s the period of the significant reform setback as defined in annex 3B. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 3C.5 Estimates of climate-related investment needs

Author(s) and year	Climate target	Concept (total vs. additional need)	Investment need or gap (nominal amount)	Investment need or gap (percent of GDP)	Time coverage	Country coverage	Sectors or adaptations covered	Methodology
Black et al. (2022)	Cap temperature increase at 2°C	Total need	$0.5 trillion per year	0.4 percent of GDP per year, or 0.7 percent for high-income countries and 0.3 percent for low-income countries	2021-30	Global	"Cleaner technologies"	CGE and a sector-based "assessment tool"
Citi (2022)	Net zero emissions	Total need	$2.6 trillion per year during 2021-25; $3.8 trillion per year during 2026-30	2.6 percent of GDP per year during 2021-25; 3.3 percent of GDP during 2026-30	2021-30	Global		IEA Net Zero Scenario modeling by UNFCCC Race to Zero campaign, with support from Vivid Economics, Citi GPS
Hallegatte et al. (2018)	Implicitly, the nationally determined contributions (NDCs) of the Paris Agreement	Total need	$115 billion per year	0.1 percent of GDP per year	2020-30	Global		Accounting exercise: the global estimate is derived based on per capita costs of adaptation for 50 countries with available NDC data, assuming NDCs reflect actual needs
IEA (2021)	Investment needed to limit global warming to +1.5°C	Total and additional need	Total need of $4 trillion (2020 $) per year; additional need (gap) of around $3 trillion (2020 $) per year	Total need of 4 percent of GDP per yar; additional need (gap) of 3 percent of GDP	2020-30	Global	Clean electricity; decarbonization in buildings, industry, transport; low-emission fuel production	IEA World Energy Model simulations
IEA (2022)	World on track for net zero emissions (consistent with +1.5°C) by 2050	Total need	$4.8 trillion (2021 $) per year	4 percent of GDP per year	2021-30	Global	Fuels, electricity, infrastructure, end-use adaptations (efficiency, electrification, renewables)	IEA Global Energy and Climate (GEC) Model

TABLE 3C.5 Estimates of climate-related investment needs (*continued*)

Author(s) and year	Climate target	Concept (total vs. additional need)	Investment need or gap (nominal amount)	Investment need or gap (percent of GDP)	Time coverage	Country coverage	Sectors or adaptations covered	Methodology
IPCC (2018)	Investment needed to limit global warming to +1.5°C	Total need	$2.4 trillion per year (2010 $)	2.5 percent of GDP per year	2016-35	Global		Multi-model framework with multiple simulations
IPCC (2022)	Limit global warming to 1.5°C or 2°C	Total need	$2.3 trillion (2015 $) per year to meet the +1.5°C goal; $1.7 trillion (2015 $) per year to meet the +2°C goal	1.2 percent of GDP per year	2023-52	Global		Multi-model framework with multiple simulations
IRENA (2022)	Limit global warming to +1.5°C	Total need	$5.7 trillion per year	5.3 percent of GDP per year	2021-30	Global	Infrastructure, energy	IRENA macro-econometric model
McCollum et al. (2018)	Implementation of NDCs by all countries by 2030	Additional need	$130 billion (2015 $) per year	0.1 percent of GDP per year	2015-30	Global	Energy	Six energy and integrated assessment models: AIM/CGE, IMAGE, MESSAGEix-GLOBIOM, POLES, REMIND-MAgPIE, and WITCH-GLOBIOM
	2°C target	Additional need	$320 billion (2015 $) per year	0.4 percent of GDP per year	2015-30	Global	Energy	Six energy and integrated assessment models: AIM/CGE, IMAGE, MESSAGEix-GLOBIOM, POLES, REMIND-MAgPIE, and WITCH-GLOBIOM
	1.5°C target	Additional need	$480 billion (2015 $) per year	0.5 percent of GDP per year	2015-30	Global	Energy	Six energy and integrated assessment models: AIM/CGE, IMAGE, MESSAGEix-GLOBIOM, POLES, REMIND-MAgPIE, and WITCH-GLOBIOM

TABLE 3C.5 Estimates of climate-related investment needs (*continued*)

Author(s) and year	Climate target	Concept (total vs. additional need)	Investment need or gap (nominal amount)	Investment need or gap (percent of GDP)	Time coverage	Country coverage	Sectors or adaptations covered	Methodology
McKinsey Global Institute (2022)	Net-zero emissions transition by 2050	Total and additional need	Total need of $9.2 trillion per year; additional need (gap) of $3.5 trillion per year	Total need of 6.8 percent of GDP per year; additional need (gap) of 2.6 percent of GDP per year	2021-50	Global	Infrastructure, energy	Net zero emissions 2050 scenario defined by the Network for Greening the Financial System (NGFS), and the NGFS Current Policies scenario as a counterfactual in the REMIND-MAgPIE model
OECD (2017)	66 percent probability of staying below 2° C temperature increase	Total need	$6.9 trillion (2015 $) per year	7.5 percent of GDP per year	2016-30	Global	Energy supply and demand, transport, water and sanitation, telecom	
Paulson Institute, Nature Conservancy, and Cornell Atkinson Center for Sustainability (2020)	Halt decline in biodiversity between by 2030	Total and additional need	Total need of $722-967 billion per year; additional need (gap, or "biodiversity financing gap") of $598-824 billion per year	Total need of 0.7-1.0 percent of GDP per year; additional need (gap) of 0.6-0.8 percent of GDP per year	2019-30	Global	Biodiversity	Accounting exercise
Rockefeller Foundation and Boston Consulting Group (2022)	Net zero emissions	Total need	$3.4 trillion per year during 2020-25; $4.1 trillion per year during 2026-30	3.7 percent of GDP per year during 2020-25; 3.8 percent of GDP during 2026-30	2020-30	Global		Extrapolations based on IEA NZE scenario
UNEP (2022)	Limit temperature increase to 1.5° C or 2°C	Total need	$11 trillion ($379 billion per year) for 1.5°C scenario; $9.5 trillion ($328 billion per year) for for 2°C scenario		2022-50	Global		Model of Agricultural Production and its Impacts on the Environment (MAgPIE v4.1), developed by Vivid Economics, and off-model analysis

TABLE 3C.5 Estimates of climate-related investment needs (*continued*)

Author(s) and year	Climate target	Concept (total vs. additional need)	Investment need or gap (nominal amount)	Investment need or gap (percent of GDP)	Time coverage	Country coverage	Sectors or adaptations covered	Methodology
Baarsch et al. (2015)	Limit temperature increase to 2°C	Total need	$0.2 trillion (2012 $) per year	0.7 percent of GDP per year	Through 2030	Middle- and low-income countries, excluding China	Adaptation and resilience	Integrated assessment model (AD-RICE2012)
	Limit temperature increase to 2°C	Total need	$0.5 trillion (2012 $) per year	0.6 percent of GDP per year	Through 2050	Middle- and low-income countries, excluding China	Adaptation and resilience	Integrated assessment model (AD-RICE2012)
IEA (2021b)	Net zero emissions by 2050	Total need	$1.4 trillion per year	2.1 percent of GDP per year	2026-30	EMDEs, excluding China	Electricity, end-use energy efficiency (buildings, transport) and renewables	Scenario analysis (methodology unclear)
Markandya and González-Eguino (2019)	High-damage and low-damage scenarios	Total need	$29-411 billion by 2030 (lower and upper bounds reflect low-damage/high discount rate and high-damage/low discount rate scenarios)	0.1-1.3 percent of GDP per year	Through 2030	Developing countries		Integrated Assessment Model (IAM)
	High-damage and low-damage scenarios	Total need	$71 billion-$1.09 trillion by 2050 (lower and upper bounds reflect low-damage/high discount rate and high-damage/low discount rate scenarios)	0.1-1.5 percent of GDP per year (2050)	Through 2050	Developing countries		Integrated Assessment Model (IAM)

TABLE 3C.5 Estimates of climate-related investment needs (*continued*)

Author(s) and year	Climate target	Concept (total vs. additional need)	Investment need or gap (nominal amount)	Investment need or gap (percent of GDP)	Time coverage	Country coverage	Sectors or adaptations covered	Methodology
Narain, Margulis, and Essam (2011)	Adaptation to limit temperature increase to 2°C	Total need	$70-98 billion per year (2005 US$)	0.2-0.3 percent of GDP per year	2010-50	Developing countries	Infrastructure, coastal zones, water supply, agriculture, fisheries, forests and ecosystems, human health, extreme weather	Modeling exercises, including some CGE exercises
Rozenberg and Fay (2019)	Limit temperature increase to 2°C and fill investment needs	Total need	$640 billion-$2.7 trillion per year (2015 $)	2.0-8.2 percent of GDP per year	2015-30	Developing countries	Energy, transport, water and sanitation, irrigation, flood protection	Accounting exercises benchmarked against goals, CGE models
World Bank (2022c)	Resilient and low-carbon pathway			Need of 8 percent of GDP in low-income countries; 5.1 percent of GDP in lower-middle-income countries; 1.1 percent of GDP in upper-middle-income countries	2022-30	24 developing countries	Infrastructure, transport, energy/ electricity, water and sanitation, urban, landscape, and industry	Scenario analysis

Source: World Bank.

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CHAPTER 4

Regional Dimensions of Investment: Moving in the Right Direction?

Investment growth slowed in the past decade in all EMDE regions, but most sharply in East Asia and the Pacific (EAP) and the Middle East and North Africa (MNA). Meanwhile, pressing investment needs remain. All regions need to boost infrastructure investment and investment in mitigating and adapting to climate change and reversing pandemic-related learning losses. In other areas, investment needs vary by region. They include accommodating high and rising urbanization (EAP, Latin America and the Caribbean [LAC], South Asia [SAR]); boosting productivity, especially in sectors that employ large proportions of the population (for example, agriculture in Sub-Saharan Africa [SSA]); rebuilding after conflict (Europe and Central Asia [ECA], MNA, SSA); improving trade linkages (LAC); and preparing for future public health crises. Across all EMDE regions, policy priorities include strengthening the efficiency of public investment, boosting private investment (especially in ECA, LAC, and MNA), and expanding the availability of finance for investment (especially in SSA and LAC).

Introduction

Investment in human capital and high-quality infrastructure has multiple benefits. It supports the provision of basic services to households and market access for firms, helps the integration of domestic and international markets, and promotes advances in labor productivity and per capita incomes through capital deepening and technical progress. Investment in infrastructure can also support climate change mitigation and adaptation.

Investment growth was slower in the past decade (2011-21) than in the preceding one (2000-10) in all six EMDE regions.[1] In all EMDE regions except East Asia and the Pacific (EAP), investment fell in 2020 amid the outbreak of the COVID-19 pandemic and rebounded in 2021. In 2022, investment growth performance was mixed, and for several regions, the outlook for investment growth is now mediocre. This puts the spotlight on policies that could help meet the large and diverse investment needs across regions.

This chapter explores cross-regional differences by addressing three questions:

- How has investment growth evolved in the past two decades in each EMDE region?

Note: This chapter was prepared by Sergiy Kasyanenko, Philip Kenworthy, Franz Ulrich Ruch, Ekaterine Vashakmadze, Dana Vorisek, and Collette Wheeler.

[1] Throughout this chapter, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). "Investment growth" is measured as the annual percent change in real investment. Annual investment growth rates for country groups are weighted by average 2010-19 investment levels.

- What are the current and prospective investment needs in each EMDE region?
- Which policies could help countries address their investment needs in each EMDE region?

Contributions. This chapter adds regional granularity to the analysis of global investment growth in chapter 3 and does so consistently across the EMDE regions. It draws on a rich body of regional studies that have examined the constraints on investment growth and possible policy solutions.

Findings. This chapter identifies several patterns in investment growth among the six EMDE regions: EAP, Europe and Central Asia (ECA), Latin America and the Caribbean (LAC), Middle East and North Africa (MNA), South Asia (SAR), and Sub-Saharan Africa (SSA). First, investment growth slowed in the past decade in all regions, but most sharply in EAP and MNA. In EAP, a policy shift in China aimed at reducing reliance on credit-fueled investment and mitigating financial stability risks was largely responsible for the slowdown. In MNA, an oil price slide in 2014-16, armed conflicts, and persistent policy uncertainty contributed to the slowdown.

Second, investment growth is projected to remain well below its 2000-21 average in the near term in EAP, ECA, LAC, and SAR, but to be close to its two-decade average in MNA and SSA. Consensus long-term (five-years-ahead) investment growth forecasts have been downgraded repeatedly. Annual investment growth in the 2020s is now forecast to be lower than in the 2010s in all regions except in LAC and SAR, where adverse shocks that depressed investment growth in the 2010s are not expected to recur.

Third, all regions have large needs to invest in physical and human capital, whether to mitigate and adapt to climate change and reverse pandemic-related learning losses (all regions); improve very low levels of infrastructure development (SAR, SSA); accommodate rising levels of urbanization (EAP, LAC, SAR); support productivity growth, particularly in sectors that employ large proportions of the population (for example, agriculture in SSA); rebuild following conflicts (ECA, MNA, SSA); improve trade linkages (LAC); or prepare for future public health crises.

Fourth, a range of policies are needed to lift investment. Priorities include strengthening the efficiency of public investment (especially in SAR and SSA), boosting private investment (especially in LAC and MNA), and expanding the availability of financing for investment (all regions).

Investment trends

The decade 2000-10 saw double-digit, or near double-digit, average annual investment growth in EAP, ECA, MNA, and SAR. In the subsequent decade, 2011-21, investment growth was sharply lower in all regions, although the magnitude and causes of the decline varied across regions. Commodity price movements, domestic policies,

uncertainty stemming from domestic conditions, and spillovers from key trading partners all played a role (Vashakmadze et al. 2018).

The sharpest slowdowns occurred in MNA and EAP, where investment growth averaged nearly 8 and 6 percentage points per year less, respectively, in 2011-21 than in 2000-10 (figure 4.1). In MNA, the decade 2011-21 was marked by the oil price plunge of 2014-16, several armed conflicts, and persistent political uncertainty in some countries. Investment growth was negative in four of the six years of 2016-21. In EAP, the slowdown mostly reflected a policy shift in China aimed at reducing reliance for economic growth on credit-fueled investment and at managing financial stability risks. Elsewhere in the region, investment growth weakened in commodity exporters, such as Indonesia, following commodity price declines in the middle of the decade, and in Thailand owing to policy uncertainty.

In three other regions—ECA, LAC, and SAR—average investment growth in 2011-21 was over 3 percentage points per year slower than in 2000-10. In ECA, investment was buffeted by spillovers from the euro area debt crisis, a domestic financial crisis in Russia, the mid-decade commodity price plunge, conflict in Eastern Europe and associated sanctions, and financial stress in Türkiye. In SAR, the slowdown, which mostly occurred in the first half of the decade, reflected excess manufacturing capacity in the face of sluggish external demand, financial sector stress, and uncertainties related to government policy. In LAC, slower investment growth in the 2010s mirrored a broader weakening of GDP growth, with severe recessions in the region's largest economies. SSA experienced the mildest investment growth slowdown among the six regions in the 2010s, with strong public investment growth limiting the overall investment slowdown to less than 2 percentage points a year.

The investment growth slowdown in EMDEs in 2011-21 was accompanied by changes in the regional composition of aggregate EMDE investment and average EMDE investment growth. Most notably, despite slower investment growth in EAP in 2011-21, EAP's share of aggregate EMDE investment rose from half to more than three-fifths compared to 2000-10, while its share of EMDE investment growth jumped from about three-fifths to more than three-quarters (figure 4.2).

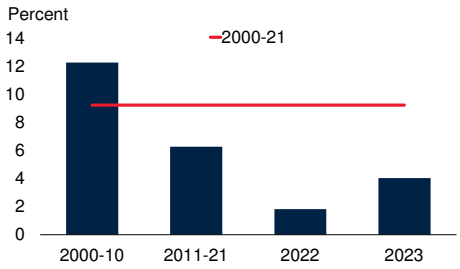
Investment growth is projected to remain well below its 2000-21 average in the near term in EAP, ECA, LAC, and SAR but it is anticipated to be close to its two-decade average in MNA and SSA. Consensus long-term (five-years-ahead) investment growth forecasts have been downgraded repeatedly. Annual average investment growth in 2022-30 is now forecast to be lower than in 2011-21 in all regions except in LAC and SAR, where adverse shocks that depressed investment growth in the 2010s are not expected to recur.

Medium- and long-term prospects for EMDE investment growth have deteriorated over the past decade. Five-year-ahead consensus forecasts have declined in all EMDE regions with available data, and the 10-year-ahead projections are well below the actual growth rates of the 2010s (figure 4.3).

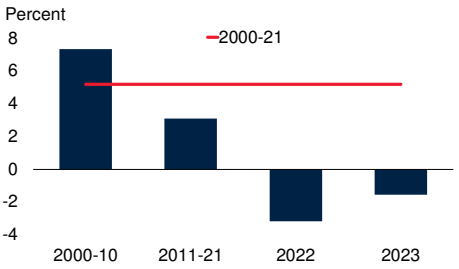
FIGURE 4.1 Average investment growth, by EMDE region

Investment growth was slower in 2011-21 than in 2000-10 in all EMDE regions, and declined in 2020 in every region except East Asia and the Pacific. After rebounding in 2021, investment growth in 2022-23 is projected to be below long-term averages in some regions.

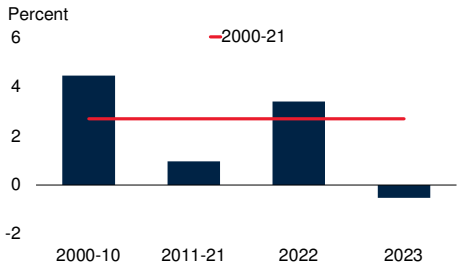
A. EAP investment growth



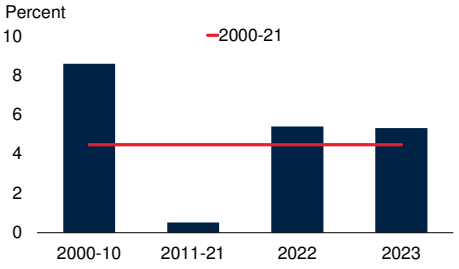
B. ECA investment growth



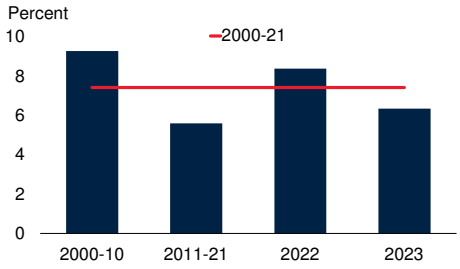
C. LAC investment growth



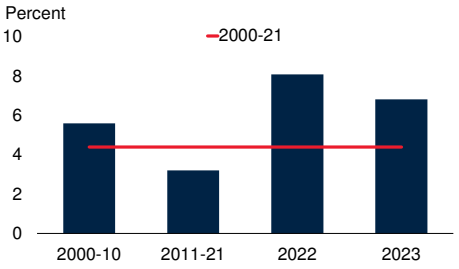
D. MNA investment growth



E. SAR investment growth



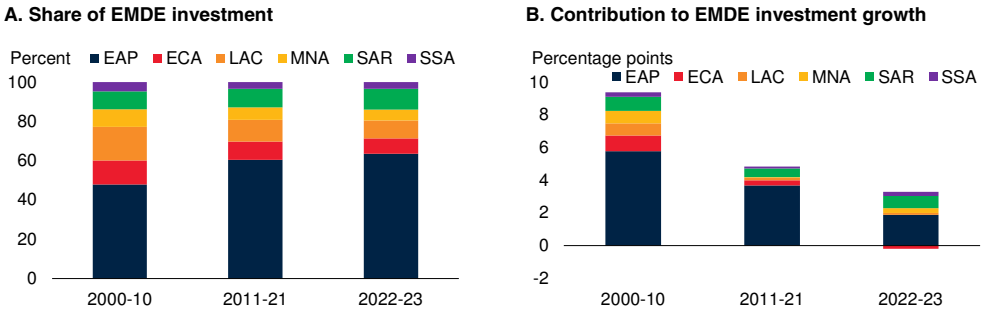
F. SSA investment growth



Sources: Haver Analytics; World Bank, World Development Indicators database; World Bank.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
A.-F. Investment growth rates are estimates for 2022 and forecasts for 2023. Regional investment growth rates are calculated using real annual fixed investment in constant U.S. dollars as weights. Growth rates for 2000-10, 2011-21, and 2000-21 are geometric averages of regional annual investment growth. Sample includes 11 EAP, 13 ECA, 20 LAC, 11 MNA, 5 SAR, and 38 SSA economies.

FIGURE 4.2 Regional contributions to EMDE investment and investment growth

East Asia and the Pacific accounted for the majority of EMDE investment and investment growth in the 2010s.



Sources: Haver Analytics; World Bank, World Development Indicators database; World Bank.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. 2022-23 indicates forecast.
A.B. Investment growth rates are estimates for 2022 and forecasts for 2023. Investment is real annual fixed investment in constant U.S. dollars as weights. Shares for 2000-10, 2011-21, and 2022-23 are simple averages of regional annual investment growth. Sample includes 11 EAP, 13 ECA, 20 LAC, 11 MNA, 5 SAR, and 38 SSA economies.

Investment needs

All EMDE regions continue to have substantial investment needs, reflecting several major challenges and policy priorities. All regions will need to invest heavily in infrastructure, whether to mitigate and adapt to climate change (all regions), reverse pandemic-related learning losses (all regions), improve very low levels of infrastructure development (SAR, SSA), accommodate high and rising levels of urbanization (EAP, LAC, SAR), support productivity growth, particularly in sectors that employ large proportions of the population (for example, agriculture in SSA), rebuild following armed conflicts (ECA, MNA), improve trade linkages (LAC), or prepare for future public health crises (all regions). All regions will need to address a likely widening of investment gaps during the pandemic, as public spending was redirected to high-priority social safety nets and healthcare, even as they prepare their health and education systems for future crises.

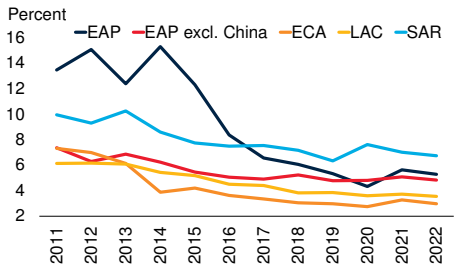
Basic infrastructure. Despite some remarkable successes, the provision of essential public services (water, sanitation, electricity, and transport), which support health and safety and enable participation in economic activity, remains a challenge in many EMDEs, especially in SSA but also in parts of other regions. About 775 million people worldwide lack access to clean water; 1.7 billion people do not have adequate sanitation; 2.4 billion people still cook their food with solid fuels (such as wood); and 1 billion people live more than 2 kilometers from an all-weather road.

Climate change mitigation and adaptation. In large EMDEs whose greenhouse gas emissions are globally significant, investment in climate-smart infrastructure and

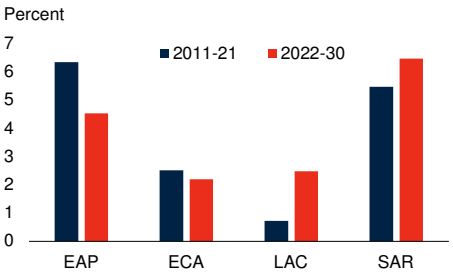
FIGURE 4.3 Regional investment growth prospects

Private sector forecasts of investment growth in all EMDE regions have declined over the past decade, with the sharpest downgrades in East Asia and the Pacific and South Asia. Investment growth during the 2020s is projected to be well below the rates of the 2010s.

A. Five-year-ahead investment growth forecasts



B. Actual and forecast investment growth



Sources: Consensus Economics; World Bank.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; SAR = South Asia.
A. Figure shows the five-year-ahead forecasts for investment growth as of the year shown on the x-axis. Sample includes data for six economies in EAP (China, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam), seven in ECA (Bulgaria, Croatia, Hungary, Poland, Romania, Russia, and Ukraine), six in LAC (Argentina, Brazil, Chile, Colombia, Mexico, and Peru) and one in SAR (India).
B. Geometric mean of actual investment growth in 2011-21 and of current-year to eight-year-ahead consensus forecasts for investment growth for 2022-30, as of September 2022. Includes 6 economies each in EAP, ECA, and LAC and 1 economy in SAR.

technologies by both public and private sectors is an urgent priority, ideally combined with other actions such as measures to improve energy efficiency. In smaller EMDEs, adaptation to climate change necessitates investment in new and retrofitted infrastructure, the maintenance of which will also require resources.

For EAP (for example, Vietnam), the World Bank recently estimated additional financing needs for adaptation measures at 4.5-5.4 percent of GDP per year (World Bank 2022a). Small island states in EAP and LAC have particularly large investment needs to strengthen their resilience to the rising frequency of severe weather events and to address challenges from rising sea levels.

SAR and SSA are particularly vulnerable to climate-induced increases in poverty, disease, child mortality, and food prices. Half of SAR's population live in areas expected to become climate hot spots and agriculture is a critical source of employment in those areas (Amarnath et al. 2017; Hallegatte et al. 2016; Jafino et al. 2020; Mani et al. 2018). Fragile states in SSA are particularly at risk because their governments often lack the institutional capacity needed to respond effectively to climate challenges (Maino and Emrullahu 2022).

Rebuilding following conflict. The war following Russia's invasion of Ukraine in early 2022 has dramatically expanded investment needs in ECA. Preliminary assessments for recovery and reconstruction needs in Ukraine across social, productive, and infrastructure sectors total $349 billion—more than 1.5 times the country's 2021 GDP

(World Bank 2022b). The conflict has also dramatically worsened near-term prospects for investment in Russia and Belarus, in part because of international sanctions. In MNA, there is continued need to replace private and public capital destroyed during wars in the Syrian Arab Republic, the Republic of Yemen, and Iraq. In Syria, the cost of rebuilding damaged or destroyed infrastructure was estimated in 2016 to be in the range of $100-200 billion—more than ten times the country's 2015 GDP (Gobat and Kostial 2016). Iraq too faces large infrastructure investment needs, increased by conflict. It has been estimated that some $200 billion in 2018 prices would be needed to restore "hard" infrastructure to pre-ISIS levels in Iraq, almost equal to the country's 2018 GDP (Gunter 2018). In the Republic of Yemen, recovery and reconstruction costs are estimated at $20-25 billion cumulatively over a five-year period, equivalent to 1.1-1.3 times the country's 2020 GDP (World Bank 2020a).

Education and health investment. Beyond investment in infrastructure and physical capital, the COVID-19 pandemic has underscored the need to invest in health and education. This is especially urgent in SSA, as it remains well behind other regions in human capital development. However, it is also essential in ECA, LAC, and MNA to ensure that education systems provide the skills needed for productive employment.

LAC spends more as a proportion of GDP on education and healthcare than any other EMDE region, but outcomes suggest that better value could be derived from these investments. Educational attainment is highly unequal across income levels, and the region on average attains only mediocre Programme for International Student Assessment (PISA) scores.

In ECA, despite above-average levels of education, learning outcomes, as measured by PISA scores, have deteriorated over the past decade in some economies. There have also been substantial learning losses from the pandemic. With regard to healthcare, since 2000 such measures as the proportion of the population covered for essential services and maternal mortality rates have improved more slowly in ECA than in other regions.

In MNA, the share of human capital in total wealth is the lowest among EMDE regions. The returns to education are also the lowest, reflecting in part low-quality education (Lange, Wodon, and Carey 2018; Montenegro and Patrinos 2014). With regard to healthcare, inadequacies are indicated by the fact that in 2021, the region shared with SAR the highest prevalence of diabetes among EMDE regions, at 12.1 percent of the adult population.

In SAR, healthcare and health outcomes are also poor. Apart from the high prevalence of diabetes, SAR has the lowest number of hospital beds per capita among EMDE regions, and among the most burdensome out-of-pocket healthcare expenses. These issues result largely from low public health spending; at only 2 percent of GDP, it is well below all other EMDE regions. Urgent investment is required in healthcare to help address these challenges. Taxation that would bring health benefits, such as sugar taxes, have been suggested as funding options to meet growing needs and help address morbidity (Kurowski et al. 2021). SAR also faces significant air pollution that imposes heavy health

costs and mitigation of that will require major investment.

In SSA, investment in health and education is especially urgent considering the scale of human capital losses caused by the pandemic. The region remains one of the most vulnerable to public health risks, with many countries remaining ill-equipped to respond effectively to outbreaks of infectious diseases. Meanwhile, educational outcomes are among the poorest in the world. Thus, just 10 percent of lower secondary students achieve minimum proficiency in mathematics, reflecting the lack of access to quality schooling, especially for the poor (UNESCO 2019).

Transport infrastructure. SSA has large transport infrastructure needs, especially to reap the full potential of the African Continental Free Trade Agreement (chapter 6). In many SSA countries, only a small proportion of the road network is paved, and railway development is broadly inadequate, often because of damage from wars or natural disasters, or poor maintenance. In SAR also, the quantity and quality of transport infrastructure fall well behind most other regions, contributing to the region's lack of global integration. Transport infrastructure upgrades are also needed in EAP, ECA, and LAC to deepen the integration of remote parts of some countries and strengthen the resilience of regional value chains. In EAP, SAR, and LAC, infrastructure investment, combined with effective land use regulation, is needed to accommodate high and rising urbanization. The annual cost of traffic congestion is already estimated to be more than 1 percent of GDP in several major cities in LAC (Buenos Aires, Sao Paulo, Montevideo and Santiago; Calatayud et al. 2021).

Digital connectivity. In EAP, due to the presence of many small remote island states, and in ECA, where digitization falls well behind that in its main trading partners, increased public sector investment in digital connectivity infrastructure is needed—particularly high-speed fiber optic lines ("the middle mile") and drop lines that allow individual homes to be connected ("the last mile"). The focus needs to be on reducing the digital divide by expanding international connectivity and local broadband services to remote islands and communities (chapter 7). The resilience of digital infrastructure to climate events and natural disasters also needs to be improved.

Policies to boost investment

Given current mediocre prospects for investment growth and the wide array of challenges that EMDEs face, policies to stimulate investment remain a priority. Although specific policy choices depend on national and regional circumstances, multi-pronged strategies are generally needed to boost both public and private investment growth. The World Bank and other multilateral development institutions can help EMDEs design and implement these strategies.

Improve the efficiency of public investment. Increasing the efficiency of public investment is a priority in all EMDE regions, especially in lower-middle-income and low-income economies due to their limited resources. The efficiency of public investment in SSA and SAR consistently lags behind other EMDE regions, while in

ECA it substantially trails EU peers. Low efficiency partly reflects weaknesses in public investment management, including poor project selection, weak enforcement of procurement procedures, and poor monitoring of project execution. Improvements in these areas are often key. Effective use of medium-term budgeting frameworks can help improve spending efficiency, by improving the predictability and transparency of spending, as can the introduction of independent spending evaluations. Better coordination between various levels of government can help reduce duplication and inconsistencies. Public investment efficiency could also be improved through rules that protect capital expenditures during periods of fiscal consolidation.

Create more fiscal space. Additional domestic tax revenues could provide needed space for public investment in priority areas. Revenue-to-GDP ratios are particularly low in SAR and SSA. Additional revenues could be obtained through improved revenue collection, enhanced tax administration, a broader tax base, higher tax rates, or reduced exemptions. For example, new tax reform legislation in Indonesia is expected to raise revenue by 1.2 percent of GDP in the medium term. Productive public investment could also be boosted by shifting expenditures away from items that do not promote economic growth or other policy objectives. Expenditure priorities could be identified in periodic public expenditure reviews that assess all expenditures against policy objectives. For some large countries in LAC, this may require reforms to reduce budget rigidities (Herrera and Olaberria 2020).

Promote private investment. Empirical studies show that increases in public investment tend to raise private investment, but that this crowding-in effect may be temporary (Kose et al. 2017). A favorable business environment—including stable macroeconomic conditions, predictable policies and regulations, robust competition, and limited barriers to entry and exit—is an important precondition for vigorous private investment growth anywhere. In LAC, tax reforms could encourage investment (Acosta-Ormaechea, Pienknagura, and Pizzinelli 2022). Funding for private investment could be increased by greater mobilization of domestic saving (LAC), broader access to formal financial services (SSA), and stronger banking systems (EAP, SAR). By increasing market size, regional integration can incentivize private investment (ECA, LAC, SAR, SSA). Public-private partnerships, which are less common in SSA and MNA than elsewhere, have been successfully applied to numerous sectors in other EMDE regions, although the need for autonomous regulatory agencies to oversee the private agents is clear. Since the effective use of high-productivity technologies often requires complementary skilled human capital, better-quality education and health systems typically foster private investment.

The remainder of the chapter is presented in six sections, one on each of the six EMDE regions. Each section examines the evolution of investment growth since 2000 and the region-specific underlying factors. Regional investment needs and policy options are also examined.

EAST ASIA and PACIFIC

After several decades of strong growth, investment in East Asia and the Pacific (EAP) slowed significantly in 2011-21 mainly on account of China. Investment growth fell sharply in 2020, during the COVID-19 pandemic outbreak, but remained positive, unlike in other EMDE regions. It rebounded in 2021-22 thanks to pandemic-related stimulus spending. Investment in China is expected to resume its structural deceleration when policy support is withdrawn. In the region excluding China, investment growth, which was negative in 2020, is expected to continue its recovery in 2022-23, but at rates that will be insufficient to prevent a further widening of the gap between investment and its pre-pandemic trend. The prospect of weak investment growth in EAP over the medium term raises concerns about the region's potential output growth. Given the importance of investment in generating productivity and per capita income gains, it is important that impediments to productive investment growth, including financial impediments, be reduced.

Introduction

East Asia and the Pacific (EAP) accounted for 60 percent of EMDE investment during 2011-21.[2] Investment growth in EAP slowed from 11.6 percent a year, on average, in 2000-08 to 6.4 percent a year in 2011-21. China, which represented 85 percent of EAP GDP and 90 percent of EAP investment in 2000-21, was the main contributor to this slowdown. In China, investment growth almost halved from 12.3 percent a year in 2000 -08 to 6.6 percent a year in 2011-21. However, the decline in investment growth was not limited to China: in the region excluding China, investment growth also moderated, from 7.8 percent a year in 2000-08 to 4.7 percent a year in 2011-21.

In China, the slowdown in investment growth was policy-led and aimed at reducing the reliance of GDP growth on credit-fueled investment and at managing financial stability risks. In the region excluding China, the moderation of investment growth, which started in the early 2010s, initially reflected the worsening terms of trade of large commodity exporters, including Indonesia and Malaysia, and increased policy uncertainty in Thailand. Investment growth in the region weakened further in 2018, partly reflecting increased global policy uncertainty related to the escalation in trade

[2] Throughout this section, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). For the sake of brevity, "investment" is understood to indicate investment levels. Investment growth is measured as the annual percent change in real investment.

tensions between China and the United States. In 2020, investment growth fell sharply during the COVID-19 pandemic outbreak, turning negative in the region excluding China.

Investment growth rebounded in much of the region in 2021 and was robust in 2022. Nevertheless, in the region excluding China, where investment contracted by 7.6 percent in 2020, investment was still below its pre-pandemic level in mid-2022. In 2022-23, investment growth is expected to rise above its 2011-21 average rate, but not sufficiently to prevent a further widening of the gap between investment and its pre-pandemic trend. In China, after a couple of years of stimulus-fueled growth, investment is expected to resume its structural deceleration when policy support is withdrawn.

The prospect for weak investment growth in EAP over the medium term raises concerns about the effects on EAP's potential output growth—the growth rate that can be sustained at full employment and capacity utilization. The sustained weakening of investment growth during the 2010s, together with declining total factor productivity growth, has already contributed to a slowdown in labor productivity growth in EAP and, as a result, slower convergence toward advanced economy per capita income levels (Dieppe 2020). The adverse effect of the COVID-19 pandemic on investment in EAP could be prolonged and compounded by the fallout from the war in Ukraine and heightened geopolitical tensions.

Despite several decades of rapid investment growth, investment needs in the region remain significant. Given the importance of investment in generating growth of productivity and per capita income, it is important that impediments to productive investment, including those related to financing, be reduced. For many EAP countries, boosting well-targeted public investment can have particularly large benefits due to high multipliers (Izquierdo, Pessino, and Vuletin 2018). At the same time, improving business climates and reducing policy uncertainty are essential to supporting private investment.

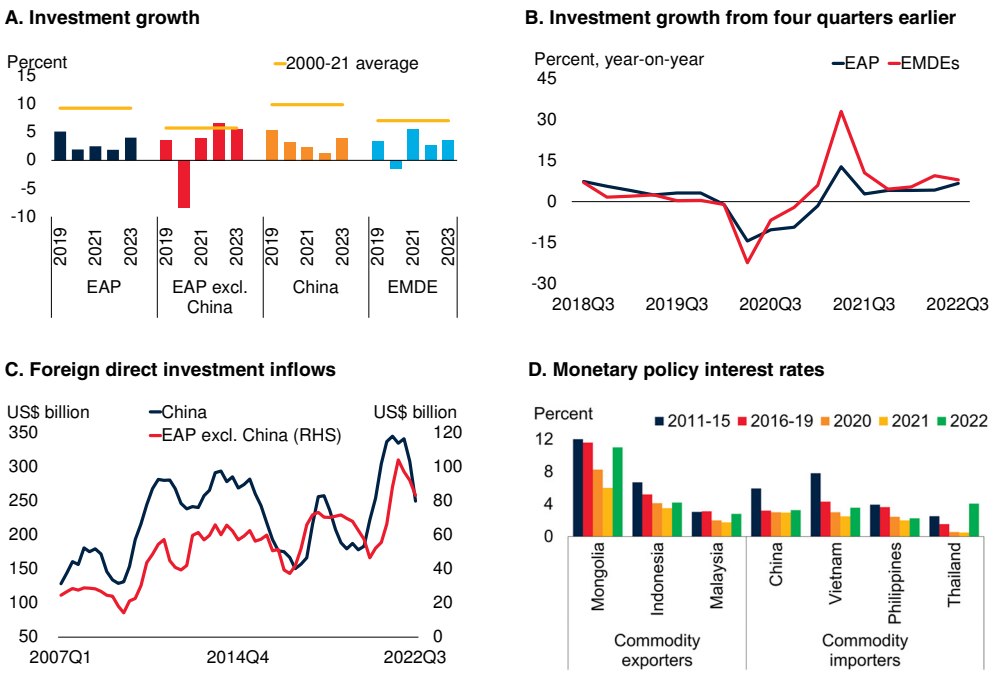
Several possibilities could improve the regional investment outlook. A productivity-enhancing investment surge might be triggered by the recovery from the pandemic. A boost could materialize through renewed investment in digital technologies in sectors such as manufacturing, finance, and education, or through the onshoring of production of some essential products (Dieppe 2020). A pickup in investment also creates opportunities to shift infrastructure spending toward more resilient and environmentally sustainable options, in turn raising productivity and supporting progress toward the Sustainable Development Goals (Hallegatte and Hammer 2020).

Evolution of regional investment

Investment growth in EAP declined from 11.6 percent a year on average in 2000-08 to 6.4 percent a year in 2011-21. But it has remained higher than average investment growth in all EMDEs (figure 4.4). The investment slowdown was particularly pronounced in China, where it dropped from a peak of 24.1 percent in 2009 to below 5 percent in 2019. This slowdown was policy-led and aimed at reducing reliance on

FIGURE 4.4 EAP: Investment growth

Investment growth in EAP stabilized in 2021-22 after a decline in the preceding decade that largely reflected a policy-induced slowdown in China. In the rest of the region, following a decline in 2020, investment rebounded in 2021 and is expected to continue growing strongly in 2022-23. Foreign direct investment to the EAP region remains buoyant and monetary policy is still accommodative despite recent interest rate hikes.



Sources: Haver Analytics; International Monetary Fund; United Nations Conference on Trade and Development; World Bank, World Development Indicators database; World Bank.
A. GDP-weighted averages. 2023 indicates forecast.
B. Includes 68 EMDEs, of which 7 are EAP.
C. "EAP excl. China" includes Indonesia, Cambodia, Lao PDR, Malaysia, Mongolia, the Philippines, Thailand, and Vietnam.
D. Policy rates are the average of end-of-period data. Last observation is September 2022.

credit-fueled investment for GDP growth and at managing financial stability risks. It was achieved largely through tighter macroprudential regulations and stricter oversight of shadow banking.

In the region excluding China, the moderation of investment growth initially reflected the worsening of terms of trade in large commodity-exporting economies like Indonesia and Malaysia during 2014-16 (Vashakmadze et al. 2018; World Bank 2017). In this period, virtually all EAP economies recorded investment growth below long-term averages, mainly reflecting weak private investment. Tight monetary, fiscal, and prudential policies designed to contain rapid credit growth also limited investment growth in these countries. In smaller, more heavily commodity-dependent economies, including Mongolia and Papua New Guinea, investment contracted in the mid-2010s as foreign direct investment (FDI) in mining sector projects declined and domestic

macroeconomic policies were tightened sharply in response to balance of payments stress. Among the commodity-importing countries, investment weakness during the mid -2010s reflected policy uncertainty in Thailand and the Philippines, including delays in investment project approvals.

Investment growth in the region weakened further in early 2019, partly reflecting increased global policy uncertainty amid the escalation in trade tensions between China and the United States. A short period of investment normalization in late 2019, supported by a stabilization of commodity prices and benign global financial conditions, was followed by a sharp weakening of investment growth at the onset of the pandemic in 2020. In EAP as a whole, investment growth in 2020 slowed to 3.2 percent. In China, stimulus policies moderated the weakening of investment growth, bringing it down to 4.4 percent. But in the rest of EAP, investment shrank by 7.6 percent. This decline, which occurred despite benign financial conditions, contrasts with the resilience of investment in the region excluding China during the 2009 global recession, when investment continued growing. However, the investment contraction in 2020 was less severe than the one the region experienced in 1999, after the Asian financial crisis, when investment in the region excluding China fell by almost 10 percent. The contraction in 2020 was sharpest in Malaysia, Mongolia, and the Philippines, where GDP also declined the most. Outside China, the decline in investment in 2020 was smallest in Vietnam, where activity was supported by a large fiscal stimulus program and resilient FDI inflows.

Investment growth rebounded in much of the region in 2021, led by stimulus-fueled public investment. However, private investment remained subdued, reflecting weak business confidence. In the region excluding China, investment growth is expected to accelerate in 2022 and 2023 before returning to its 2011-21 trend rate as policy support is unwound. Public investment is expected to play a smaller role in the near term. After the substantial fiscal stimulus of 2020, governments in the region have become more focused on safeguarding fiscal sustainability and containing debt service costs. In China, investment is expected to resume its policy-guided deceleration once policy support begins to be withdrawn.

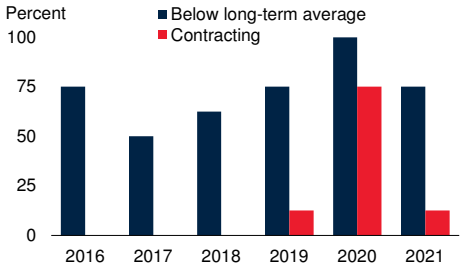
The growth of private investment will be limited by uncertainty about the post-pandemic economic landscape, the viability of existing production structures, and tightening financing conditions. In 2020, investment contracted in about four-fifths of EAP economies. Investment rebounded in about two-thirds of EAP countries in 2021, but investment growth remained below its long-term average in almost all these cases; and investment declined further in the remaining one-third of countries (figure 4.5). Medium-term (5-years-ahead) private sector forecasts suggest continued weakness in investment growth, while sizable investment needs remain.

Projected investment growth implies that the gap between investment and its long-term (2000-21) trend level will continue to grow. The prospect of weak investment growth in EAP in the medium term, after the severe contraction in 2020, raises concerns about the effects on EAP's potential output growth—the growth rate of output that can be

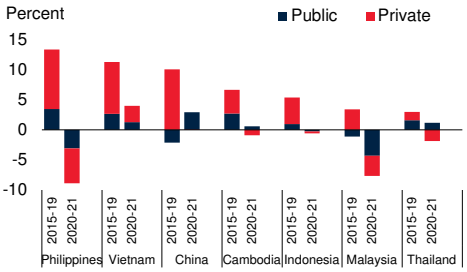
FIGURE 4.5 EAP: Investment growth slowdown and investment needs

In 2020, investment fell in about four-fifths of EAP economies. In 2021, investment rebounded in about two-thirds of countries as the region began to recover from the COVID-19-induced downturn, but fell further in one-third of countries. Medium-term private sector forecasts suggest continued weakness in investment growth in almost all EAP economies, despite sizable investment needs, especially in infrastructure.

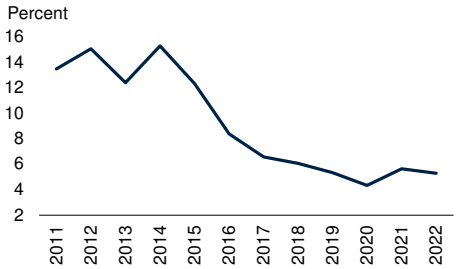
A. Share of countries with weak or negative investment growth



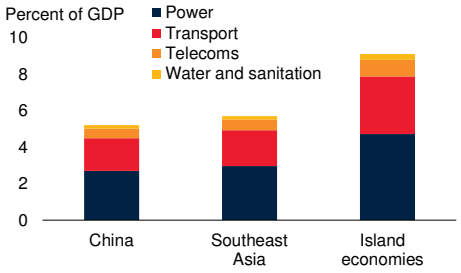
B. Contributions to investment growth



C. Five-year-ahead investment growth forecasts



D. Infrastructure investment needs



Sources: Asian Development Bank (2017); Bhattacharya (2012); China Economic and Industry Data Database; Consensus Economics; General Statistics Office of Vietnam; Haver Analytics; Inderst (2016); International Monetary Fund, Investment and Capital Stock database; Rozenberg and Fay (2019); World Bank.

A. Share of countries in EAP region with investment growth below the long-term (2000-19) average or negative investment growth ("contracting").

B. Weighted averages of gross fixed capital formation growth rates in the public and private sectors, respectively, in constant 2005 U.S. dollars. The sample includes nine EAP economies.

C. Five-year-ahead Consensus Economic forecasts made in the year denoted. Weighted average.

D. Climate-adjusted estimated infrastructure investment needs.

sustained at full employment and capacity utilization. The sustained weakening of investment growth in the 2010s, together with declining total factor productivity growth, has already contributed to a slowdown in labor productivity growth in EAP and, as a result, slowed EAP's convergence with per capita incomes in the advanced economies (Dieppe 2020).

Regional investment needs

Infrastructure. Income and demographic shifts, urbanization, and climate change are the main forces driving investment needs in the region (figure 4.6). Rapid urbanization, large-scale migration, and population aging place heavy strains on urban infrastructure.

In many East Asian countries, about one-third of the population lives in substandard housing. Meeting the growing demands of these trends while mitigating and adapting to climate change requires a balance to be struck between economic growth and environmental protection. Estimates of the costs of the needed investment vary widely (ADB 2017; ESCAP 2022; Hansen 2022; OECD 2019a), but it is clear that EAP countries need to invest more than 5 percent of their GDP over the next decade to meet the infrastructure needs of their growing economies (ADB 2017).

The largest costs would involve upgrades to power and transport infrastructure, investment in telecommunications, and real estate development. There are significant disparities across the region, including within countries, in the density and quality of transport networks, electricity provision, housing, water, and sanitation. The within-country gaps are largest in China, primarily because of its size; Indonesia; and the lower-income ASEAN economies (figure 4.5). But there are substantial needs for upgrading and maintenance of infrastructure in other EAP economies, including Malaysia, the Philippines, and Thailand.

Despite some remarkable successes, providing adequate transport networks, power and water supplies, and other utilities remains a challenge across much of the region. Extensive construction activities are underway, with transport, especially rail, accounting for the largest share. The primary goal of these efforts is better integration of the region's transport networks and support for urbanization.

China's highway network more than doubled in size between 2010 and 2021, and the share of high-speed railways was boosted from 33 to 50 percent of total railway kilometers. However, transport density in China still falls far short of that in advanced economies. Infrastructure needs vary considerably across Chinese regions and range from establishing new high-speed railways to installing basic municipal infrastructure and pollution-reducing (or pollution-reversing) technologies.

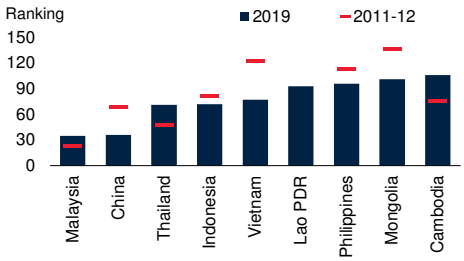
Lack of adequate infrastructure is the main cause of Indonesia's reduced but still high logistics costs (around 15 percent of companies' total expenditure), including high transport costs. Middle-income ASEAN countries, such as Malaysia and Thailand, are still investing heavily in rail and other public transport systems. In Malaysia, projects like the expansion of the public transport system in Kuala Lumpur, and airport and port upgrades, are expected to proceed through 2030 with a significant share of investment going toward renewable energy and green infrastructure. The Philippines ranks particularly low for transport and trade-related infrastructure. Although the Philippines rose two places in the World Economic Forum's 2022 global infrastructure ranking to 57th place, this remains the country's lowest-ranked competitiveness factor. By contrast, it ranks quite high on measures of health and education infrastructure and the quality of its seaports and airports. In Cambodia and Lao PDR, investment in basic road infrastructure is a priority.

Education and health care. The region has made great progress in human development outcomes, including child survival, nutrition, and education, but still faces serious human-resource shortfalls.

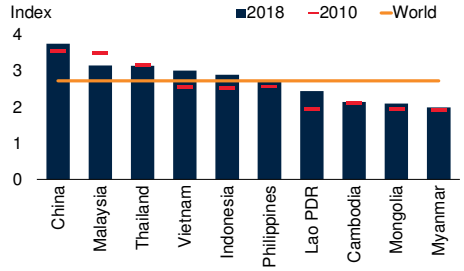
FIGURE 4.6 EAP: Infrastructure, environment, health, and education indicators

Despite significant progress, many EAP economies face challenges providing adequate transport networks, power and water supplies, and other utilities. At the same time, the region is confronted with environmental problems that threaten to undermine economic growth and regional stability. Many EAP economies have made great progress toward education and human development goals, including for child survival, nutrition, and education, but some still face significant education and other human-resource shortfalls.

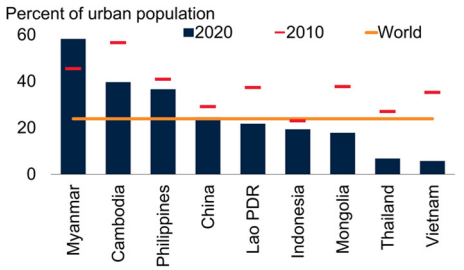
A. Ranking of overall infrastructure



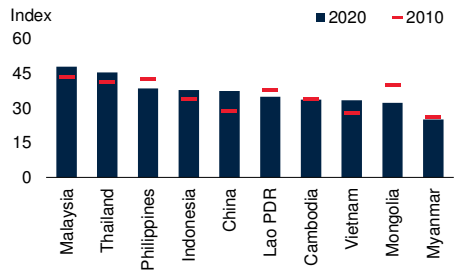
B. Quality of trade and transport-related infrastructure



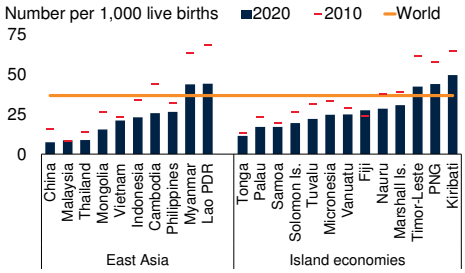
C. Share of urban population living in slums



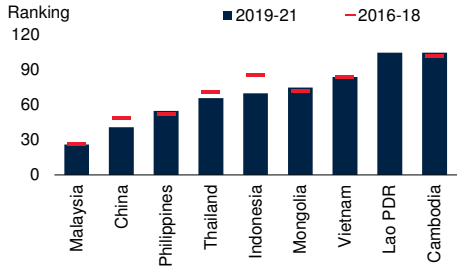
D. Environmental performance



E. Under-5 mortality rate



F. Ranking of capacity to retain or attract talent



Sources: Lanvin and Monteiro (2021); World Economic Forum; Wolf et al. (2022); World Bank, World Development Indicators database.
A. World Economic Forum ranking of 140 countries according to the quality of their infrastructure. 1= best, 140 = worst.
B. Logistic Performance Index Surveys conducted by World Bank and Finland's Turku School of Economics. 1 = extremely underdeveloped by international standards; 7 = well developed and efficient by international standards.
D. The Environmental Performance Index is constructed by calculating and aggregating 20 indicators that reflect national-level environmental data, including child mortality, wastewater treatment, access to drinking water, access to sanitation, and air pollution (average exposure to PM2.5). These indicators use a "proximity-to-target" methodology, which assesses how close a particular country is to an identified policy target. Scores are then converted to a scale of 0 to 100, with 0 being the farthest from the target (worst observed value) and 100 being closest to the target (best observed value).
E. Probability of dying between birth and five years of age, per 1,000 live birth. Latest data are for 2020.PNG = Papua New Guinea.
F. Ranking of Global Talent Competitiveness Index conducted by Lanvin and Monteiro (2021). 1 = best, 134 = worst.

- *Health care.* EMDEs in EAP reduced child mortality rates by an average of one-fourth between 2010 and 2020. However, child mortality rates in Kiribati, Lao PDR, Myanmar, Papua New Guinea, and Timor-Leste are still well above global averages. The region has historically faced a high incidence of infectious diseases, some of which have spread globally (for example, SARS, pandemic influenza, and COVID-19; Lee and Pang 2015). Rates of non-communicable diseases are expected to rise, and infectious diseases are expected to remain a risk associated with high population mobility and environmental degradation (Anbumozhi and Intal 2015). Adjusting to these trends will require public investment in basic infrastructure, education, health, and environmental protection.

- *Education.* Although enrollment in primary education in the region is almost universal, there are deficiencies in student retention (Cambodia, Lao PDR, Myanmar), quality of education (Cambodia, Lao PDR, Malaysia, Thailand, Vietnam), and literacy rates (Cambodia, Lao PDR, Papua New Guinea, Timor-Leste). Extended school closures during the pandemic led to substantial further learning losses, especially for the poor (chapter 2).

Environmental challenges. Many countries in the region face environmental problems that threaten to undermine not only economic growth and stability but living standards, lives, and livelihoods. The main challenges include water management, deforestation and land degradation, air pollution, and climate change. According to the Verisk Maplecroft Global Risk Analytics Dataset, which ranks the world's 576 largest urban centers on their exposure to a range of environmental and climate-related threats, 99 of the world's 100 riskiest cities are in Asia, including 37 in China, where air and water pollution presents a growing health risk. The worst-performing city in the ranking, Jakarta, also suffers from severe air pollution, but added to this are perennial threats from seismic activity and flooding. These have prompted the government of Indonesia to initiate relocating the capital.

Regional policy priorities

Improve spending efficiency. In the wake of the COVID-19 pandemic, EAP countries have been struggling to reconcile spending on relief, recovery, and growth with shrinking fiscal space. With economic recoveries now underway, fiscal policy support could be better targeted (World Bank 2021a). More efficient and better targeted support for households and firms, rather than universal transfers and price regulations, would create space for investment in infrastructure for trade, energy, and technology diffusion (World Bank 2022c). When curtailing spending or raising taxes is difficult in the short term, countries can commit to future fiscal restraint and efficiency-enhancing reforms. Committing to fiscal rules and future revenue and expenditure reforms would help reconcile future spending needs with tightening budget constraints amid growing debt. Countries could also improve public investment management, which is key for increasing social rates of return. In the longer term, additional domestic tax revenues could help create space for needed public investment. Efforts to remove exemptions,

improve tax administration capacity, and broaden tax bases could help generate budgetary resources. For example, new tax reform legislation in Indonesia is expected to raise revenue by 1.2 percent of GDP per year in the medium term.

Private sector participation can help improve efficiency, and at the same time provide funding. Developing countries in Asia with relatively low-income levels face major challenges in implementing public-private partnerships (Cambodia, Myanmar), especially in the context of infrastructure development. Among these challenges are governance issues, institutional structure and capacity constraints, weak public-private partnership laws and policies, and weak country and sovereign risk ratings. Several reforms could help realize the potential benefits of public-private partnerships. Governments could centralize agencies that coordinate national infrastructure, in cooperation with the private sector and multilateral agencies. Multilateral development banks could work with the private sector to provide quality and governance assurances. A global "code of conduct" with a clear set of standards for businesses covering a regulatory framework, transparency principles, and a system for dispute resolution could enhance confidence in the private sector as a good partner.

Encourage private investment. Confidence in the business environment is central to encouraging private investment (World Bank 2017). Measures to improve the environment could include cutting red tape where there are unnecessary regulations, clarifying laws and regulations, allowing greater market access to foreign companies, opening more investment areas to private enterprise (especially in services sectors), and cutting financing costs. Reforms to deepen capital markets and strengthen banking systems (for example, through faster and more effective insolvency procedures) can encourage private financing. (IMF country rankings for financial development in the region range widely, from 14th for Thailand to 170th for Solomon Islands.) Such reforms could be complemented by measures and assistance to encourage diffusion of technology. Increased domestic and international competition could strengthen incentives for productivity-enhancing technological innovation, which could also be promoted by improved access to finance and digital infrastructure. Eliminating domestic distortions, such as fossil fuel subsidies and local content requirements, could encourage investment in, and the adoption of, green technologies.

Focus on developing skills that are in demand in labor markets. Primary and secondary education must focus on education quality and on learning outcomes, and on building effective and accountable educational systems. Higher education, vocational education, and job training can become more effective if institutions are given the right incentives to meet labor market demand. Efforts to help match job openings and the skills of prospective workers will also pay dividends, as will investments in "EdTech" (World Bank 2021b). The substantial learning losses resulting from the extended school closures during the pandemic must be reversed to prevent lasting damage to student progression, human capital formation, and opportunities for productive work (chapter 2).

Health: focus on preventative care. In health, additional investment should favor less costly preventative care rather than hospital care. However, this will entail reforms to insurance regimes.

Address environmental challenges. Instruments in this area that can be used by policy makers include: phasing out fossil fuel and energy subsidies; aligning carbon prices with environmental policy goals, including emissions targets; raising public investment in low-carbon innovation and infrastructure; and undertaking low-carbon policy reforms in key sectors, such as energy, transport, agriculture, land use, and urban planning. Fuel subsidies have recently been increased in most countries as a temporary crisis measure aimed at moderating increases in fuel prices. This runs counter to the efforts in major EAP countries in the last few years to reduce fuel subsidies (China, Indonesia). Production of fossil fuels such as coal is also being revived. These actions should not be allowed to compromise the achievement of emission reduction commitments or perpetuate dependence on imported fossil fuels and the region's vulnerability to future energy price shocks.

The costs associated with moving toward a low-carbon economy need to be equitably distributed. The revenue generated by carbon pricing, for example, can be fed back into the economy to help subsidize abatement costs, alleviate negative social impacts, or cut taxes (World Bank 2021a). To garner support for a low carbon economy, policy makers must emphasize its widespread benefits. And they must adopt a holistic approach to support implementation. They need to encourage stakeholder participation; commit to scientific and technological research; emphasize long-term planning; implement reforms to align resource and utility pricing with costs, including externalities; improve governance and general institutional capacity; and strengthen regionally coordinated approaches and international support.

Investment growth in EAP is unlikely to revert to the high rates of the first decade of the 2000s, given the structural slowdown in China. But investment needs in the region remain substantial, and governments and multilateral agencies will remain important providers of funding. Such funding should be directed toward projects with the highest social returns. Close coordination of local, regional, and global initiatives will be needed to help reduce duplication and inconsistencies in public investment projects.

EUROPE and CENTRAL ASIA

Investment growth in Europe and Central Asia (ECA) weakened from an average annual rate of 7.3 percent in 2000-10 to 3.1 percent a year in 2011-21. The slowdown resulted from overlapping crises and structural headwinds. Current and prospective investment needs are sizable across ECA. They are within reach in the European Union (EU) member states, while Ukraine's reconstruction challenges will be enormous. More broadly, increased investment is needed to support the green and digital transitions, improve social protection, foster private sector development, and close the gaps in living standards between ECA and the EU.

Introduction

Europe and Central Asia (ECA) accounted for less than 10 percent of EMDE investment in 2011-21—down from 12.2 percent in 2000-10 (figure 4.7.A-D).[3] The decline in ECA's share of EMDE investment reflected a steep fall in investment growth in the region, from an average annual rate of 7.3 percent in 2000-10 to 3.1 percent over 2011-21. Compared with 2000-10, average annual investment growth during 2011-21 was more than 6 percentage points lower in almost half of ECA's economies.[4]

The slowdown in investment growth over the past two decades reflects several adverse shocks, including the global financial crisis of 2007-08, the Russian Federation's domestic financial crisis of 2008-09, the European debt crisis of 2009-11, conflicts in Eastern Europe, the 2014-16 oil price plunge for ECA's energy exporters, the COVID-19 pandemic, and intense financial pressures in Türkiye—the region's second largest economy after Russia. In addition, structural pressures weighed on ECA investment, including those related to maturing global value chains and stalled economic reform progress in some countries.

ECA investment fell in 2019—mostly on account of a decline in Türkiye amid weak investor sentiment and high policy uncertainty. There was a further contraction of 1.4 percent in ECA investment in 2020 with the onset of the COVID-19 pandemic.

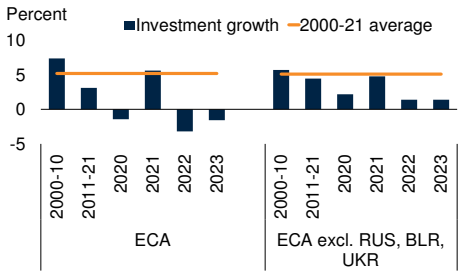
[3] Throughout this section, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). For the sake of brevity, "investment" is understood to indicate investment levels. Investment growth is measured as the annual percent change in real investment.

[4] Data available for the following ECA economies: Albania, Armenia, Bulgaria, Belarus, Georgia, Hungary, North Macedonia, Moldova, Poland, Romania, Russian Federation, Türkiye, and Ukraine.

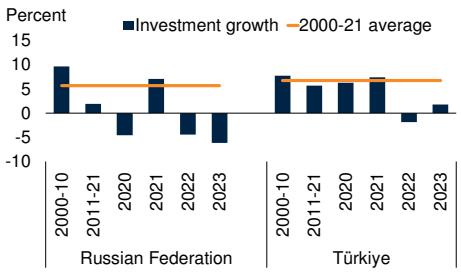
FIGURE 4.7 ECA: Investment growth and needs

ECA suffered a sharp output and investment growth slowdown in 2011-21, owing to several adverse shocks and structural changes. The recovery in 2021 that followed the pandemic-induced collapse in 2020 was short-lived because of Russia's invasion of Ukraine. Investment needs are sizable in ECA, especially those for reconstruction in Ukraine.

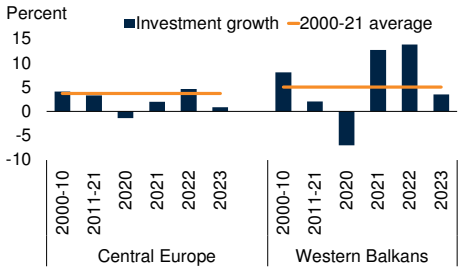
A. Investment growth in ECA



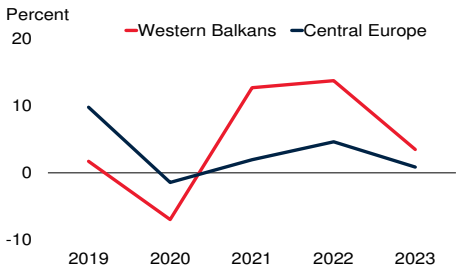
B. Investment growth in the Russian Federation and Türkiye



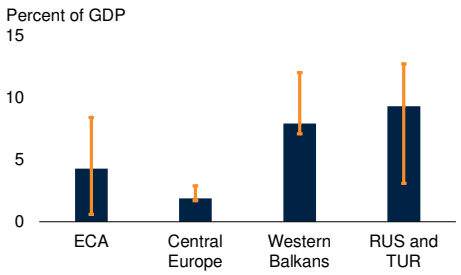
C. Investment growth in Central Europe and the Western Balkans



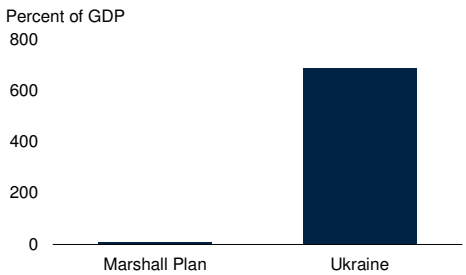
D. Investment growth in Central Europe and the Western Balkans



E. Estimated annual infrastructure investment to halve gap with euro area by 2030



F. Estimated reconstruction costs in Ukraine versus post-WWII Marshall Plan for Europe



Sources: Board of Governors of the Federal Reserve; European Investment Bank; Global Infrastructure Hub; International Monetary Fund; Kyiv School of Economics; Three Seas Initiative; Ukraine Government; U.S. Bureau of Economic Analysis; World Bank.

Note: BLR = Belarus; CE = Central Europe; RUS = Russian Federation; TUR = Türkiye; UKR = Ukraine; WBK = Western Balkans. 2023 indicates forecast.

A.C.D. Sample includes 13 ECA countries (A), 2 Western Balkan and 4 Central European economies (C, D).

E. Estimates of infrastructure investment needed to halve the infrastructure gap with the euro area by 2030. Estimates for ECA are from Global Infrastructure Hub, IMF (2020), Rozenberg and Fay (2019), and the Three Seas Initiative. Central Europe, the Western Balkans, and Russia and Türkiye are as estimated by IMF (2020). Bars show median, and orange whiskers show minimum and maximum range.

F. Reconstruction costs are converted into real 2015 U.S. dollars using the U.S. Bureau of Economic Analysis GDP deflator series. Ukraine costs are based on July 2022 estimates by the European Investment Bank, Kyiv School of Economics, and Ukraine Government. Under the Marshall Plan, the U.S. provided about $13.3 billion in aid, or close to $1.1 trillion in real 2015 U.S. dollars, with 16 economies signing up for assistance.

Investment rebounded by 5.6 percent in 2021, but Russia's invasion of Ukraine in February 2022 reversed the recovery. Investment in ECA is estimated to have shrunk by 3.2 percent in 2022, and is forecast to contract 1.6 percent in 2023—the sharpest fall projected for any EMDE region in 2023. In contrast to 2020, when the contraction in investment was widespread across ECA, most of the fall in 2022 is accounted for by Ukraine, Russia, and Belarus, reflecting the war and the impact of international sanctions. Excluding Ukraine, Belarus, and Russia, investment growth in ECA is projected to recover to 1.4 percent in both 2022 and 2023.

Current and prospective investment needs are sizable across ECA—to support the green and digital transitions, improve social protection, foster private sector development, and to close ECA's gaps with the European Union (EU) in living standards, although these gaps vary widely across ECA (figure 4.7.E). Over the remainder of this decade, the EU plans to step up lending and grants to Central Europe and the Western Balkans, partly meeting investment needs in these sub-regions. Eventually, Ukraine's immense reconstruction needs will require funding, including from the international donor community (figure 4.7.F). In contrast, the ability to narrow investment gaps in Belarus and Russia is currently curbed by the international sanctions imposed in response to the invasion of Ukraine, leaving both economies with limited external financing options. The invasion will also make filling sizable investment needs more difficult in neighboring ECA economies. In the economies of the South Caucasus and Central Asia, which are closely linked to Russia, weaker economic growth in Russia will likely dent investment prospects, including through reduced inflows of foreign direct investment (FDI).

Across ECA's economies, recent headwinds—including pandemic-related increases in government debt, negative spillovers from Russia's invasion of Ukraine, and tightening global and domestic financing conditions, as well as lingering structural issues, mean that efforts to strengthen the growth of investment, public or private, faces severe challenges. Reforms are needed to confront the shocks from the pandemic and the invasion, to address long-standing structural challenges, and to set the stage for sustained recovery.

Evolution of regional investment

In 2011-21, ECA experienced the second sharpest slowdown in investment growth, relative to the preceding decade, among EMDE regions. Investment growth fell from an average annual rate of 7.3 percent in 2000-10 to 3.1 percent a year in 2011-21, with the pace of growth in the second decade weaker in most ECA economies. Weakening investment growth in large part reflected the effects of several adverse shocks, including the global financial crisis (2007-08), Russia's domestic financial crisis (2008-09), spillovers from the European debt crisis (2009-11), Russia's annexation of Crimea in 2014 and associated sanctions, the 2014-16 oil price plunge, the COVID-19 pandemic, and financial stress in Türkiye. As a result, investment had not recovered to the levels observed prior to the global financial crisis in 90 percent of the ECA sample by 2019. Related to the weakening of investment growth, net FDI inflows fell from nearly 5.5 percent of GDP in 2007 to 1.8 percent of GDP in 2018-19.

In the aftermath of the European debt crisis of 2009-11, there was a significant weakening of prospects for economic growth in the EU, ECA's largest trading partner.[5] The associated weakening of prospective growth in demand for ECA's exports and in financial flows from the EU to ECA reduced prospective returns on investment in ECA and increased financing costs. As ECA countries rely heavily on financial flows from the EU (including for FDI), there were significant negative spillovers from deteriorating EU growth prospects to ECA investment (figure 4.8.A).[6] Just as investment growth was starting to firm after 2016, the external environment deteriorated again, as a spike in policy uncertainty around the United Kingdom's exit from the EU weighed on trade growth and investor confidence in Europe. An escalation in trade tensions between the United States and China also dampened ECA's trade and investment prospects, as several economies in the region are deeply integrated into global markets and trade, especially supply chains for automobiles.

For most of the decade preceding the pandemic, declines in private investment persisted following the global financial crisis as ECA economies experienced multiple adverse shocks in quick succession. Investment financing became difficult to obtain from domestic banking sectors that were still healing from the crises and earlier credit booms. Even by 2019, private investment had not recovered to 2008 levels in six ECA economies (Albania, Armenia, Belarus, Bulgaria, Ukraine, and Romania).[7] The recoveries in Central Europe and the Western Balkans were weak between 2011 and 2016, in the aftermath of the European debt crisis, reflecting disrupted financial intermediation and impaired banking systems and corporate sectors, with sharp increases in non-performing loan ratios (Bykova and Pindyuk 2019). Large foreign currency-denominated debt amplified the damage to the banking sector (EBRD 2015). Following several years of rapid credit growth, Türkiye faced severe financial market pressures in 2018-19, prompting banking and corporate sector deleveraging, a deterioration in consumer and business confidence, and heightened policy uncertainty. As a result, private investment in Türkiye contracted in 2018 and 2019, the two years prior to the pandemic.

Long-term consensus forecasts of private investment growth in Eastern Europe, the South Caucasus, and Central Asia also declined in the years leading up to the pandemic amid escalating geopolitical tensions and armed conflict (Eastern Europe, the South Caucasus), and sharp terms of trade shocks from falling commodity prices (Central Asia, Eastern Europe, the South Caucasus; figures 4.8.B and C). In the region's energy exporters, private investment weakened alongside the sharp fall in oil prices in 2014-16. A steep rise in geopolitical tensions following Russia's annexation of Crimea in 2014

[5] Ten-year-ahead GDP growth forecasts for the EU produced by Consensus Economics fell from 1.9 percent in 2007 to 1.2 percent in 2019.

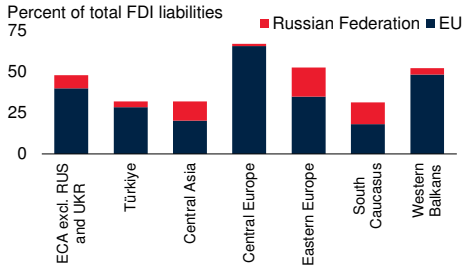
[6] Data available for the following ECA economies: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Moldova, Montenegro, North Macedonia, Poland, Romania, Russian Federation, Serbia, Tajikistan, Türkiye, and Ukraine.

[7] For five other ECA economies—Bosnia and Herzegovina, Hungary, Montenegro, Russia, and Serbia—private investment reached 2008 levels between 2016 and 2018.

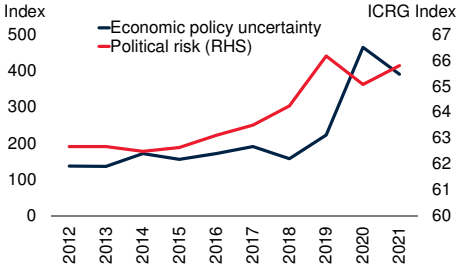
FIGURE 4.8 ECA: Investment prospects

Russia's invasion of Ukraine has reversed the 2021 investment recovery in ECA and exacerbated the economic slowdown in the EU, ECA's largest trading partner. Long-standing structural issues, including stalled improvements in governance, are also weighing on investment.

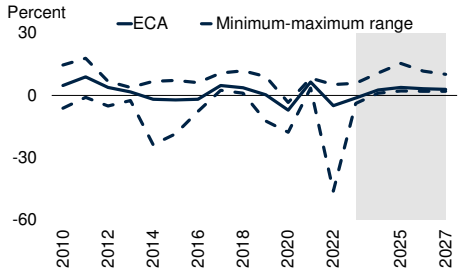
A. Foreign direct investment liabilities, by source, 2019-20



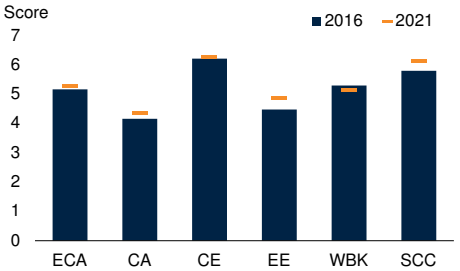
B. Political risk in 15 ECA countries and policy uncertainty in Russia and Poland



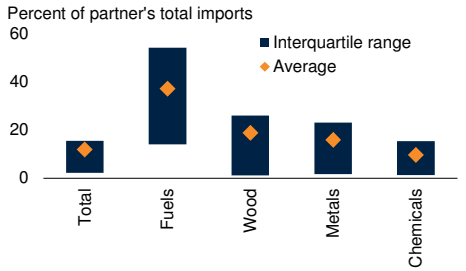
C. Investment growth, 2010—21, and 2022 forecasts for 2022-27



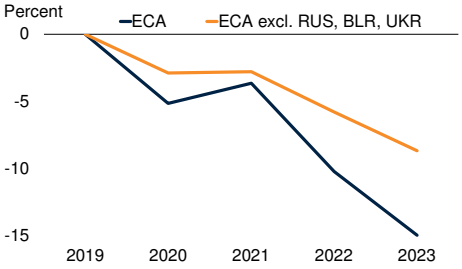
D. 'Well-governed transition' indicator (EBRD assessment)



E. ECA countries' dependence on imports from Russia



F. Deviation of investment from pre-pandemic projections



Sources: Baker, Bloom, and Davis (2016); Consensus Economics; EBRD; Haver Analytics; International Country Risk Guide (ICRG); International Monetary Fund; national sources; Winkler, Wuester, and Knight (2022); World Bank.

Note: BLR = Belarus; CA = Central Asia; CE = Central Europe; EE = Eastern Europe; FDI = foreign direct investment; ICRG = International Country Risk Guide; RUS = Russian Federation; SCC = South Caucasus; UKR = Ukraine; WBK = Western Balkans.

A. Unweighted 2019-20 averages.

B. Unweighted averages. Higher values indicate greater political stability risk and/or economic policy uncertainty. Political stability risk includes 15 ECA economies, as measured by ICRG. Economic policy uncertainty for ECA is an average of Russian Federation and Poland, as measured by national sources and Baker, Bloom, and Davis (2016).

C. Long-term investment prospects refer to 6- to 10-year-ahead forecasts, as in the latest *Consensus Economics* survey. Data prior to 2022 reflects actual investment growth. Shaded areas based on January 2023 survey. Sample includes 7 ECA countries. Solid line uses 2019 real U.S. GDP weights. Dashed line shows the minimum and maximum range.

D. EBRD's "well-governed transition" indicator, measures the quality of institutions and the processes that they support. Scores range from 1 to 10, where 10 represents a synthetic frontier corresponding to the standards of a sustainable market economy.

F. Lines show the percent deviation between the latest projections and forecasts released in the January 2020 edition of the *Global Economic Prospects* report (World Bank 2020c). For 2023, the January 2020 baseline is extended using projected growth for 2022.

also triggered a decline in investor confidence, with private investment in Eastern Europe experiencing double-digit percentage contractions in both 2014 and 2015. The oil price plunge, combined with international sanctions that heavily restricted access to external finance in Russia, caused private investment in Russia to shrink in 2014-15. FDI inflows to Russia fell by more than three-quarters immediately following the imposition of international sanctions in 2014, and remained nearly 45 percent lower in subsequent years (UNCTAD 2022). Throughout the remainder of the decade, investment growth in Russia was tepid, reflecting subdued extractive investment, steep capital outflows, and persistent FDI losses. As a result, private investment in 2019 was lower than in 2014. Neighboring countries suffered from spillover effects, including weaker trade, remittances, and FDI.

Public investment, accounting for about a quarter of total investment in ECA, was also constrained prior to the pandemic, as many governments faced falls in commodity revenues amid the sustained decline in commodity prices over 2011-16. Over the decade, significant fiscal consolidations were implemented in most ECA countries, with structural deficits narrowing or turning into surpluses in about two-thirds of the ECA economies with data. In the region's energy exporters, fiscal adjustment needs grew in the second half of the decade. To ensure fiscal sustainability, spending had to be realigned with lower revenues. The need for fiscal consolidation, in the wake of the European debt crisis, added to the woes of ECA's EU members (Central Europe) and candidate partners (Western Balkans). In Central Europe, fiscal consolidation over the 2010s proceeded gradually in Poland—ECA's third largest economy—and eased somewhat in the other economies in the second half of the decade, especially in Romania. The absorption of sizable EU structural funds in the second half of the decade helped to ease fiscal constraints and bolster public investment.

Structural factors also played a role in the slowdown of investment growth in 2011-21. Weak governance and shortcomings in the transition to market-based economies presented challenges to effectively implementing public investment, strengthening spending efficiency, and supporting private investment growth (figure 4.8.D). ECA's investment growth weakened alongside stalling progress with reforms and a weakening of other drivers of economic growth. After a reform boost from the EU-accession process, governance reform efforts slowed in many of the new member states in Central Europe, while reform progress sputtered in some candidate economies in the Western Balkans. In some ECA countries, reform progress backtracked, weakening the business environment. In some cases, pervasive corruption and large informal sectors continue to be formidable constraints on the ability of private firms to invest, innovate, and close the productivity gap with the EU. Deterioration of the business environment, combined with shortcomings in the transition to market-based economies and weaker governance, are all likely to have contributed to slowing investment growth. Structural change at the global level also likely played a role, as global value chains—a major driver of productivity-enhancing investment and technology transfer—appeared to mature (Lakatos and Ohnsorge 2017).

Following a decade of weak growth, ECA investment fell by 1.4 percent in 2020, the first year of the COVID-19 pandemic. Of the five EMDE regions where investment declined in 2020—it continued to grow in East Asia and the Pacific—ECA experienced the shallowest contraction, partly thanks to large fiscal support packages, with buoyant public investment offsetting sharp falls in private investment. It also reflected positive output and investment growth in Türkiye, as financial pressures abated somewhat from 2018-19. For many ECA economies, however, investment plunged in 2020 amid substantial portfolio outflows, with private investment falling by double-digit percentages in some economies in the Western Balkans and South Caucasus. FDI inflows collapsed more severely in ECA than in other EMDE regions in 2020, falling to a near 20-year low as large energy exporters, especially Russia, grappled with declines in extractive investment (UNCTAD 2021).

Following the pandemic-induced recession in 2020, ECA investment grew by 5.6 percent in 2021—slightly stronger than the 2000-21 average growth rate of 5.2 percent and strong enough to bring investment in the year to within 4 percent of its pre-pandemic projection. This improvement was not region-wide, however, amid rising borrowing costs and elevated political tensions and policy uncertainty, with investment contracting in 2021 in Bulgaria, Belarus, Georgia, Kyrgyz Republic, and Montenegro (World Bank 2022d). As a result, investment in 2021 was at least 10 percent below pre-pandemic projections in some economies in Central Europe, Eastern Europe, the South Caucasus, and Western Balkans.

Russia's invasion of Ukraine in February 2022 halted the economic recovery. The ensuing war has had far-reaching consequences for investment in ECA and regional supply chains, given many countries' economic linkages with Russia and Ukraine (figure 4.8.E). The invasion has caused a fresh plunge in investor confidence, as well as capital outflows, tighter financing conditions, higher inflation, and currency depreciations. The war has also dampened regional trade and investment by weighing on external demand from the euro area, as well as Russia. FDI inflows, which recovered to some extent in 2021 in many ECA economies, have become more muted and are likely to remain so (UNCTAD 2022). Although FDI inflows are largely from the EU, some countries in the South Caucasus, Eastern Europe, and Central Asia have relied heavily on Russia as a financing source.[8]

Investment has thus been hit by Russia's invasion of Ukraine through multiple channels. Regional value chains have been interrupted, as many ECA economies depend heavily on both Russia and Ukraine for imports of key commodities and intermediate goods (Winkler, Wuester, and Knight 2022). The war has also pushed up inflation, prompting policy rate hikes in advanced economies and in most of ECA's economies and driving global and domestic borrowing costs higher. Moreover, limited fiscal space, which was narrowed by policies to support activity during the pandemic and the resulting increases

[8] Russia accounts for about one-third of FDI inflows in Armenia and Belarus and about one-fifth of FDI inflows in the Kyrgyz Republic and Moldova.

in government debt, has made it more difficult to take countercyclical policy action and maintain public investment plans.

As a result of the invasion and associated sanctions, investment in ECA is estimated to have contracted by 3.2 percent in 2022 and projected to continue shrinking at 1.6 percent in 2023. While the contraction in 2022 was only about one-fifth as steep as during the global financial crisis, it was far steeper than the pandemic-induced contraction of 2020. Unlike 2020, when the fall in investment was region-wide, most of the contraction in 2022 is accounted for by Ukraine, Belarus, and Russia. Investment growth in ECA excluding these three countries is estimated to have remained positive in 2022, at 1.4 percent, and is projected to remain at that pace in 2023. In 2023, investment is projected to be nearly 15 percent below pre-pandemic projections in ECA and nearly 9 percent below these projections in ECA excluding Ukraine, Belarus, and Russia (figure 4.8.F). Regional investment is expected to pick up beyond 2023, owing to reconstruction efforts in Türkiye following two devastating earthquakes in February 2023.

Regional investment needs

Even before the COVID-19 pandemic, Russia's invasion of Ukraine, and earthquakes in Türkiye, meeting ECA's sizable investment needs was expected to be a challenge, as prospects for investment growth trailed other EMDE regions amid heightened policy uncertainty and elevated geopolitical tensions. Public and private debt issuance in ECA also slowed from 2012-13 peaks in the decade prior to the pandemic, despite wide investment gaps (figure 4.9.A).

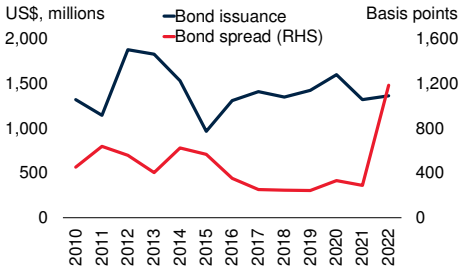
The pandemic, as a well as the war, is likely to have widened investment gaps in ECA by further eroding medium- to long-term investment prospects. The gap in investment in Central Europe—which generally has lower investment needs than the rest of ECA—was estimated in 2020 to have widened from about 4 percent of GDP in 2019 to 6 percent of GDP in 2020-21, excluding needs related to the green and digital transitions (European Commission 2020a). In Russia and Belarus—which are under international sanctions related to the invasion of Ukraine—investment in 2022 is estimated to be at least 10 percent below pre-pandemic projections and, in Russia, widen to nearly 18 percent in 2023 (World Bank 2022d). Assuming that international sanctions remain, investment gaps in these countries are likely to remain wide, with investment increasingly relying on the public sector.

In Türkiye, earthquakes in early February 2023 have affected about 13.5 million people—or over 15 percent of Türkiye's 2021 population—with natural gas and electricity cut off in many areas and hundreds of buildings destroyed based on early needs assessments. Natural disaster experience from other ECA countries suggest the economic cost and investment needs could become sizable for Türkiye. In Croatia, the two earthquakes in 2020 (which, although devastating, were smaller in magnitude and resulted in less than 10 deaths in sharp contrast to Türkiye) incurred economic losses of 8.7 percent of 2019 GDP.

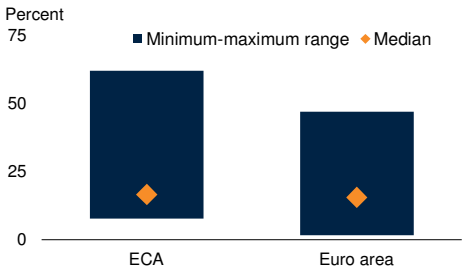
FIGURE 4.9 ECA: Financing needs and constraints

Tighter financing conditions could weigh on debt issuance in ECA. In many ECA economies, public investment dividends are held back by inefficiencies in public spending and weak absorption capacity, which could stall per capita income catch-up with the EU. Incomplete reforms to state-owned enterprises, a growing state footprint, and weak rule of law weigh on private investment.

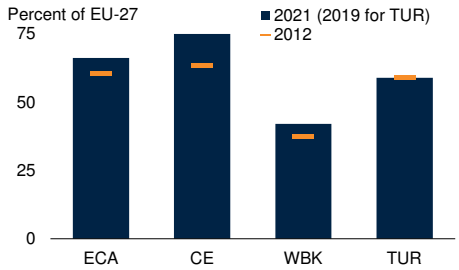
A. Bond issuance and yield spreads



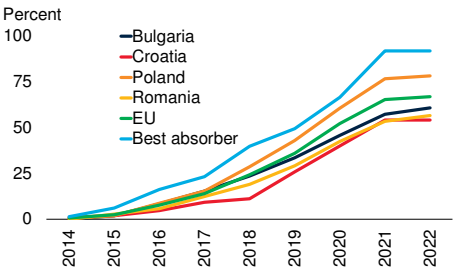
B. Efficiency gaps in public infrastructure investment



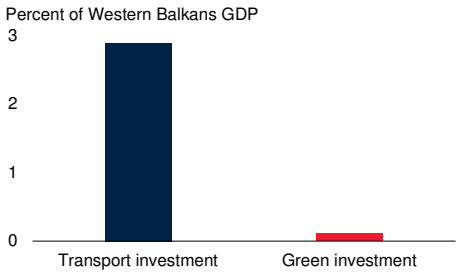
C. GDP per capita relative to EU-27



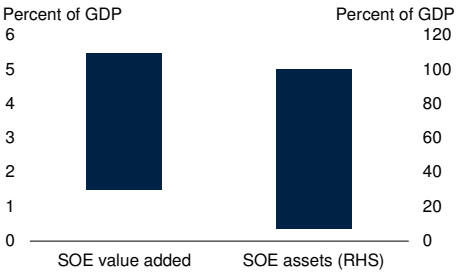
D. Cumulative absorption rates, 2014-20 EU spending program



E. Planned EU investments in transport and green projects in the Western Balkans



F. State-owned enterprise activity and assets, 2014-16



Sources: Bartlett, Bonomi, and Uvalic (2022); Dealogic; European Bank for Reconstruction and Development (2020); Eurostat; IMF (2021s); World Bank.

Note: CE = Central Europe; SOE = state-owned enterprise; TUR = Türkiye; WBK = Western Balkans.

A. Unweighted average for an unbalanced sample of 16 ECA economies for bond issuance and 11 ECA economies for bond spread.

B. Efficiency gap is the percent difference between a country's spending efficiency and that of the best performers. Higher values indicate greater inefficiency. Infrastructure spending efficiency is calculated using the volume and quality of infrastructure as the output and public capital stock and GDP per capita as the input, as estimated in IMF (2021a). Orange diamonds indicate medians, and bars show the minimum-maximum range. Sample size includes 15 ECA and 16 euro area economies.

C. GDP per capita at current market prices in percent of EU-27 total per capita (based on purchasing power standards). Aggregates calculated using real U.S. dollar GDP at average 2010-19 prices and market exchange rates. Sample size includes 8 ECA economies.

D. Absorption rates of EU funds reflect the total net payments divided by planned EU spending for the 2014-20 EU spending program. "Best absorber" indicates the EU-27 country that achieved the highest absorption rate of EU funds.

E. Investments in transport and green projects in percent of Western Balkans GDP.

Infrastructure. ECA's infrastructure gaps with the euro area remain large, including in relation to roads, railways, air transport, power generation capacity, internet, and fixed and mobile telephone density. Closing half of these gaps by 2030 would require infrastructure investment of between 3.0 and 8.5 percent of GDP a year (IMF 2020).[9] Infrastructure investment to meet the Sustainable Development Goals and limit climate change to 2°C would cost, on average, 4.2 percent of GDP a year in ECA (Rozenberg and Fay 2019).

Such estimates for ECA as a whole mask considerable variation across subregions. In the Western Balkans and Eastern Europe excluding Ukraine, halving infrastructure gaps with the euro area by 2030 could cost 7-12 percent of GDP per year—4-9 percent of GDP per year more than current investment levels (IMF 2020). In contrast, in Central Europe, the investment needed to close half the gap is 3 percent of GDP a year or less, given the larger initial infrastructure stock (IMF 2020).

ECA's sizable investment gaps are related partly to shortcomings in the efficiency of public infrastructure investment relative to EU peers (figure 4.9.B). In Bulgaria, for instance, the same public investment outcomes could have been achieved with considerably less investment spending (less by about 2 percent of GDP) if the efficiency of public investment and quality of infrastructure were closer to peers (IMF 2022a).

Education. Although average years of education in ECA are among the highest of the EMDE regions, there is significant scope for increased investment, beyond gross fixed investment, to improve basic and tertiary education in ways that would raise labor productivity (World Bank 2020b). The OECD's PISA scores and learning-adjusted years of schooling suggest that the subregions and countries where improvements in the quality of basic education are needed most are Central Asia (Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan); the South Caucasus (Azerbaijan and Georgia); the Western Balkans (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, and North Macedonia); Moldova; and, in Eastern Europe, Bulgaria and Romania. The latter two are among the EU countries that invest the least in education, including public expenditures on teachers and training, education infrastructure, digital learning, and equity and inclusion. Early childhood education is also important. On average, children who attend preschool stay in school nearly a year longer and are more likely to eventually be employed in high-skill jobs. High-quality interventions in the early years have a high benefit-cost ratio and can deliver annual returns of about 13 percent on investment (García et al. 2016).

In some economies in ECA, particularly in Central Asia, inadequate investment in human capital has left parts of the workforce poorly equipped for rapid technological change (Flabbi and Gatti 2018). Low educational attainment among the workforce and

[9] Estimate for total investment rather than additional investment needed over current investment. Sample includes ECA countries classified as EMDE or advanced economy: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Moldova, Montenegro, North Macedonia, Poland, Romania, Russia, Serbia, the Slovak Republic, Slovenia, Türkiye, and Ukraine.

inadequate skills have often been cited as constraints on doing business, job creation, and innovation in ECA (Brancatelli, Marguerie, and Brodmann 2020; World Bank 2019a). An aging workforce, a declining working-age population share, and high emigration rates among young and skilled workers in ECA highlight the need for education, training, and retraining to help workers adapt to new job requirements and technologies (Aiyar, Ebeke, and Shao 2016; Hallward-Driemeier and Nayyar 2018). Access to retraining programs, particularly for workers in sectors that have been hit the hardest—whether due to the pandemic or automation—can play an important role in facilitating their re-employment.

The COVID-19 pandemic underscored the critical need for investment in digital skills and technology to ensure educational continuity, as well as for resources to upgrade information and communications technology infrastructure to support virtual learning, particularly for more vulnerable households. Digital approaches to remote learning that were developed during the pandemic can be leveraged to broaden access to affordable education across EMDEs, including in ECA (Li and Lalani 2020). There is wide divergence in internet access, with some EU members having rates similar to those in euro area countries, while Central Asia lags even the EMDE average.

Digitalization. Investment in accelerating the digital transformation could support faster growth of productivity and output in ECA, while also strengthening economic resilience in times of crisis (Hallward-Driemeir et al. 2020; ITU 2020). During the pandemic, over 50 percent of small and medium-sized enterprises (SMEs) surveyed by the OECD increased the use of digital tools to ensure business continuity in the wake of reduced mobility (OECD 2021a). Preliminary evidence also suggests that innovation and digitalization may have helped promote firm survival (Muzi et al. 2021).

Although ECA fares well relative to other EMDE regions on digital connectivity, weak investment in recent years has led to large infrastructure gaps in telecommunications, limiting the capacity for further regional integration (IMF 2014). Moreover, outdated technologies, lagging innovation, misallocation of labor to inefficient sectors, and market rigidities have weighed on productivity and contributed to divergences in total factor productivity (TFP) across countries and firms (Bahar and Santos 2018; Hallward-Driemeir et al. 2020; Syverson 2011). While the number of individuals using the internet in countries in Central Europe is on par with the rest of the EU, it is below the global average in several of ECA's poorest EMDEs, hindering their ability to close the distance to the TFP frontier (Burunciuc 2021; UN 2020). The digital divide also extends to firms, with SMEs trailing larger companies in digital connectivity and adoption, particularly in high-speed broadband and e-commerce tools, which makes narrowing productivity gaps with larger companies even more challenging (Hallward-Driemeir et al. 2020; OECD 2021a).

For many ECA countries, improving digital infrastructure and expanding access to high-quality digital connectivity will require boosting investment in communications infrastructure (Hallward-Driemeir et al. 2020). Liberalized telecommunications, coupled with regulatory independence, effective control of monopoly power, and efficient taxation of digital services, can catalyze private sector investment to lower the

cost of access to digital services and increase use of the internet, with positive spillovers to the rest of the economy (Arezki et al. 2021; Rodriguez-Castelan et al. 2021). Public investment can also play a role in supporting the digital transformation for firms by reducing cost barriers and accelerating digitalization, particularly by finance-constrained SMEs.

Regional policy priorities

For ECA's EU economies, private and public investment will benefit from the phasing in of projects financed by EU funds. The EU's National Recovery and Resilience Plans (NRRPs), which are supported by the largest funding package ever approved by the EU, provide a unique opportunity to promote economic recovery as well as green and digital infrastructure, and to help close investment and income gaps with more advanced EU members. In all, NextGenerationEU funds to support the NRRPs amount to 9.3 percent of 2021 GDP in Bulgaria, 11.0 percent in Croatia, 6.3 percent in Poland, and 12.1 percent in Romania—much larger than the EU average of 5.6 percent. Since the passage of the NRRPs, private investment prospects have also improved. In Bulgaria—the EU's poorest economy, where output per capita is only about 55 percent of the EU average—private-sector forecasts for long-term (10 years ahead) investment growth almost doubled, from 1.6 percent in January 2020 to 3.0 percent in July 2022 (figure 4.9.C). Even in Poland—where output per capita is about three-quarters of the EU average—long-term investment growth forecasts rose from 1.9 percent in January 2020 to 3.1 percent in July 2022. Across EU and partner economies, however, the boost to investment could be tempered by low absorption of funds because of inadequate administrative capacity and governance (figure 4.9.D).

Western Balkan countries are also expected to be large recipients of EU funding over the remainder of the decade, which should help to counter headwinds to investment growth in these economies. The EU's Economic and Investment Plan for the Western Balkans is aimed at fostering integration and convergence with the EU, with financing over the next decade totaling over 25 percent of Western Balkans GDP. The EU investments also include sizable funding for the green and digital transitions—a key priority given that these economies are among those in ECA farthest from the green transition frontier and experiencing the highest levels of air pollution in Europe (Bartlett, Bonomi, and Uvalic 2022; European Fund for the Balkans 2021; OECD 2021b; Regional Cooperation Council 2018; UNEP 2019). The investments are largely in transport systems, which have long lacked sufficient investment, particularly in logistics and maintenance (figure 4.9.E; European Commission 2021a, 2021b). Modernizing and improving transportation will promote climate goals, as currently less than half of railway networks are electrified and most are powered by fossil fuels (European Commission 2020b).

In Ukraine, the focus will eventually turn to recovery and reconstruction. The World Bank estimates that at least $349 billion (1.5 times 2021 GDP) will be needed, based on damage incurred as of June 1, 2022 (World Bank 2022e). Other estimates put total reconstruction costs in the range of $750 billion to $1.1 trillion, with infrastructure costs at around $190 billion (Arons 2022; Kyiv School of Economics 2022; Ukraine

Government 2022). Within about one month of the invasion, infrastructure damage alone had already exceeded Ukraine's 2022 budget. Given these major reconstruction and investment needs, Ukraine's recovery will be contingent on substantial external financing on concessional terms. Reconstruction efforts could usefully be accompanied by domestic reforms that strengthen institutional quality and transparency, address structural bottlenecks, and ensure that the financial sector is able to bolster private sector-led growth.

More broadly, several steps can be taken to improve the climate for private investment in ECA. A supportive environment would include stable policy frameworks, which reduce uncertainty for businesses, and an effective regulatory environment, in which environmental standards are effectively enforced and strong competition is ensured through control of monopoly power (Ambec et al. 2013). Reforms that could promote private sector investment include the removal of distortions and restrictions on competition—including nontransparent investment regulations, cumbersome tax compliance rules, and more favorable treatment for state-owned enterprises—as well as better targeting of policy support measures.

Lack of exposure to international competition—partly because of non-tariff barriers and complex trade rules—as well as restrictive product market and services regulations, remain structural bottlenecks to domestic and foreign investment in the region (Shepotylo and Vakhitov 2015; World Bank 2016a). Low innovation rates—which partly stem from weak competition, inadequate control of corruption, and the dominance of state-owned enterprises—continue to dampen the business environment and hinder investment in the region, particularly in the absence of progress with other reforms (figure 4.9.F; EBRD 2018, 2019).

Structural reforms that help to close investment gaps and promote FDI inflows and greater participation in global value chains, by boosting private sector development and transition to competitive and inclusive markets, could help boost productivity in the region, particularly in the economies outside the EU (EBRD 2014; Gould 2018; EBRD 2018; World Bank 2019b). Greater economic integration and regional coordination could also help spur innovation and competition, and help unleash the region's growth potential (Kunzel et al. 2019). The pace of future growth will largely depend on the successful implementation of structural reforms to improve the business environment, achieve debt sustainability, and restructure state-owned enterprises (Belarus, Kyrgyz Republic, Moldova, Ukraine, Uzbekistan; EBRD 2017; Funk, Isakova, and Ivanyna 2017).

Measures to improve the climate for private investment need to be complemented by improvements in public investment, including by better prioritizing public expenditures and enhancing the appraisal and review of public investment projects. Even in ECA's EU member states, public investment efficiency can be as much as 2 percent of GDP lower than in other EU countries. Sound policies with respect to infrastructure investment and improvements in governance, education, and public health might help countries become more integrated into global and regional value chains.

LATIN AMERICA and the CARIBBEAN

Over 2000-21, investment growth in Latin America and the Caribbean (LAC) averaged 2.7 percent a year but was volatile, buffeted by commodity price swings and financial cycles. The average investment-to-GDP ratio was the lowest among EMDE regions, with a falling ratio of public investment to GDP, despite substantial unmet needs—shown, for example, in mediocre logistics networks and high levels of urban congestion. The region spends proportionally more on human capital formation—education and healthcare—than its peers, but the value derived does not seem to have been commensurate, suggesting room for improved efficiency. Many policies could help raise physical and human capital investment and improve outcomes in terms of output and welfare. More public spending could be allocated to investment, while capacity for project preparation and delivery could be upgraded. On the private investment side, regulatory and competition frameworks could be improved, while investment-friendly reforms to tax frameworks could be considered. The region could harness significant green investment dividends from renewable energy and related electrification, but transitioning sustainably and equitably will be crucial. More fundamentally, without achieving higher domestic savings, LAC is unlikely to consistently reach the levels of investment needed to narrow substantially the income gap with advanced economies.

Introduction

Latin America and the Caribbean (LAC) accounted for around 13 percent of emerging market and developing economy (EMDE) investment during 2000-21.[10] Investment growth over the period was volatile. Following subdued growth in the early 2000s, there was a surge in investment in the period up to 2011 (temporarily interrupted in 2009 by the global financial crisis), followed by a long, fallow period from 2012 to 2020 when annual investment growth was never above 3.5 percent, and negative in five years.

Throughout the period, there was close co-movement between investment growth and commodity price changes, the major driver of terms of trade changes in LAC. Indeed, the marked decline in investment growth from 2010-16 was concentrated in South American commodity exporters such as Brazil, Chile, and Peru, while investment in Central America and the Caribbean was more resilient. Global financial conditions, and

[10] Throughout this section, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). For the sake of brevity, "investment" is understood to indicate investment levels. Investment growth is measured as the annual percent change in real investment.

U.S. monetary policy in particular, are also important determinants of investment cycles in LAC. Following a strong rebound from the pandemic trough of 2020, investment is forecast to once again underperform in 2023 and 2024. Much of this anticipated weakness reflects the lagged effects of sharp and synchronous monetary tightening in both LAC and the advanced economies in 2022.

Prospective investment needs in LAC are sizeable, especially for the provision of infrastructure and other public goods like healthcare and education. Investment in LAC also offers potential sources of commodity inputs crucial to a global green transition, but a long-term green investment dividend is likely to transpire only with conducive policy frameworks in place, and if policy makers can successfully leverage commodity windfalls to raise living standards. More broadly, consistently higher investment growth will be required if countries in LAC are to achieve faster growth of potential output, labor productivity, and real per capita incomes (chapter 2).

Evolution of regional investment

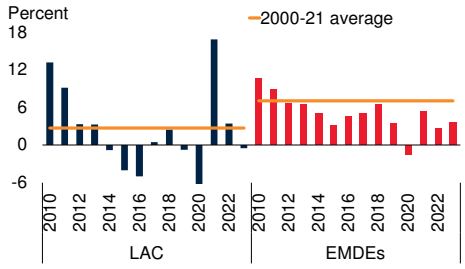
During 2000-21, annual average investment growth in LAC was 2.7 percent, significantly lower than the average for all EMDEs of 7 percent. The investment-to-GDP ratio averaged 19 percent in LAC in 2000-21, the lowest allocation to investment of any EMDE region, and well below the aggregate EMDE average of 28 percent. From the start to the end of the period, LAC's contribution to total EMDE investment declined from close to one quarter in 2000, to less than one tenth by the early 2020s. Marked weakness in investment since 2015 has been particularly pronounced in the public sector, reflecting fiscal constraints alongside the growth of government consumption spending. Indeed, in 2014, the public capital stock per capita in LAC fell below the EMDE average, while the private capital stock per capita remained at roughly twice the EMDE level (figure 4.10).

Fluctuations in LAC investment growth over the past two decades have broadly paralleled those in GDP growth. Regional investment grew healthily before the global financial crisis, as Argentina and Mexico emerged from recessions in 2003, and growth in Brazil picked up sharply from 2004 to 2008. Output and investment resumed steady expansions after the interruption of 2009, but faltered after 2011, and particularly in 2014-16, as commodity prices declined and monetary accommodation began to be withdrawn. By 2015-16, Brazil was in a deep recession, with consecutive years of double-digit negative investment growth. More years of anemic regional growth of output and investment followed, as Argentina slipped back into economic crisis, and growth remained weak in Brazil while slowing markedly in other sizeable regional economies like Chile and Colombia. While the sharpest slowdowns occurred in some of LAC's largest economies, the weakness of investment growth in the late 2010s was widespread. Between 2016 and 2019, investment growth was consistently below its long-run regional average in more than half of the countries in LAC, and in 2016 and 2019 the proportion approached 70 percent.

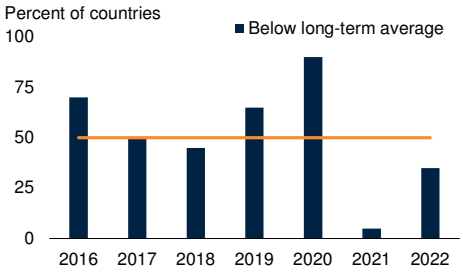
FIGURE 4.10 LAC: Investment growth

From 2014 to 2020, investment growth in LAC was below its post-2000 average. Weakening investment growth has been widespread across economies in the region, and particularly pronounced in the public sector. Public capital stock per person in LAC fell below the level for EMDEs in aggregate in the late 2010s.

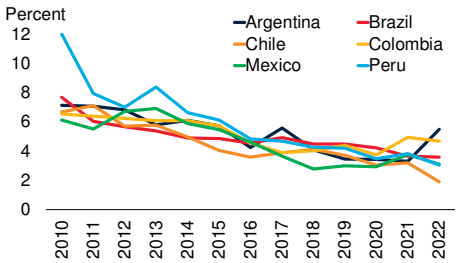
A. Investment growth



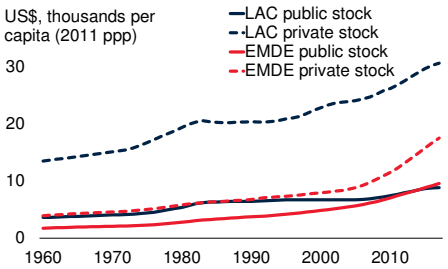
B. Countries with investment growth below its long-term average



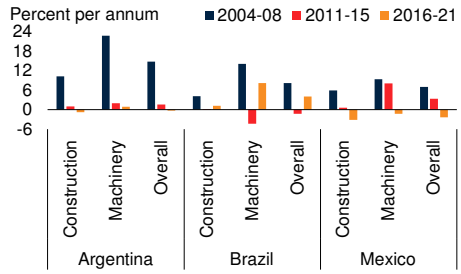
C. Five-year-ahead investment growth forecasts



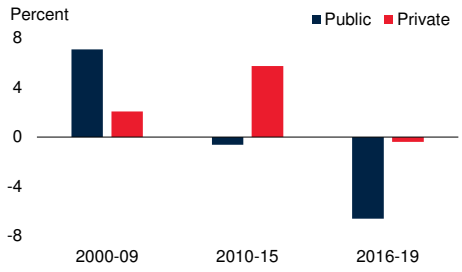
D. Public and private capital stocks per head



E. Investment growth by sector



F. Public and private investment growth



Sources: Consensus Economics; Haver Analytics; International Monetary Fund; national sources; World Bank.
Note: EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean; ppp = purchasing power parity.
A. Average growth rates weighted by investment levels. Includes 98 EMDEs, of which 20 are in LAC.
B. Economy coverage is the same as for panel A. Share of countries in LAC region with investment growth below the long-term (2000-21) average.
C. Five-year ahead consensus forecasts for investment growth.
E. For Argentina, 2004 is excluded. For Brazil, construction and machinery investment are derived using gross fixed capital formation indicators from the Instituto de Pesquisa Econômica Aplicada as proxies.
F. Annual average growth rates of real gross fixed capital formation in specified time periods, weighted by private and public investment levels. Sample contains 19 EMDEs in LAC. Private investment includes investment through public-private partnerships.

The onset of the COVID-19 pandemic, immediately following the stagnation of the late 2010s, precipitated a double-digit percentage investment collapse in LAC in 2020 as lockdowns hit global demand and sent commodity prices plummeting. The decline was short-lived, however. In 2021, investment surged, underpinned by accommodative global financial conditions, a rapid recovery in commodity prices, and extensive fiscal stimulus by governments across the region. In Argentina and Brazil, investment-to-GDP ratios increased by nearly 3 and 2 percentage points, respectively. Prospects for 2023 look substantially weaker, however. With central banks in LAC undertaking some of the sharpest monetary tightening cycles globally, elevated interest rates are likely to dampen investment. Moreover, the decline in commodity prices from mid-2022 and the weak outlook for global growth indicate a likely weakening in the region's terms of trade. Historically, such weakening has been associated with slower investment growth.

Commodities remain the dominant category of exports from LAC, especially South America, and commodity price movements have been a key driver of investment growth fluctuations in the region (figure 4.11). The relationship between commodity price movements and investment growth in South America operates through multiple channels. Rising commodity prices, as seen in the mid-2000s, directly incentivize a supply response through higher investment in commodity production and auxiliary industries, which shows up most clearly in machinery investment. Regional terms of trade also improve, effectively transferring income to LAC from commodity importers, including, generally, through real currency appreciation. Increased incomes and wealth feed broader increases in demand, to which investment also responds. Increasing fiscal revenues, which result from the prevalence of state-owned enterprises in key extractive sectors as well as the broader rise in economic activity, encourage increases in public investment (World Bank 2016b). These effects are strengthened by easier credit conditions, reinforcing the cyclical alignment of credit and investment growth. When commodity prices subsequently reverse, as they did after 2012, the same channels operate in reverse. Monetary policy may also have exacerbated the volatility of investment, as underestimation of the cyclical components of growth may have led to underestimated positive output gaps during booms, and therefore insufficiently restrictive policy (Ablerola et al. 2016).

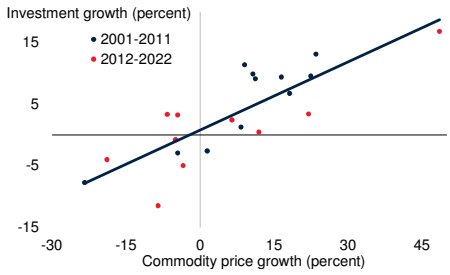
External financial conditions, most notably in the United States, have had important spillovers on investment in LAC (Araujo et al. 2016). The gradual tightening of U.S. monetary policy in 2015, coupled with falling commodity prices, saw South American currencies depreciate rapidly against the dollar, in some cases by as much as 30 percent. Concerns about the effects of depreciation on inflation led central banks, notably in Brazil, to tighten policy despite weak demand, thus dampening investment. A spell of tighter financial conditions in the United States in 2016 further contributed to a period of tight financial conditions in Latin America that did not abate until 2017, when investment growth in the region again turned positive.

Beyond cyclical factors, low domestic saving and tax policies in LAC may have acted as structural headwinds to investment. Compared to OECD countries, LAC countries rely

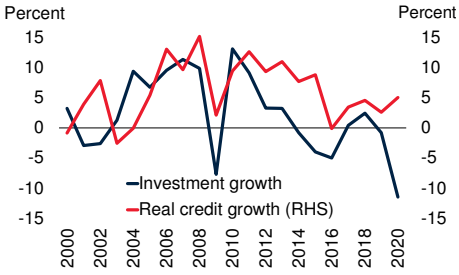
FIGURE 4.11 LAC: Correlates of investment growth

Investment growth in LAC has been closely correlated with movements in commodity prices, which have buffeted regional growth. Financial and credit conditions have amplified the cycles. Corporation tax frameworks may represent a structural headwind to investment in LAC.

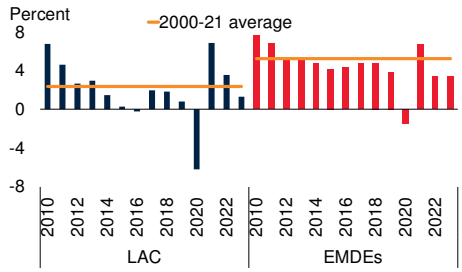
A. Investment growth and commodity price movements



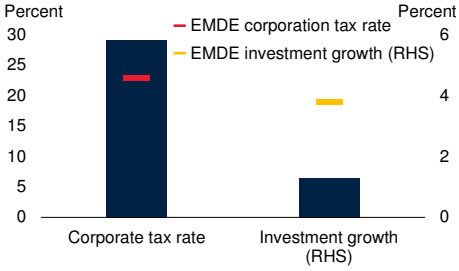
B. Growth of investment and credit



C. GDP growth



D. Corporation tax and investment growth in LAC



Sources: Haver Analytics; International Monetary Fund; Organisation for Economic Cooperation and Development; World Bank.
Note: EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean.
A. Annual commodity price growth is a simple average of annual changes in the prices, in U.S. dollars, of energy, metals (excluding precious metals), and agricultural commodities.
B. Last observation is 2020. Investment-weighted average growth rates.
C. GDP-weighted average growth rates.
D. Corporation tax is average effective corporation tax from 2017-19. Investment growth is average annual investment growth from 2017-21. Sample contains 27 EMDEs (horizontal lines), with 7 countries from LAC (vertical bars).

more on corporate income taxes, potentially disincentivizing investment (Acosta-Ormaechea, Pienknagura, and Pizzinelli 2022). LAC countries also tend to have materially higher corporate taxes than other EMDEs. The average effective corporate tax rate in large LAC economies between 2017 and 2019 was around 29 percent, compared to the 23 percent average for all EMDEs.

Regional investment needs

Investment needs in the region remain significant, encompassing both gross fixed capital formation (GFCF) for services like transportation and digital connectivity and, beyond GFCF, regarding investment in human capital formation through improved healthcare

and education. Low-quality infrastructure, reflecting historically low investment, weighs on regional productivity and economic growth. Thus, infrastructure bottlenecks may be a key factor limiting agglomeration-related productivity gains that might otherwise be expected to accrue from the region's high levels of urbanization (Gómez-Lobo et al. 2022). High income and wealth inequality between and within countries contributes to highly variable performance on health and education indicators. Even the region's richer countries have pockets of significant need, despite higher spending on human development than in other EMDEs (World Bank 2022f). LAC economies could benefit substantially from a global green transition, but realizing this potential will require greater investment in enabling industries, backed by conducive policy frameworks. More generally, the increase in labor productivity needed across LAC to raise living standards is likely to be achieved only through higher investment growth, including in the private sector.

Infrastructure. Surveys indicate that mediocre infrastructure is a key constraint holding back LAC's development. In 2017, the average economy in LAC ranked 79th out of 136 countries on infrastructure quality, marginally better than the EMDE average but well below the averages of East Asia and the Pacific (EAP), Europe and Central Asia (ECA), and the Middle East and North Africa (MNA; World Economic Forum 2018). It has been estimated that meeting the infrastructure-related sustainable development goals (SDGs) will require infrastructure investment in LAC of at least 4.5 percent of GDP annually (figure 4.12; World Bank 2019c). Extrapolating from data from 2008-15, roughly 70 percent of such needed infrastructure investment (over 3 percent of GDP annually) is likely to be publicly funded. However, in the years leading up to the pandemic, public infrastructure investment in LAC countries was about 1 percent of GDP, suggesting a sizeable public investment gap (Infralatam database; Serebrisky et al. 2018). Past estimates of the total infrastructure investment gap in LAC are in the range of 3 to 4 percent of GDP (Brichetti et al. 2021; Kohli and Basil 2011).

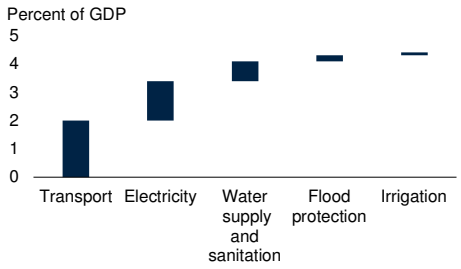
Inadequate infrastructure provision is likely to be a key contributor to high levels of urban congestion. This is an important challenge because LAC is projected to be the most urbanized EMDE region by 2050. Rising congestion costs may offset otherwise beneficial returns to scale in urban environments, representing one potential cause of an apparent lack of agglomeration benefits in productivity growth in LAC cities (Gómez-Lobo et al. 2022). The annual cost of traffic congestion alone is estimated to be worth more than 1 percent of production in the cities of Buenos Aires, Sao Paulo, Montevideo, and Santiago (Calatayud et al. 2021).

Improvements to telecommunications infrastructure can also boost connectivity and productivity, including by facilitating expanded services trade. LAC has greater mobile and broadband connectivity, on average, than other EMDE regions, but lags substantially behind advanced economies. The need for a rapid switch to remote learning and work during the pandemic highlighted how digital connectivity can enhance social and economic resilience to crises (Bai et al. 2021; Strusani and Houngbonon 2020).

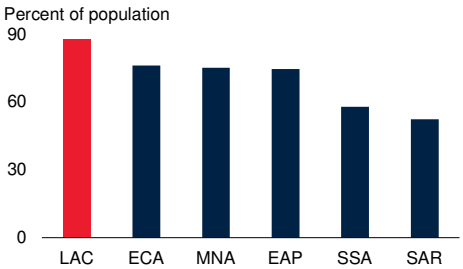
FIGURE 4.12 LAC: Investment needs

Inadequate infrastructure impedes connectivity and productivity growth. Despite higher spending than in other EMDE regions, unequal access to education and healthcare holds back human capital formation. A global green transition promises opportunities, but higher levels of investment will be needed to realize them.

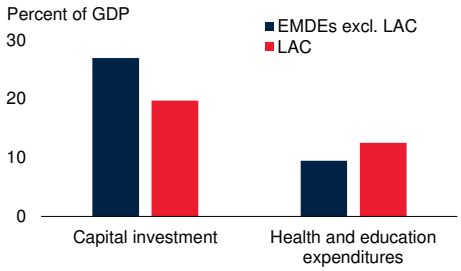
A. Annual infrastructure investment needs



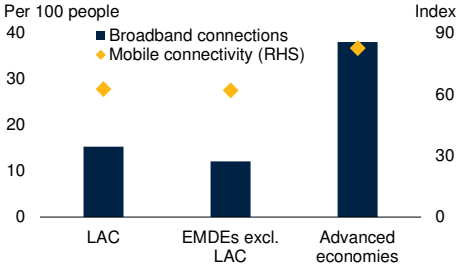
B. Projected urban population share in 2050



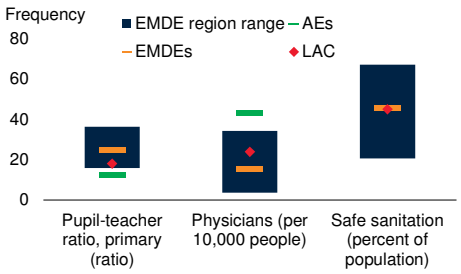
C. Fixed investment, and health and education spending



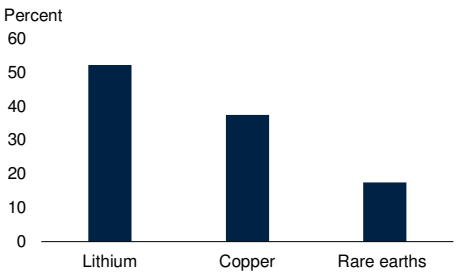
D. Broadband and mobile connectivity



E. Selected health and education indicators



F. Proportion of global commodity reserves in LAC



Sources: GSMA Mobile Connectivity Index; Rozenberg and Fay (2019); U.N. Populations Division; USGS (2021a, b, c); World Bank.
Note: AE = advanced economies; EMDEs = emerging and developing economies; LAC = Latin America and the Caribbean.
A. Bars depict investment needs in LAC according to the preferred investment scenario ("ambitious goals, high efficiency") from Rozenberg and Fay (2019).
B. Projections by the United Nations Population Division.
C. Capital investment is gross fixed capital formation. Health spending is current health expenditure. Education spending is general government expenditure on education. Values are a weighted average for LAC from 2015-19, and average of weighted averages for other regions from 2015-19.
D. All values are population-weighted averages. Broadband connections is 2020 values. Mobile access is the 2021 average of Infrastructure and Affordability enabler scores within the GSMA Mobile Connectivity Index.
E. AE, EMDE, and LAC values are simple averages of the latest available data across countries, excluding years before 2017. Sample includes: 26 AEs and 109 EMDEs (23 in LAC) for pupil-teacher ratios; 31 AEs and 99 EMDEs (29 in LAC) for physicians; 36 AEs and 80 EMDEs (11 in LAC) for sanitation. Safe sanitation means facilities not shared with other households and with safe disposal.
F. Values are LAC proportions of total world reserves in 2022. "Lithium" includes Argentina, Brazil, and Chile. "Copper" includes Chile, Mexico, and Peru. "Rare earths" includes Brazil. Data availability limitations may result in slight underestimates.

Recent country-level studies highlight the need for several countries in LAC to upgrade port infrastructure and transport connectivity in underserved potential export corridors (Argentina, Mexico, the member countries of the Organization of Eastern Caribbean States; World Bank 2018a, 2018b, 2019d). Such investments should help reduce trade costs and facilitate product and partner trade diversification.

Education. Beyond GFCF, LAC spends a significantly higher proportion of GDP on education—about 5 percent—than any other EMDE region. However, LAC only performs moderately better than EMDE averages on measures of education quality, including pupil-teacher ratios and the proportion of trained teachers in primary education. This suggests there is scope to derive better value from education expenditures. On educational attainment, Chile, Colombia, Costa Rica, and Mexico register in the bottom quartile of OECD member countries for PISA scores, while most other LAC countries participating in PISA fall within the lower half of the ranking of non-OECD member countries (OECD 2019b). Educational attainment in LAC mirrors high income inequality; the richest 20 percent of pupils are five times more likely than the poorest 20 percent to complete upper secondary education (UNESCO 2020).

Against this backdrop, the COVID-19 pandemic set back educational progress across LAC, with the poorest households worst affected. School closures in LAC were some of the longest in the world and early evidence suggests significant resulting learning losses, concentrated among younger and socioeconomically disadvantaged children (World Bank 2022g). The digital divide was a key driver of disparities: only about 40 percent of primary schools and 60 percent of secondary schools in LAC had access to the internet for educational purposes (World Bank 2021c). Given the increasing importance of digital skills, further government efforts to universalize connectivity in schools could boost lifetime earnings and enhance social mobility. More generally, the remediation of pandemic-related learning losses and assurance of more equitable educational access are likely to require more effective, and in rural and low-income areas greater, investment in education. Specific needs identified in recent World Bank country reports include improved teacher training and professional development (Argentina, Ecuador), expanded and enhanced early childhood education (Bolivia, El Salvador), and a greater focus on ensuring that education systems develop the skills sought by employers (Dominican Republic, Mexico, Paraguay; World Bank 2018a, 2018b, 2018c, 2018d, 2019d, 2021d, 2022c).

Healthcare. At around 8 percent of GDP in 2015-19, health spending in LAC as a proportion of output was higher than in any other EMDE region, with per capita health spending higher only in ECA. Some beneficial outcomes from above-average spending are clear: life expectancy in LAC compares favorably to other EMDE regions, the region has about twice the number of physicians per capita of the average EMDE, and vaccination rates are generally high. Nonetheless, there are important areas where improvement has been slow. In 2017, ECA, EAP, and MNA all had lower maternal mortality rates, which have fallen only slowly in LAC since 2000. Similarly, while LAC

was the EMDE region with the highest proportion of the population covered for essential health services in 2000, it has since seen the slowest improvement on this metric and has been overtaken by EAP and ECA. The COVID-19 pandemic laid bare shortcomings in regional healthcare systems, with LAC suffering a disproportionate death toll, likely reflecting inequitable healthcare access (Schwalb et al. 2022). The region also continues to lag in aspects of public health infrastructure; the proportion of the population with access to well-managed sanitation services is below the EMDE average.

Investing in improved public health infrastructure and services for low-income groups is likely to be a cost effective way to improve health outcomes and boost human capital. Recent studies of countries including Bolivia, Ecuador, El Salvador, and Paraguay suggest that improving sanitation in rural and low-income communities should be a priority (World Bank 2018b-c, 2021d, 2022h). Investments that raise the efficiency of healthcare provision could also free up resources for other sectors. This is likely to be important in coming decades given low productivity growth and growing demand in the healthcare sector, and the increasing prevalence of non-communicable diseases. Indeed, model-based estimates indicate that per capita health spending in LAC is set to grow faster than GDP at least up to 2050 (Rao et al. 2022). The region can meet its future healthcare demands at lower cost by investing in primary care facilities and triage capacity (including telemedicine), preventative public health interventions, and better information and data systems—all of which would lessen the burdens on governments and households (Savedoff et al. 2022).

Green transition. LAC economies could benefit substantially from the global transition toward greener forms of energy and broader emissions reduction. The region is endowed with a large proportion of the known reserves of several minerals and metals needed for electrifying transport and scaling up renewable energy technologies. For example, LAC is the location of roughly half of the world's lithium reserves (mainly in Chile, Argentina, and Brazil, though Bolivia has the largest known lithium resources in the world), more than a third of copper reserves (Chile, Peru, Mexico), and over a fifth of rare earth reserves (Brazil), as well as significant amounts of nickel, manganese, and graphite (USGS 2021a-f). However, the efficient extraction and processing of green minerals will require large-scale capital investment and improved technological methods to ensure sustainability. Chile is the only country in LAC that currently exports substantial amounts of lithium, and there are significant concerns about potential strain on water supplies from using water in the extraction of lithium from brine (IEA 2022). In addition to sustainably expanding extractive capacity, which could further entrench primary commodity export dominance in LAC, several governments in the region have ambitions to foster domestic green industries down the value chain, including electric vehicle and battery manufacturing. Evidence suggests that these plans may be more likely to succeed if public policy assumes a role nurturing such industries, as the auto sector tends otherwise to innovate incrementally on existing production techniques (Aghion et al. 2016). However, successfully implementing such plans would likely require substantial upgrades to regional research and development, development of complex manufacturing capacity, and significant upskilling of workforces.

Regional policy priorities

While policy priorities differ among countries, across LAC there is a clear need for improved infrastructure, and for more equitable access to quality education and healthcare. Given limited fiscal space, increasing public spending will be challenging, and policy makers may need to focus on reprioritizing and improving the efficiency of expenditures within existing budgets. At the same time, increasing the growth of output and productivity in the region's private sector will require stronger growth of business investment, beyond that focused on primary commodity extraction. This will require more supportive environments for private enterprise.

Public investment. Estimates of infrastructure gaps in LAC indicate that the region underinvests in infrastructure, including the provision of transport, energy, telecommunications, and water. While some such services can be provided primarily by the private sector, it is likely that LAC economies will need to materially increase public infrastructure investment to reach the 2030 infrastructure-related SDGs. In some cases, projects that offer very high economic returns could be funded via public borrowing, but otherwise countries in LAC have limited fiscal space, particularly in the aftermath of the COVID-19 pandemic and prior years of weak growth. The first recourse to raise productive public infrastructure investment could therefore be reprioritizing existing public expenditure away from unproductive uses. Public budgeting reviews could be used to identify wasteful spending—estimated by one analysis to be as high as 4.4 percent of regional GDP (Izquierdo, Pessino, and Vuletin 2018). In some countries (Argentina, Bolivia, Brazil) reforms may be required to reduce budget rigidities (Herrera and Olaberria 2020). Governments could also consider implementing fiscal rules that favor investment spending over consumption, though potential sustainability risks from poor quality investment would need to be managed (Blanco et al. 2020). Where policy makers seek to fund investment by raising additional revenues, negative growth impacts can be avoided by measures that broaden the tax base, limit distortive tax expenditures, and improve tax compliance. Governments could also consider increasing consumption taxes on goods such as alcohol, tobacco, and sugar, which could raise revenue while helping combat chronic illnesses that are bad for both general welfare and the public purse (Estevão and Essl 2022).

Even absent broader fiscal reforms, there is substantial scope for improving infrastructure in LAC by raising the efficacy of public investment. One study estimated that by operating at the efficient frontier, LAC infrastructure services output could be doubled with the same inputs (Suárez-Alemán, Serebrisky, and Perelman 2019). Substantial efficiency gains could be derived, for example, from improvements in project selection, planning, management, and procurement (Fay et al. 2017). In some cases, additional use of public-private partnerships may improve risk allocation in the financing of infrastructure projects, smooth budget outlays, and augment state capacity in project delivery and maintenance (Garcia-Kilroy and Rudolph 2017). Policy makers could also consider establishing functionally independent advisory commissions (such as those in place in New Zealand and the United Kingdom) to aid in the planning and prioritization of infrastructure expenditures.

Private investment. To improve incentives for private investment, taxation frameworks in LAC could be reformed to reduce the relatively high dependence on corporate income taxes. In this context, broadly applicable reforms such as increased investment expensing are likely to provide more effective and efficient incentives than complex special tax regimes (Acosta-Ormaechea, Pienknagura, and Pizzinelli 2022). To incentivize green investment and research, carbon taxes could be used (Aghion et al. 2016). Regulatory environments in LAC could be improved, such as by ensuring that regulators have technocratic governance and that regulatory frameworks are transparent. Processes should follow international best practices regarding, for example, policy consultations, impact assessments, and ex-post evaluations (Querbach and Arndt 2017). Competition frameworks could be enhanced to reduce monopoly power, encourage innovation, and foster a level playing field among private firms as well as between private firms and state-owned enterprises. Upgrading the skills of the population through more effective utilization of education spending would increase the attractiveness of LAC as a destination for private investment. Policy makers could, for example, increase focus on educational attainment among students from low-income households, while seeking efficiency improvements and better matching between skills that are in demand and subjects studied in higher education (Ferreyra et al. 2017). Combatting corruption and reducing violence and social unrest would also bolster investor confidence (Keefer and Scartascini 2022).

Raising domestic saving. Domestic saving rates are lower in LAC than in other EMDE regions, even after accounting for the influence of such factors as financial depth, demographics, and macroeconomic and political stability (Becerra, Cavallo, and Noy 2015). Given historical long-term correlations between investment and domestic saving, it is unlikely that investment rates in LAC can durably increase without higher saving (Apergis and Tsoumas 2009). Policy makers therefore face a tension between increasing public investment and supporting higher national saving through government saving, sharpening the rationale for funding new investment out of existing fiscal envelopes. Evidence on the crowding out of private investment by public investment in LAC is ambiguous, but mitigating this risk calls for governments to focus on investments that can raise total factor productivity, thereby increasing returns on private capital and incentivizing private investment (Fernández, Imrohoroglu, and Tamayo 2017; Ramirez and Nazmi 2003; Santiago et al. 2020). Measures to increase financial access, trust in the banking system, and financial literacy (through early financial education, for example) could help raise household saving rates (Cavallo and Serebrisky 2016). In the absence of higher domestic savings, LAC will have to continue relying heavily on foreign saving to support growth of the region's capital stock—an approach that may have contributed to low investment-to-output ratios over the last twenty years.

MIDDLE EAST and NORTH AFRICA

Investment growth has been anemic in the Middle East and North Africa in recent years. It was negative in 6 of the 11 years from 2011-21. Investment has been constrained by periods of declining oil prices, armed conflicts, political upheaval, and weak governance. Investment needs, while varying substantially between the wealthier countries of the Gulf Cooperation Council and the countries marred by fragility and violence, remain generally sizeable, especially in the transport and energy sectors. The COVID-19 pandemic and climate change call for immediate investment to avoid losses to lives and livelihoods. Policies to encourage investment include rationalizing the role of the state in economic activity, incentivizing the private sector, and diversifying fossil fuel-reliant economies so that they are better positioned for the future.

Introduction

The Middle East and North Africa (MNA) accounted for 6 percent of investment in emerging market and developing economies (EMDEs) during 2011-21.[11] Over the past two decades, 2000-21, the region saw a momentous collapse in investment growth, from an average of 8.6 percent a year in 2000-10 to 0.5 percent a year in 2011-21. Foreign direct investment inflows halved over the two decades and were the lowest among EMDE regions in the 2010s, at 1 percent of GDP. In 2022, investment growth is estimated to have been 5.4 percent, just above the 1990-2021 annual average of 5.0 percent (figure 4.13).

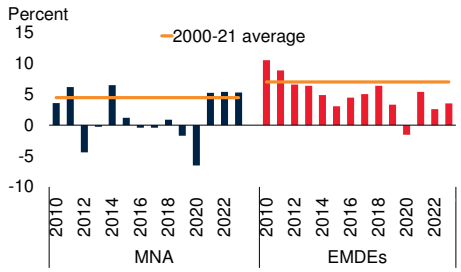
The precipitous slowdown in investment in the past decade reflected violence and conflict, the impacts of the COVID-19 pandemic, the effects on oil exporters of a large drop in oil prices in the middle of the decade, and macroeconomic and political instability in many net oil importers. The oil price collapse in 2014-16 led to a significant slowdown in investment growth among oil exporters, from about 9.1 percent a year in 2000-10 to 0.3 percent a year in 2011-21. Oil importers in the region also saw a steep slowdown in average annual investment growth between the two decades, from 6.6 percent to 1.6 percent.

[11] Throughout this section, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). For the sake of brevity, "investment" is understood to indicate investment levels. Investment growth is measured as the annual percent change in real investment.

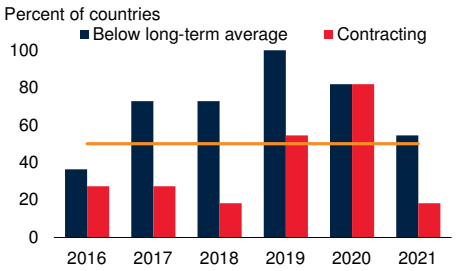
FIGURE 4.13 MNA: Investment growth and correlates

Investment growth in the Middle East and North Africa slowed in the last decade and was negative more than half the time. The slowdown reflects a severe terms-of-trade deterioration in oil exporters, armed conflict and its spillovers, and political uncertainty in several oil importers. The pandemic has led to a persistent gap between actual investment and pre-pandemic forecasts.

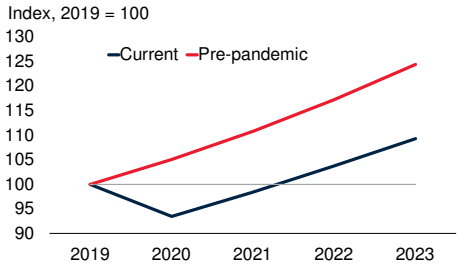
A. Investment growth



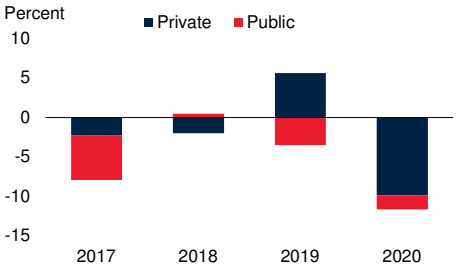
B. Economies with below average or negative investment growth



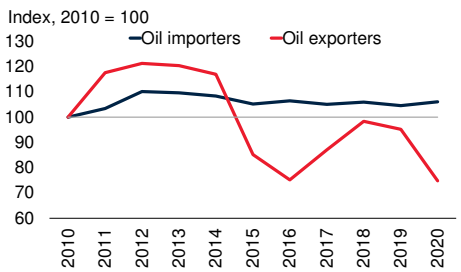
C. Investment



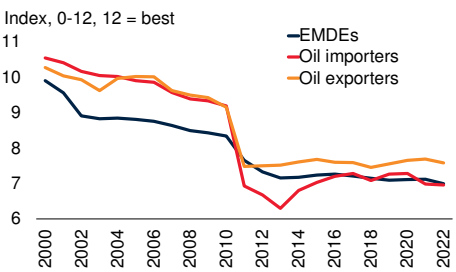
D. Composition of investment growth



E. Terms of trade



F. Political stability



Sources: Haver Analytics; PRS Group; World Bank.

Note: EMDEs = emerging market and developing economies; MNA = Middle East and North Africa.

A. Averages weighted by investment levels. Sample includes 98 EMDEs and 11 from MNA.

B. Economy coverage is the same as for panel A. Share of countries in MNA region with investment growth below the long-term (2000-21) average or negative investment growth ("contracting").

C. Investment level based on data and projections in the January 2020 and January 2023 *Global Economic Prospects* reports. 2023 indicates forecast.

D. Based on data from Bahrain, the Arab Republic of Egypt, the Islamic Republic of Iran, and Saudi Arabia. In Egypt, nominal investment is deflated using the gross capital formation deflator.

E. World Bank's Net barter terms of trade indexes. Investment-weighted averages. Oil exporters include Algeria, Kuwait, Oman, Saudi Arabia, and the United Arab Emirates. Oil importers include Egypt, Jordan, Lebanon, Morocco, and Tunisia.

F. Based on the Government Stability sub-index of the International Country Risk Guide. Unweighted average of 102 EMDEs, including 10 MNA oil exporters and 6 MNA oil importers.

The pandemic led to a 6.5 percent decline in investment in the region in 2020, with the drop in oil-importing countries three times greater than that in oil exporters. The rebound in 2021 was tepid, with investment growth of 5.3 percent. Consequently, investment in 2021 remained about 12 percent below pre-pandemic projections, and even further below projections in oil importers than in oil exporters. Over 2022-24, growth in investment in MNA is expected to approximately match the region's longer-run (2000-21) average rate, with investment failing to catch up with its pre-pandemic trend.

Investment needs remain significant in MNA—especially among oil importers and economies suffering fragility and conflict—including in infrastructure, climate change adaptation and mitigation, and addressing the legacy of the pandemic. But infrastructure needs vary widely across the region, from countries with some of the highest scores in the world for infrastructure quality—United Arab Emirates is ranked fourth globally—to ones with some of the lowest (Yemen, Lebanon). The region also needs to invest in preparing for a warmer and more volatile climate and a decarbonized future. A focus on green economic growth—promoting clean energy and ecofriendly investment—would yield greater economic returns by creating more jobs and avoiding environmental degradation. To meet these investment needs, governments can implement policies that decrease the size of the state, support new industries to diversify production and exports, incentivize the private sector appropriately through improvements in governance and investor protections, and efficiently price fossil fuels.

Evolution of regional investment

Over the last two decades, economic activity and investor sentiment in MNA have been weighed down by armed conflicts in several countries, far-reaching political changes, the oil price plunge of 2014-16, and lately the pandemic and war in Ukraine. As growth prospects dimmed, especially among oil-exporting countries, investment growth slowed sharply, from an annual average of 8.6 percent in 2000-10 to 0.5 percent a year in 2011-21. Foreign direct investment inflows halved to 1 percent of GDP on average during 2011-20, the lowest among EMDE regions. Investment contracted in four of the six years 2016-21. At the height of the COVID-19 pandemic, in 2020, investment declined by 6.5 percent, before rebounding by 5.3 percent on average in 2021-22. Investment in 2022 is expected to remain about 12 percent below its pre-pandemic projections, and below pre-pandemic forecasts in four-fifths of the region's economies. While the causes of the slowdown in investment in the past decade differ between oil importers and exporters—the former battling external factors and the latter domestic policy uncertainty—the outcome has been anemic investment growth in both groups.

Investment in oil-exporting MNA economies

Investment growth in oil-exporting MNA economies—where oil and gas account, on average, for four-tenths of output, and most of fiscal revenues and goods exports—has evolved broadly in line with oil prices, which collapsed in 2014 and remained below averages for the 2010s until late 2021. The war in Ukraine in 2022 raised oil prices again. While investment rebounded strongly in the first half of 2022, the future path of

investment in the sector is unclear, given longer-term trends away from fossil fuels and high volatility and uncertainty in the oil market.

When the steep oil price decline began in mid-2014, governments in the oil-exporting economies initially responded with fiscal stimulus, often in the form of public investment. As a result, investment growth rose by over 7 percentage points in 2014 to 7.4 percent. But the collapse in oil prices proved enduring and led to sustained oil revenue losses. The resulting fiscal constraints contributed to declines in investment over 2015-19 averaging -1.5 percent a year, with investment contracting in three of the four largest oil exporters—the Islamic Republic of Iran, the United Arab Emirates, and Saudi Arabia. The average terms of trade of the oil exporters only recently returned to pre-2014 levels.[12]

The COVID-19 pandemic further depressed investment in these economies as they were hit by simultaneous shocks to both oil sectors and, because of mobility restrictions, non-oil economic activity. In Saudi Arabia, investment collapsed by 10.4 percent in 2020, compared with the 4.5 percent average decline among oil exporters as a whole.

The fall in investment in 2020 was followed by growth averaging 5.8 percent across 2021 and 2022. Investment in 2022 is estimated to have surpassed its 2019 level but to have remained 4 percent below pre-pandemic projections.

Investment in oil-importing MNA economies

Among oil-importing countries, investment contracted by 14 percent in 2020 following a decade of weak growth stemming from political tensions that began with the Arab Spring in 2011, spillovers from the euro area financial crisis of 2010-11, and domestic macroeconomic instability. During the 2010s, the only year of strong growth was 2016, when Egypt and Morocco, the two largest net oil-importing economies in the region, both ramped up infrastructure investment.

Since 2017, the public sector in Egypt has aggressively expanded investment, including in education and training. Gross capital formation grew by 36 percent between 2017 and 2020. The increase in public investment has been part of a structural reform agenda, only partially completed, aimed at restoring macroeconomic stability and promoting sustainable economic growth. Reforms have included the introduction of a more flexible exchange rate; fiscal reforms, including reductions in energy subsidies and improvements in public finance management; improvements to the monetary policy framework; a new law to streamline customs and reduce non-tariff barriers; a new banking law; and increased freedom for the private sector to participate in more sectors of the economy (IMF 2021a). These reforms were aimed partly at improving the environment for private investment. A sharp decline in private investment in 2020 was partly offset by increased public investment as part of a response to the pandemic.

[12] Panel regression estimates suggest that the terms-of-trade shock accounted for nearly all of the slowdown in investment growth during the initial oil price decline in 2014.

Oil-importer investment growth of 2.9 percent in 2021 was anemic given the 14 percent COVID-induced collapse in 2020. It was also too little to lift investment above its 2019 level, which is expected to be surpassed only in 2023. Investment in 2022 is now estimated to have been almost 30 percent below pre-pandemic forecasts.

Regional investment needs

A ramping up of infrastructure investment is needed across MNA and could support the economic recovery from the pandemic (figure 4.14). Investment outlays would likely be most beneficial if they were directed at addressing the consequences of the pandemic; meeting infrastructure needs; diversifying economies; and mitigating, and adapting to, climate change. A main focus on green economic growth—promoting clean energy and ecofriendly investment—could yield the largest economic returns, by creating more jobs and avoiding environmental degradation (Batini et al. 2021). Environmental degradation of skies (air pollution) and seas (plastics) costs the region 2 percent of GDP a year on average (Heger et al. 2022). Upgrading infrastructure can also save lives and livelihoods, with an estimated 5.5 percent of GDP lost annually in the region due to poor roads and related accidents (Um 2020). Just as the region's challenges are diverse and complex, so are investment needs in infrastructure, education, health, and green technology.

Responding to the pandemic. The COVID-19 pandemic has highlighted inadequacies in the health and education sectors in MNA, and the urgent need to invest in them. Most MNA economies were ill-prepared for the pandemic, with public officials overconfident about health system capabilities (World Bank 2021e). Even prior to the pandemic, achieving universal healthcare coverage would have required countries globally to increase spending on primary healthcare by at least 1 percent of GDP (WHO 2019). Despite significant progress in MNA over the last two decades toward achieving universal healthcare—meaning access to health services, when and where needed, without financial hardship—the region still lags behind other EMDE regions and the advanced economies in this regard. In some of the region's economies, public spending on healthcare, per capita, is among the lowest in the world, resulting in limited access and large out-of-pocket expenses for citizens. Insufficient investment in health services, particularly in non-Gulf Cooperation Council (GCC) economies means inadequate numbers of health workers, insufficient hospital beds per capita, and limited ability to provide essential health services

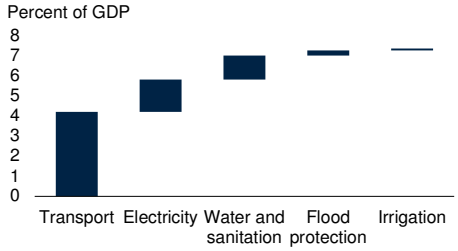
The World Bank's Human Capital Index has risen over the past decade in almost 80 percent of MNA economies, with much of this gain coming from educational improvements.[13] Nonetheless, a child born in MNA in 2020 was expected to achieve only 56 percent of its future productivity on average, according to the index. The pandemic has reversed some of the gains to education with pandemic-related school

[13] The Human Capital Index measures the amount of human capital (that is, the level of productivity) a child born today could expect to attain by the age of 18, based on the risks to health and education that child is expected to face.

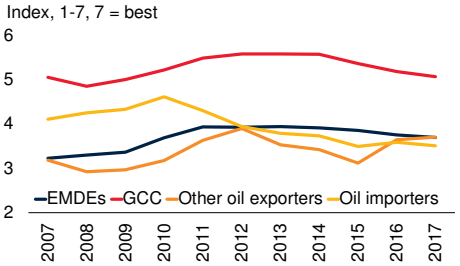
FIGURE 4.14 MNA: Infrastructure, health, and education indicators

Infrastructure investment needs in MNA are high, especially in electricity and transport. While MNA performs well relative to other EMDEs on basic health measures, its education indicators remain generally below EMDE averages.

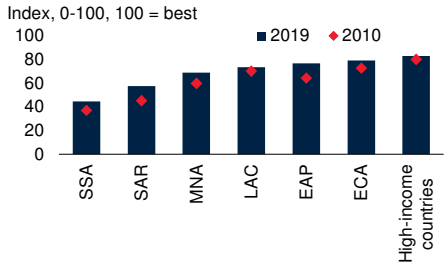
A. Infrastructure investment needs



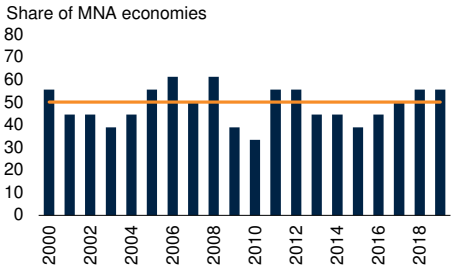
B. Quality of infrastructure



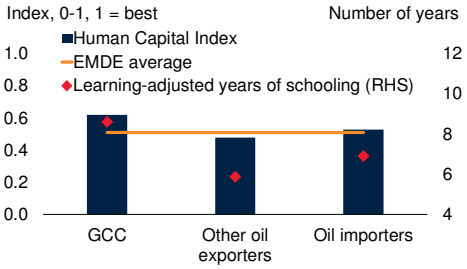
C. Universal health coverage



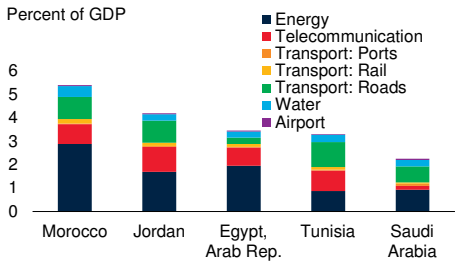
D. Health spending below EMDE median



E. Selected human capital indicators



F. Infrastructure investment needs



Sources: Rozenberg and Fay (2019); Global Infrastructure Outlook; World Economic Forum Global Competitiveness Index; World Health Organization; World Bank.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; GCC = Gulf Cooperation Council.

A. Investment needs in a preferred scenario as defined in Rozenberg and Fay (2019).

B. Unweighted averages of survey data from the World Economic Forum Global Competitiveness Index. Data was collected using the question: "How would you assess general infrastructure (for example, transport, telephony, energy) in your country? (1 = extremely underdeveloped—among the worst in the world; 7 = extensive and efficient—among the best in the world)." Oil importers include Egypt, Jordan, Lebanon, Morocco, and Tunisia. Non-GCC oil exporters include Algeria, the Islamic Republic of Iran, Libya, and the Republic of Yemen. GCC countries include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

C. Unweighted average. Based on World Health Organization's Universal Health Coverage (UHC) Services Coverage Index.

D. Based on domestic general government health expenditure as percentage of GDP. Sample includes 152 EMDEs (18 from MNA).

E. Unweighted average. Sample includes 138 EMDEs (16 from MNA).

F. Based on the G20's Global Infrastructure Outlook.

closures averaging 48 weeks in 2020-21 in MNA, above the global average of 38 weeks. The resulting outsized damage to human capital accumulation could significantly impair the lifetime earnings of many (Azevedo et al. 2021). Returns to education are also the lowest of any EMDE region, reflecting in part the low quality of education (Montenegro and Patrinos 2014). Anemic economic growth and job creation in the region have also contributed to high rates of youth unemployment, and the lack of work experience for many is a further set back for human capital (Kheyfets et al. 2019).

Responding to climate change. MNA has already been feeling the effects of climate change, with natural disasters, including heatwaves and floods, becoming more frequent (IMF 2022b; World Bank 2014). Rising risks to lives and livelihoods highlight the urgent need to invest in climate change mitigation and adaptation and to ensure that the recovery from the pandemic is green and inclusive (Acerbi et al. 2021; IMF 2022b). Risks are particularly acute among economies dependent on agriculture: rising temperatures are expected to reduce growing areas and crop yields and exacerbate water scarcity, which will undermine food security, force migration, lower labor productivity, and raise the likelihood of conflict. In Morocco, for example, where droughts are already a major source of macroeconomic vulnerability, a continuation of recent trends could result in a rationing of water to various sectors of the economy that could cause the loss of up to 6.5 percent of GDP by 2050 (only partially offset by new infrastructure and improved efficiency) and prompt the migration of up to 1.9 million people, or 5.4 percent of the population (World Bank 2022i). For the region, crop yields could decline by up to 30 percent if temperatures were to rise by 1.5-2 degrees Celsius relative to pre-industrial times (World Bank 2014).

Estimates of the costs of adapting to climate change are larger when the indirect costs of action needed for climate resilience are taken into account. They are also dependent on assumptions about the climate outlook and therefore vary widely. One World Bank study estimated the cost to the region at around 7.3 percent of GDP on average per year from 2015 to 2030 (World Bank 2014). The IMF has estimated individual country costs to be as low as 0.1 percent of GDP in Bahrain, Jordan, and Saudi Arabia, but as high as 2 percent of GDP in Iraq over the next ten years.[14] Given the abundance of sunshine (radiant energy), much of the region can benefit from a shift to solar energy, which has undergone rapidly decreasing costs (IMF 2022b). Current generation capacity from renewables is only about one-tenth of total installed energy generation capacity in MNA (Um 2020).

Broader infrastructure needs. Investment needs in the region go beyond addressing climate change and the repercussions of the pandemic. Infrastructure needs are also important, although they vary widely across MNA. Infrastructure spending can create the foundation for strong private-sector-led growth and provide access to opportunities for citizens. Infrastructure investment in the region averaged 3 percent of GDP over the

[14] These estimates only cover adaptation to floods, storms, and sea level rise and do not address rising temperatures or droughts, an important risk for the region.

last decade, financed mainly by the public sector (Um 2020). This rate of investment will not be enough to meet infrastructure needs in the coming decade. If all MNA economies increased spending on roads by 1 percent of GDP per year, the share of the rural populations within reach of a primary or secondary road would still increase to only about one-half by 2030. Estimates suggest that infrastructure investment of about 7 percent of GDP will be needed to meet the sustainable development goals by 2030 (figure 4.14A). Increased investment in infrastructure could also help improve labor market conditions in MNA. One study estimated that each $1 billion of infrastructure investment has the potential to generate 110,000 infrastructure-related jobs, on average, in oil-importing MNA countries (Estache et al. 2013).

In oil-importing and non-GCC oil-exporting countries there is significant underinvestment in transport (roads, in particular) and electricity. According to the G20's Global Infrastructure Outlook, Egypt will need to spend an average of 5.2 percent of GDP per year over the next decade to meet infrastructure needs mainly in energy and telecommunications (Oxford Economics and Global Infrastructure Hub 2017). Egypt's energy sector could benefit from expanding and diversifying energy supply, a shift toward renewable sources, and the modernization of the oil and gas sector (World Bank 2018e).

Over 2001-17, Morocco had one of the highest investment rates globally, varying between 25 and 38 percent of GDP. Most of this represented public sector investment in infrastructure. In the latest (2017) survey, the country ranked 42nd in quality of infrastructure, having risen more than 20 spots in a decade. Despite this achievement, infrastructure investment needs remain large owing to growth in demand for infrastructure services arising from population growth and urbanization (World Bank 2020d). Over the next decade the country will need average infrastructure investment of 6.2 percent of GDP annually, mainly in the energy and transport sector (Oxford Economics and Global Infrastructure Hub 2017).

Lebanon faces significant infrastructure deficiencies, including a dysfunctional electricity sector, water shortages, and inadequate waste and wastewater management (Harake and Kostopoulos 2018; Le Borgne and Jacobs 2016). The port explosion in Beirut in 2020 and the country's ongoing economic crisis have highlighted the need for infrastructure investment. The explosion is estimated to have caused damage equivalent to 15-19 percent of 2020 GDP (World Bank, European Union, and United Nations 2020). Large numbers of Syrian refugees in Lebanon (and Jordan) have added to strains on the provision of public goods.

Countries involved in armed conflict are at risk of large-scale destruction of physical capital. In Syria, the war that began in 2011 has devastated the economy: in 2019, income per head was no higher than in the early 1990s (World Bank 2022j). The cost of rebuilding infrastructure damaged or destroyed by the conflict has been estimated to be in the range of $100-200 billion in 2015 prices, the lower bound being about ten times the country's 2015 GDP (Gobat and Kostial 2016). Iraq also faces large infrastructure

investment needs, increased by conflict. It has been estimated that some $200 billion in 2018 prices would be needed to restore "hard" infrastructure to pre-ISIS levels, almost equal to Iraq's 2018 GDP (Gunter 2018). In Yemen, recovery and reconstruction costs are estimated at $20-25 billion, equivalent to 1.1-1.3 times its 2020 GDP (World Bank 2020a).

GCC countries also have infrastructure needs, predominantly in electricity generation, although the pandemic has highlighted the need to invest also in digital infrastructure. Saudi Arabia's infrastructure investment needs over the next decade are estimated at 2.8 percent of GDP, mainly in energy and road transport. With higher income levels, these countries' plans for public spending on infrastructure in the medium term generally track their needs.

Regional policy priorities

Policy priorities differ across the region. In most of MNA, policy priorities include addressing low-quality education, reducing youth unemployment, improving governance, and decreasing the state's economic footprint. In agriculture-dependent economies and those with large populations along the coast, adaptation to climate change is a priority. In economies that have faced conflict, a priority is to restore essential services and infrastructure. Among oil-dependent economies, priorities include diversification of production and exports and empowering the private sector.

Increasing public and private investment. Across the region, the scaling back of subsidies since 2014 has created some space for increased public spending on investment in infrastructure, health, and education, but more is needed (Parry, Black, and Vernon 2021). Several policies can raise the volume and efficiency of public and private investment. Countries with insufficient fiscal space to raise public investment to meet their needs could focus on incentivizing the private sector and increasing the efficiency of existing public spending. Improving the business climate by reforming governance and regulatory frameworks and enhancing investor protection could promote private sector investment, as could increased use of public-private partnerships (as, for example, in Morocco; EBRD 2015). In 2010-21, MNA accounted for only 2 percent of EMDEs' infrastructure projects with private participation. Public-private partnerships can improve the efficiency of investment, facilitate technology and skills transfer, and reduce the burden on public budgets (OECD 2019c).

Increasing the role of the private sector in economic activity is vital for most MNA economies. In some oil importers, the electricity sector would benefit from additional privatization (Lebanon) or a larger private sector contribution to electricity generation (Egypt). In Egypt, laws have helpfully been amended to allow the private sector to participate in infrastructure, public services, and public utility projects. Improved security conditions in the region are also essential for a sustained pickup in private investment.

Restoring macroeconomic stability should also be prioritized in economies with large external and domestic imbalances. The weakening of investment growth among oil importers in the past decade was primarily due to fiscal crises in several economies, which originated in poor economic management. To promote macroeconomic stability, countries could act to improve monetary policy frameworks, introduce fiscal rules to decrease the procyclicality of government spending, implement measures to improve debt management, and undertake rigorous public spending reviews to promote more productive outcomes.

Addressing education weaknesses. The region has the lowest share of human capital in total wealth globally, and returns to education are also the lowest of any EMDE region, reflecting in part low-quality education (Lange, Wodon, and Carey 2018; Montenegro and Patrinos 2014; World Bank 2018f). Policies to address weak educational outcomes include updating stagnant education systems to meet the needs of the 21st century—by adopting suitable technology, modernizing teaching methods, introducing vocational training for teachers, increasing learning assessments, and promoting the education of girls.

Addressing healthcare issues. Regarding healthcare, sub-national governments responsible for service provision need predictable transfers from national governments. Effective spending reviews are also needed to reprioritize spending and accurately model the impact of spending choices on human capital outcomes. Pro-health taxation (for example, sugar taxes) could raise funding to meet growing needs and help reduce morbidity (Kurowski et al. 2021). In 2021, the region had the second highest prevalence of diabetes among EMDE regions, only slightly behind SAR, at 12.3 percent of the adult population.

Climate policies. Environmental degradation in the region remains a concern, with low environmental standards, subsidies that promote pollution, and the lack of comprehensive management plans, including for waste management and coastal assets (Heger et al. 2022). Green initiatives, such as rationalizing energy subsidies and introducing carbon taxes, can help address these problems, while also improving fiscal positions. Egypt was the first country in the region to issue a green bond in 2020 to unlock finance for climate-smart projects. If adopted more broadly, this initiative could unlock significant sustainable finance. Empowering the broader public with information could be an important catalyst for change. Thus, governments could improve access to data on localized pollution, climate risk, and vulnerability to improve decision-making and investment design (World Bank 2021f).

SOUTH ASIA

Over 2000-21, investment in the South Asia region (SAR) grew at the strong average rate of close to 8 percent a year, and the region's infrastructure gaps narrowed. But since 2020, investment growth has been dented by the COVID-19 pandemic and war in Ukraine. The demands of a rapidly growing population, often weak education standards, poor healthcare coverage, and high vulnerability to climate change indicate the need for a resumption of sustained, rapid investment growth. Given the limited fiscal space to increase public investment, policies that incentivize the private sector, increase social as well as private returns to investment, and promote greener growth would make filling these investment needs easier.

Introduction

South Asia (SAR) accounted for 8 percent of EMDE investment, on average, over 2011-21. Annual average growth of investment was 7.4 percent in 2000-21, above the EMDE average.[15]

Rapid investment growth in the early 2000s was followed by two periods of weakness in the 2010s that reflected weak output growth, excess manufacturing capacity in the face of sluggish external demand, and policy uncertainty in several countries. Then, in 2020, investment fell by about 10 percent as measures to restrict the spread of COVID-19 and reduced in-person interaction led to a collapse in economic activity and increased policy uncertainty. Fiscal support boosted public investment, but not by enough to offset the drop in investment in the private sector. In 2021, investment rebounded by 15 percent as the roll-out of vaccines and a surge in goods demand boosted activity. Investment growth slowed from about 9 percent a year, on average, in 2000-10 to just over half that rate in 2011-21. Much of that slowdown was due to the private sector, which accounted for four-fifths of total investment in the region on average during 2000-21. The steepest slowdown in investment growth over the two decades to 2021 occurred in India, while in Nepal investment growth increased.

The rebound of investment growth in SAR in 2021 continued in 2022 at 8.4 percent. Nevertheless, investment in 2022 remained 7 percent below pre-pandemic projections. The outlook for investment growth in SAR is highly uncertain, with significant

[15] Throughout this section, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). For the sake of brevity, "investment" is understood to indicate investment levels. Investment growth is measured as the annual percent change in real investment.

downside risks due to soaring inflation, rapid increases in interest rates, several economies in crisis, and rising risks of a global recession.

Investment needs in SAR were large before the pandemic and have only increased since. They include addressing poor healthcare coverage, raising still-low rates of school completion and improving poor-quality education, addressing mounting infrastructure needs to increase the integration of the region's economies into the global economy and to provide for the region's quarter of the world's population, addressing shortcomings highlighted and damage done by the pandemic, and adjusting to, and contributing to the alleviation of, climate change. Governments can help directly by increasing public investment, but limited fiscal space may make this challenging. Governments have other options, including increasing the efficiency of public investment, mobilizing private sector funds by boosting public-private partnerships, and improving the general business climate to promote private investment. Infrastructure investment can play an important role in improving the environment for business, raising labor productivity, and improving household incomes, as underscored by the recent launch of rapid transit systems in Pakistan and broader productivity gains made in the region (Bizimana et al 2021; Mehar 2020).

Evolution of regional investment

Despite the strong average pace of investment growth in the region in the two decades to 2021, there have been two recent periods of weakness. The more recent one, related to the COVID-19 pandemic, resulted in a contraction in fixed investment by about 10 percent in 2020. Despite the strong rebound of 2021-22, investment in 2022 remained 7 percent below what it was forecast to be before the pandemic (figure 4.15). Investment shortfalls from pre-pandemic projections were particularly large in 2022 in Nepal and Sri Lanka.

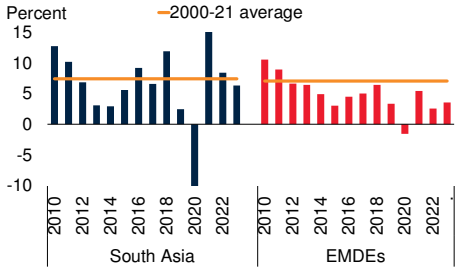
The earlier period of weak investment growth was in 2012-14 and reflected a slowing of SAR's consumption-driven expansion. Investment growth slowed sharply from 13 percent in 2010 and remained weak in the following few years; it was barely 3 percent in 2014. The slowdown reflected weakening growth in India (which accounts for more than three-quarters of the region's total investment), only partially offset by pickups in Bhutan, Nepal, and Pakistan.

In India, structural bottlenecks, including unreliable power, poor road and rail networks, and arduous administrative requirements on business, have been barriers to investment over the past decade, along with banking sector weaknesses that have constrained investment finance. The recent government investment drive recognizes the need to accelerate infrastructure development and unblock impediments to private sector-led growth. Investment growth in India slowed from an annual average of 10.5 percent in 2000-10 to 5.7 percent in 2011-21. In FY2013/14, private investment, which accounted for nine-tenths of total investment, stagnated as global financial conditions tightened rapidly and capital outflows accelerated. Subsequent years saw continued muted investment growth relative to the preceding decade. The slowdown

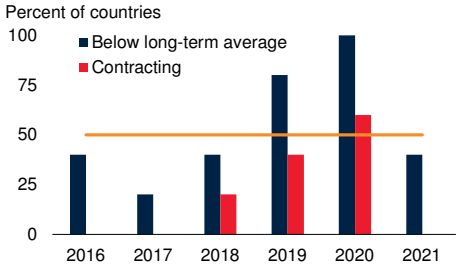
FIGURE 4.15 SAR: Investment growth and correlates

Despite two periods of significant weakness, investment growth was higher in South Asia than in emerging market and developing economies over the last two decades. In recent years, most economies saw investment growth below long-term averages, in spite of improving terms of trade and political stability. The level of investment remains below the pre-pandemic trend as COVID-19 and the war in Ukraine undermine growth. The private sector drives most of the growth in investment.

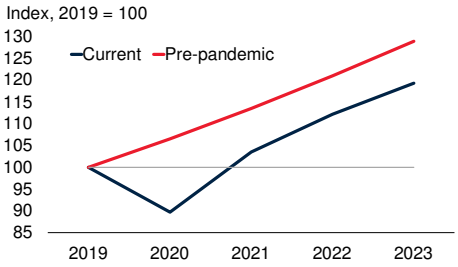
A. Investment growth



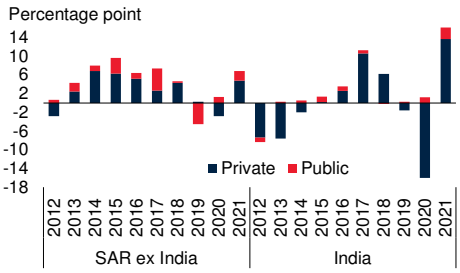
B. Share of SAR countries with weak investment growth



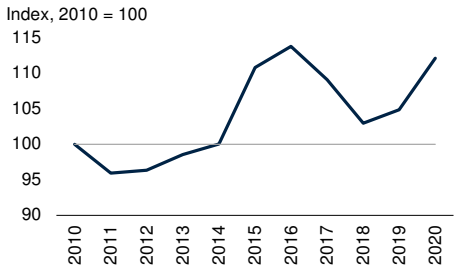
C. Investment



D. Contribution to investment growth



E. Terms of trade



F. Political stability

Sources: Haver Analytics; PRS Group; Ministry of Finance of Sri Lanka; Reserve Bank of India; World Bank.
Note: EMDEs = emerging market and developing economies; SAR = South Asia.
A. Weighted averages. Sample includes 98 EMDEs and 5 from SAR.
B. Share of SAR economies with investment growth below its long-term average or negative. Long-term averages are country-specific and refer to available data over 2000-21.
C. Based on projections in the January 2020 and January 2023 *Global Economic Prospects* reports. 2023 indicates forecast.
D. "SAR ex India" is weighted average for Bangladesh, Nepal, and Pakistan.
E. Investment-weighted averages.
F. Investment-weighted average of International Country Risk Guide's Political Risk Index. An increase denotes greater political stability.

has been attributed to a range of factors, including excess capacity in manufacturing following the 2009 global recession, policy uncertainty, and reforms implemented by the Reserve Bank to address financial sector weaknesses, particularly among state-owned banks (Tokuoka 2012; World Bank 2016c). Stress in the financial sector came to the fore again a few years later and resulted in an abrupt slowdown in private fixed investment in FY2019/20.

COVID-19 led to a 10.4 percent contraction in fixed investment in India in FY2020/21, but a robust recovery followed, assisted by the government's investment drive. Thus in FY2021/22, investment rebounded by 15.8 percent, making the shortfall from the pre-pandemic trend among the smallest in SAR. Public investment in the 2022/23 budget is expected to expand by one-third, and there is also an incentive program to boost private investment. By boosting public investment during years of private sector weakness (2013-16, 2020) the government played an important counter-cyclical role.

In Bangladesh, the region's second largest economy, investment growth was robust in 2000-21, at an annual average rate of 8.3 percent, without any slowing trend—unlike in India. This robust growth reflects strong underlying GDP growth, fed partly by rapid urbanization; a rapidly growing, export-oriented ready-made garment sector; a high domestic saving rate; and high public investment. In fact, public investment in Bangladesh, at 6.5 percent of GDP in 2011-20, was double India's public investment-to-GDP ratio. Also, COVID-19 had a limited economic impact: investment slowed, rather than contracted, growing by 4 percent in the fiscal year ended June 2020, with stagnating private investment offset by a rapid expansion of infrastructure-related public investment. In the three fiscal years to June 2022, public investment grew by 45 percent.

In Pakistan, investment has been subject to pronounced boom-bust cycles over the past two decades, with growth averaging only 3.1 percent a year in 2000-21, among the lowest average growth rates in SAR. In 2011-21, investment growth peaked in FY2014/15 at close to 16 percent and remained high for several years. The 2015 surge mainly reflected the China-Pakistan Economic Partnership infrastructure project and the construction of a gas pipeline from the Islamic Republic of Iran. The former project is part of China's "One Belt, One Road" initiative, and consists of a network of highways, railways, and pipelines to connect Western China to the Arabian Sea through the Gwadar Port in Pakistan. Largely reflecting the impact of the pandemic, investment contracted by 17 percent in the two fiscal years to end-June 2020, and the recovery since then has been anemic. Government estimates for FY2021/22 suggest that investment was still 11 percent below its FY2017/18 peak. Severe flooding in 2022 is forecast to set fixed investment back even further in the next two years.

In Sri Lanka, investment growth averaged about 5 percent a year in 2000-21, with expanding infrastructure investment partly financed by rising external debt. A balance of payments crisis erupted in mid-2022, and with international reserves down to a quarter of their pre-pandemic (end-2019) level, the country abandoned its exchange rate peg and ceased external debt repayments. With the currency depreciating rapidly, inflation

surged. Recurring electricity blackouts and an inability to import sufficient essentials, including food and energy, added to the country's challenges. Debt restructuring will be necessary to start the process of fiscal rehabilitation and macroeconomic stabilization. The crisis has significantly impaired the outlook for investment, which is expected in 2023 to have fallen back to levels last seen over a decade ago.

Regional investment needs

South Asia is the second most densely populated region in the world, behind East Asia and the Pacific, with large and pressing infrastructure investment needs (figure 4.16). Progress in meeting these needs can promote inclusive, sustainable economic growth and private sector activity. Investment needs have increased as a result of the effects of the COVID-19 pandemic, the food and energy security concerns that have arisen from the war in Ukraine, and the challenges of climate change. There is an interplay between recovery from the pandemic and action on climate change. Investments aimed at promoting economic recovery from the pandemic and preparing for future pandemics can be aligned with better climate outcomes and help to decouple future growth from fossil fuels. This is particularly important given the region's high emissions intensity and susceptibility to extreme weather events.

Responding to the pandemic. The pandemic has cost lives, raised morbidity, and reduced educational opportunities for millions of children. A robust investment response is required to reverse many of the pandemic's effects. For example, one estimate suggests that because of the pandemic, average additional (public and private) spending of 2.5 percent of GDP a year through 2030 is needed to meet several sustainable development goals (SDGs; Benedek et al. 2021).

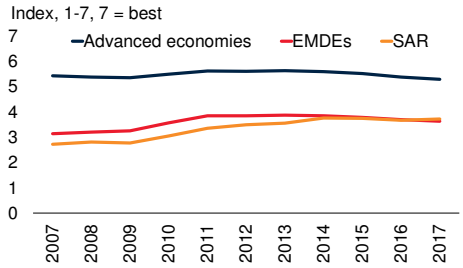
Pandemic-related school closures in SAR averaged 70 weeks through March 2022—much higher than the global average of 41 weeks—and kept nearly 400 million children out of school for significant periods (UNESCO and UNICEF 2021). The loss in educational opportunities is likely to undermine poverty reduction, significantly impair the lifetime earnings of those affected, and reduce social mobility across generations (UNESCO, UNICEF, and World Bank 2021; World Bank 2021g, 2022j). The impact of the pandemic was especially severe for the informally employed, who made up 59 percent of the region's total employment, on average, in 2010-18, significantly more than in other EMDE regions (Ohnsorge and Yu 2021). Income losses were severe given widespread informality in the services sector and the limited ability of informal firms to access government support (Apedo-Amah et al. 2020; World Bank 2020e). South Asia's informal labor force consists predominantly of low-skilled, rural, female, or young workers.

The education crisis caused by the pandemic calls for an urgent response to ensure that learning environments are safe, and learners marginalized by the pandemic are identified and enabled to catch up. To achieve these objectives, investment could focus on providing adequate infrastructure to ensure access to clean water, sanitation, and hygiene facilities; improving communication and information sharing between health

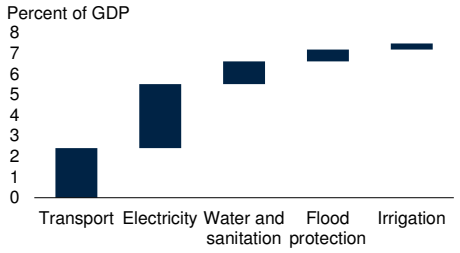
FIGURE 4.16 SAR: Investment needs

Despite improvements since 2010, sizable investment needs still exist in public infrastructure (energy, transport) and human capital development. Years of schooling in South Asia is about half of what advanced economies achieve. Agriculture is vulnerable to climate change and remains a significant part of economic activity and employment. Increasing research and development spending in agriculture could reverse expected productivity losses from the changing climate.

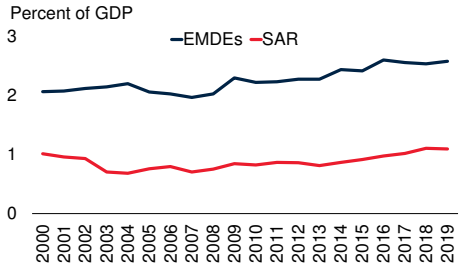
A. Quality of infrastructure



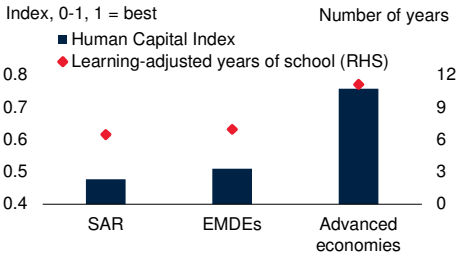
B. Infrastructure investment needs



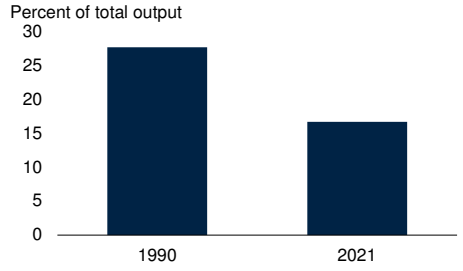
C. Public health expenditure



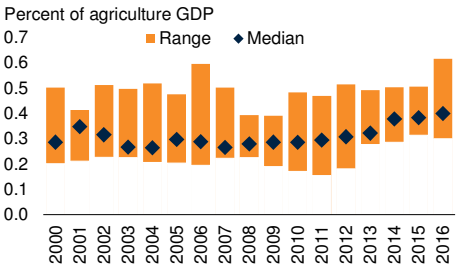
D. Human capital indicators



E. Agriculture output



F. Agriculture research spending



Sources: Agricultural Science and Technology Indicators; Haver Analytics; Rozenberg and Fay (2019); World Bank; World Health Organization.
Note: EMDEs = emerging market and developing economies; SAR = South Asia.
B. Based on the preferred scenario in Rozenberg and Fay (2019).
C. Sample includes 152 EMDEs and 8 from SAR.
D. Sample includes 138 EMDEs (7 from SAR) and 35 advanced economies
F. Based on data for Bangladesh, India, Nepal, Pakistan, and Sri Lanka. "Range" reflects minimum and maximum values.

and education authorities; and establishing infrastructure, including data and technology, to identify, target, and empower marginalized learners (UNESCO and UNICEF 2021; Van Cappelle et al. 2021; Van Cappelle, Chopra, and Ackers 2021).

By late 2022, the pandemic had officially led to over 600,000 deaths in SAR, about one-tenth of COVID-19 deaths globally. The pandemic undermined people's ability to work, study, and care for families and stretched healthcare capacity. The region entered the pandemic with underfunded healthcare systems: the median public health expenditure-to-income ratio was less than half the average for all EMDEs, and there were only 0.6 hospital beds per 1,000 people, the lowest of all EMDE regions. Along with these challenges, medical and personal protective equipment, and testing and tracing infrastructure, remain inadequate. While many countries in SAR had emergency response plans in place before the pandemic, many were designed to address natural disasters. Investing in adequate preparedness, both in fixed investment and beyond, for future pandemics remains vital.

Addressing climate change. The region is one of the most vulnerable to climate-change-induced increases in poverty, disease, child mortality, and food prices, with half its population living in areas expected to become climate hot spots (Amarnath et al. 2017; Hallegatte et al. 2016; Jafino et al. 2020; Mani et al. 2018). Projected losses from climate change for SAR economies are above the global average—as high as 18 percent of GDP per capita for Bhutan (Kahn et al. 2021). Elevated vulnerability, combined with continuing high global greenhouse gas emissions, make investing in mitigation and adaptation key to ensuring long-term sustainable growth (Agarwal et al 2021; World Bank 2022k).[16] The International Finance Corporation in 2017 identified $3.4 trillion in "climate-smart" investment opportunities in SAR from 2018 to 2030, including in energy-efficient buildings, electric vehicles, and green transport infrastructure (IFC 2017).

While the investment needed to achieve climate goals can be difficult to quantify precisely, the areas of investment needs are clear. Rising temperatures and increasingly erratic rainfall will exacerbate food and water shortages, lower agricultural productivity, and increase food price volatility. Agriculture is the sector most vulnerable to climate change, and it accounts for 40 percent of employment and 20 percent of output in SAR. To counter the climate risks to the sector, the region could focus on investing in more efficient growing methods, shifting to climate-smart agriculture to reduce water use and greenhouse gas emissions, and increasing spending on agricultural research and development (Fuglie et al. 2020). In addition, forest restoration can act as a carbon sink to help offset emissions and create jobs, and such policies as water and energy subsidies and grain price guarantees could be adjusted to improve resource allocation.

Air pollution from burning fossil fuels remains a significant cause of climate change and is estimated to have contributed to over 1 million premature deaths in SAR in 2018

[16] South Asia accounted for about 9 percent of global greenhouse gases in 2018 (Friedlingstein et al. 2022).

(Myllyvirta 2020). Fossil fuels also form a large part of the region's import bill. Greater investment in renewable energy sources would reduce air pollution and result in lower public health burdens, increased energy security, and reduced dependence on energy imports.

SAR's rapid rate of urbanization—the second-fastest among EMDE regions, into cities that are among the most exposed to climate risk—calls for investment in climate change adaptation. This includes improvements in land-use and zoning policies, investment in resilient transport and building infrastructure, enhanced service delivery, and improved disaster preparedness.

Infrastructure investment needs. Despite significant progress in expanding infrastructure in many SAR economies, both the quality and quantity of infrastructure in the region are still lower than in other EMDE regions (Bizimana et al. 2021). SAR is also one of the least economically integrated regions in the world, with inadequate transport and power infrastructure partly to blame (ADB 2009; World Bank 2016d). Rozenberg and Fay (2019) estimate that the average annual investment needed in South Asia to meet infrastructure-related sustainable development goals by 2030 is 7.5 percent of GDP—the second highest among EMDE regions. The ADB has estimated that this rises to 8.8 percent of GDP if climate needs are included (ADB 2017).

In India, the 2020 National Infrastructure Pipeline task force identified plans for investments amounting to the equivalent of about half of the country's FY2021 GDP on infrastructure projects between FY2019-FY2025. The investments are in roads, railways, air and seaports, energy, and other infrastructure. Investment in the power sector is needed to meet growing energy demands, with total installed capacity expected to increase by two-thirds by 2025. Investment is also needed to shift energy production to renewable sources, improve access, and increase the efficiency of the sector. Electricity distribution loss is 19 percent in India, more than double the global average.

Bangladesh's infrastructure requires various improvements. Poor logistics currently hinder investment and international trade (World Bank 2021h). Logistic costs have been estimated to add 5-48 percent to production costs across sectors owing to congestion, poor reliability, poor quality, and widespread informality (World Bank 2021h). While investment in the power sector has effectively met capacity needs over the last decade, further investment will help connect households to energy providers, diversify sources of power, and meet future needs (Government of Bangladesh 2020). To meet demand for electricity through 2030, investment equivalent to 15 percent of FY2022 GDP is estimated to be needed in the coming years (Government of Bangladesh 2020). In the transport sector, the road network remains inadequate, although investment in other modes of transport could reduce need. The 8th Five Year Plan estimates that to achieve its goals, investment must increase by 5 percent of GDP between FY2020 to FY2025, mainly in the private sector and through foreign direct investment.

Investment in human capital. Investment needs in health and education go beyond addressing the damage inflicted by the pandemic. Many countries in the region perform

poorly on achieving universal health coverage. The region suffers from too few healthcare professionals, low spending on public health—only 2 percent of GDP, below all other EMDE regions—and shortages of healthcare equipment (World Bank 2021g). The lack of adequate healthcare, together with high poverty levels and inadequate nutrition, means that about one-third of children in the region are stunted and four percent do not live past the age of five. In education, learning gaps remain wide, indicating a need for additional resources to empower teachers, address geographic inequalities, and adopt new methods of teaching. Thus, countries in the region generally fall short in enabling citizens to meet their productive potential. A child born in SAR is expected to attain only 48 percent of his or her productive potential, the second worst performance among EMDE regions. Sizable additional outlays on human capital investment could alleviate poverty and increase the productive potential of millions of citizens (Estache and Garsous 2012; Romer 2016).

Regional policy priorities

With limited fiscal space in the region, meeting investment needs will be challenging. It will require reforms that reduce longstanding obstacles to the growth of productivity and investment, and more efficient spending. A targeted, multi-pronged, policy strategy is needed that encourages investment by increasing returns on capital, and by expanding sources of financing (Henckel and Mckibbin, 2017; Nataraj 2007).

Public investment promoting private investment. Under the right conditions, public investment can crowd-in private investment (World Bank 2016c).[17] For example, private firms may be able to reap the benefits of scale if public infrastructure facilitates market access (Calderón, Moral-Benitob, and Servéna 2010). Literature on India appears to suggest a positive crowding-in effect (Bahal, Raissi, and Tulin 2015; Jesintha and Sathanapriya 2011; World Bank 2006).

Efficiency of public investment. On average, countries lose about one-third of public investment expenditures through inefficiencies, and the rate is highest among Asian economies (Baum, Mogues, and Verdier 2020). One way to boost the efficiency of public investment would be to reform weak public investment management practices (Vu, Bizimana, and Nozaki 2020). Reforms could include improving project appraisal (with better technical, economic, and financial analysis), improving project selection (by centralizing project review and increasing transparency), improving maintenance funding throughout the project's life, and creating up-to-date and efficient registries to monitor public assets.

Financing. Financing for public and private investment can be expanded in several ways to help meet investment needs (ADB 2009, 2012, 2022; Andres, Biller, and Dappe 2014; Dobbs et al. 2013). *First*, public-private partnerships may offer gains in efficiency and cost-effectiveness (for example, by containing the increase in public debt), raise

[17] Public investment could also lead to crowding-out of private investment, as seen in Pakistan (World Bank 2016e).

economic growth, and at the same time alleviate fiscal pressures (Anadon and Surana 2015; Bizimana et al. 2021; Lee et al. 2018; Nataraj 2007). Such partnerships can draw private funding and expertise into socially desirable projects that would not be undertaken by the private sector alone because of low private rates of return. The provision of water services and sanitation projects are good examples. Between 2010 and 2021, one-fifth of EMDE infrastructure projects with private participation were in South Asia.

Second, domestic savings can be better mobilized both by improving access to the financial system (for example, encouraging pension funds) and by broadening and raising government revenue collection. Goods and services taxes implemented in India in 2017, for example, doubled India's tax base in four years. Other tax reforms could increase tax revenue by 3-4 percentage points of GDP and thus provide additional funding for investment (ADB 2022).

Third, banks' lending capacity can be increased through action to strengthen their balance sheets, and the efficiency of capital allocation can be improved by increasing the commercial orientation of banks, including through privatization and governance reforms.

Fourth, increasing the commercial orientation of state-owned enterprises, through better regulation, privatization, or concessions to private investors, could raise efficiency and increase investment.

Fifth, asset-liability mismatches in government accounts can be reduced by tapping capital markets (for example, by issuing infrastructure bonds) rather than relying on bank lending for infrastructure-related projects.

Finally, foreign direct investment (FDI) in infrastructure can be encouraged by removing regulatory obstacles to conducting business in restricted sectors (Kirkpatrick, Parker, and Zhang 2006; World Bank 2000). With FDI inflows in SAR averaging only 1.5 percent of GDP in 2000-21, tied with the Middle East and North Africa for the lowest among EMDE regions, there is scope to encourage further FDI inflows.

Reforms to foster an enabling environment for private investment. SAR's business climate ranks just ahead of Sub-Saharan Africa, but behind other EMDE regions (Lopez, Acevedo, Medvedev, and Palmade 2016; World Bank 2016f). In Bangladesh, India, and Pakistan, entry and administrative barriers have hampered investment in construction, finance, retail and wholesale trade, telecommunications, and health care. In India, the burden of regulatory compliance, delays in utility connections, difficulties in obtaining permits to start and operate a business, high taxes, and rigid labor markets raise the cost of doing business and discourage investment (Pachouri and Sharma 2016; Shirke and Srija 2014). Additionally, in India, investors cite restrictive labor laws as factors that limit employment opportunities for women and discourage the adoption of new technologies., thereby reducing productivity in manufacturing. During 2019-20, India consolidated, rationalized, and simplified several labor laws.

Reforms that promote international competitiveness and reduce barriers to international trade can encourage investment in export-oriented and import-competing sectors (Alfaro and Chari 2014). More generally, reforms to reduce regulations that are unnecessarily cumbersome (for example, in certain aspects of land acquisition and environmental impact assessments) and to strengthen public-private partnership legislation (for example, consistent regulations, transparent bidding procedures) can foster investment. Strengthening public investment management processes, integrating infrastructure projects into budget cycles, and curbing corruption in infrastructure projects will not only improve the quality of infrastructure, but also improve the efficiency of government spending (Ali 2009; KPMG 2015). In several countries, stalled reforms on land acquisition, including in relation to compensation and environmental clearances remain an impediment to infrastructure-related private investment.

Reforms to enhance the efficiency of labor markets—encouraging greater female labor market participation, facilitating hiring and redundancy procedures, promoting training and retraining, and reducing taxes on low-paid workers—would increase the mobility and flexibility of the workforce (Shirke and Srija 2014). Should profits and household incomes subsequently rise, businesses will be incentivized to expand operations.

Regional integration. Trade within the SAR region is less than a third of its potential, limiting inflows of FDI as well as gains from trade (Kathuria, Yatawara, and Zhu 2021). Security challenges and geopolitical tensions remain an obstacle to a more conducive investment climate, especially for cross-border projects that could increase regional economic integration (Dash, Nafaraj, and Sahoo 2014). To create an environment more conducive to higher investment, the region could relax restrictive and opaque outward FDI regimes. Decreasing dispute resolution times would also help, as would rationalizing land ownership and sector-specific restrictions. Economies could also facilitate and promote inward FDI by improving cross-border networks and information sharing. This might lift intraregional inward FDI, which currently makes up less than 1 percent of total inward FDI. Finally, bringing down trade costs, averaging the equivalent of 134 percent tariffs in SAR and the highest among EMDE regions, could be achieved partly through digitalization, streamlining border and customs procedures, investing in ports and connectivity, and promoting regional trade agreements (Ohnsorge, Quaglietti, and Rastogi 2021).

SUB-SAHARAN AFRICA

Many countries in Sub-Saharan Africa (SSA) experienced a sharp deceleration in investment following the commodity price collapse of 2014-16. The rebound in 2018-19 was halted by the COVID-19 shock, which caused a significant decline in investment in 2020. The subsequent recovery has been tepid. SSA countries have some of the largest investment needs among EMDEs. The region needs to close infrastructure gaps, reverse the damage inflicted by the pandemic and the repercussions of the war in Ukraine, reduce vulnerabilities to climate change, and enhance food security. But without meaningful reforms and stronger international support, the prospects for stronger investment growth will remain very challenging amid increasing public debt and tightening access to external financing.

Introduction

Sub-Saharan Africa (SSA) accounted for about 3 percent of EMDE investment during 2011-21, with average annual investment growth of 3.3 percent.[18] Following the commodity price collapse of 2014-16, SSA suffered the sharpest investment growth slowdown among EMDE regions, from an average of 5.9 percent a year in 2011-14 to a decline of 0.3 percent a year in 2015-17, well below the long-term (2000-21) average annual growth rate of 4.6 percent. Investment growth picked up to 6.3 percent a year during 2018-19, before being halted by the COVID-19 pandemic. This triggered a 5.8 percent drop in investment in the region in 2020, much larger than the 1.5 percent decline in EMDEs as a whole. The subsequent recovery has been tepid.

Much of the slowdown in investment growth in SSA since 2014 is accounted for by weakness in South Africa and the oil exporters, especially Angola and, to a lesser extent, Nigeria. Even by late 2021, investment in Nigeria and South Africa, the region's two largest economies, was 3 percent and 20 percent lower, respectively, than in 2014. Investment declined in South Africa every year between 2016 and 2020 against the backdrop of a major deterioration in the country's economic performance. In 2011, South Africa accounted for almost a quarter of all investment spending in SSA; by 2020, its share had fallen to about 16 percent. Elsewhere in SSA, investment growth slowed in commodity-dependent economies in the wake of the declines in commodity prices in 2014-16. For the region as a whole, investment growth slowdowns reflected not only a

[18] Throughout this section, unless otherwise specified, investment refers to real gross fixed capital formation (public and private combined). For the sake of brevity, "investment" is understood to indicate investment levels. Investment growth is measured as the annual percent change in real investment.

sharp terms of trade deterioration but also domestic political tensions and fiscal consolidation in several countries to stabilize public debt-to-GDP ratios. Such increased fiscal stringency was a necessary reaction to the prior buildup of vulnerabilities during the rapid growth of the early 2010s. These included, in particular, rising public debt and widening current account deficits that in part reflected debt-financed public investment surges.

Since 2020, public investment has been constrained by a rapid buildup of government debt because of the COVID-19 pandemic, renewed fiscal pressures arising from weaker revenue growth and the repercussions of Russia's invasion of Ukraine, and the tightening of global financing conditions. Although investment growth is expected to be close to its long-term trend rate in 2022-23, it will be insufficient to meet investment needs. For example, the region's infrastructure investment needs are the largest among EMDE regions and are estimated to be roughly four times recent infrastructure spending. SSA needs a substantial acceleration in investment, not only in infrastructure but also in agriculture, health and education, and social protection. An acceleration in investment would also reinvigorate economic growth and reverse pandemic-induced increases in poverty and inequality. Given fiscal constraints, it has become urgent to mobilize alternative sources of funding, including from the domestic private sector and the international community. Private sector participation in infrastructure projects in the region is growing but remains limited.

To boost both public and private investment, SSA governments need to take action on a wide range of policies. These include efforts to improve tax collection to generate revenue for public investment, improve spending efficiency, enhance private-public partnership (PPP) frameworks to encourage more private sector involvement in infrastructure projects, strengthen the governance and efficiency of state-owned enterprises, advance efforts to deepen regional integration to open opportunities for growth-enhancing intraregional infrastructure projects, and improve the business environment to encourage private enterprise and private investment growth.

Evolution of regional investment

Extractive industries—minerals, metals, oil, and gas—play an important role in many resource-intensive economies in SSA. The resulting exposure to fluctuations in the global prices of these commodities, combined with the lumpiness of the large capital outlays intrinsic to the exploration-to-production cycles in extractive industries, makes economic growth and investment particularly volatile across the region, especially in SSA's less diversified economies. Foreign direct investment (FDI) inflows into the region tend to be pro-cyclical and concentrated in extractive sectors, with limited technology transfers or growth spillovers to non-resource sectors. Extractive industries are also a major source of fiscal revenues for many SSA governments, which often struggle to collect tax revenue from non-resource sectors. Public investment surges, often debt-financed during periods of booming commodity prices, tend to fizzle out quickly when external conditions deteriorate.

For SSA as a whole, investment growth averaged 3.3 percent a year in 2011-21—almost half of its annual average in 2000-08 (figure 4.17.A). Rapid public investment growth cooled after 2014, and private investment decelerated sharply. For example, investment growth in Ethiopia averaged almost 28 percent a year in 2008-14, driven by exceptionally rapid public infrastructure investment (World Bank 2015). However, investment growth slowed sharply to just 9.3 percent in 2015-21 because of elevated public sector debt, unfavorable external environment, and rising insecurity. Severe economic slowdowns in the region's two largest economies, Nigeria and South Africa, had adverse spillovers on investment across the region as well. In 2021, investment growth was below its 2000-21 average in almost half of SSA countries, and negative in about 16 percent of countries (figure 4.17.B).

Investment fell by 0.7 percent per year, on average, in South Africa in 2011-21, compared with over 9 percent average annual growth in 2000-08. This decline reflected a sharp deterioration in the country's economic fundamentals stemming from the lack of policies to tackle underlying structural constraints, including substantial inefficiencies in state-owned enterprises (SOEs), high unemployment, and the energy crisis triggered by worsening power cuts. Investment by SOEs has played a major role in South Africa, representing almost 45 percent of all public sector capital expenditure in 2014-20, although this share has declined over time. Much of the recent weakness in public investment spending can be attributed to Eskom. Eskom is a public utility supplying electricity, which accounts for about a half of all capital expenditure by SOEs and has had significant governance and profitability problems (Statistics South Africa 2021).

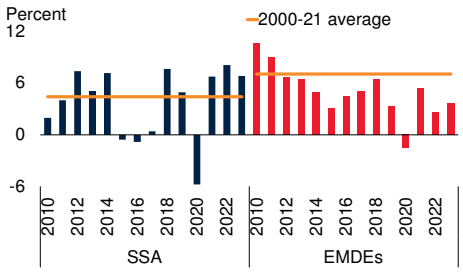
Among oil exporters, investment growth also slowed significantly after 2014 in Angola, Chad, and Nigeria, and turned negative in Equatorial Guinea, where oil production fell by nearly 60 percent from 2014 to 2021. The effects of the sharp decline in oil prices in the mid-2010s were exacerbated by combinations of weak business environments, new capital and foreign exchange controls (Angola, Nigeria), austerity measures to offset falling commodity revenues (Angola, Chad, Nigeria), and deteriorating security situations (Nigeria, Chad). Together, these weighed heavily on investor sentiment. Falling capital spending in the SSA oil sector also reflected a secular decline in oil production because of aging oil fields and increasing production costs. Investment was further depressed in 2020 by pandemic-related stoppages, supply chain problems, and maintenance delays (Cherif and Matsumoto 2021). Fiscal space also diminished considerably for many of the region's oil producers, with sharp declines in tax revenues from the oil sector, which constrained public investment. Even so, in some countries (Cameroon, Gabon) large infrastructure investment programs continued, boosting investment growth despite declining oil industry investment.

Similar to SSA oil exporters, investment growth in other commodity-exporting countries slowed sharply in 2015-17. Strong economic growth during 2011-14 had been accompanied by rapidly rising economic imbalances, including increasing private and public sector indebtedness and widening current account deficits. Pressures arising from these imbalances contributed to a broad-based investment growth slowdown when

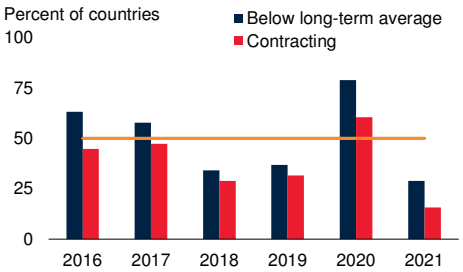
FIGURE 4.17 SSA: Investment growth slowdown

Investment growth in SSA slowed sharply after 2014 as commodity prices slipped. After a recovery in 2018-19, it turned negative in 2020 during the COVID-19 pandemic. Generally weak investment growth since 2014 reflects a terms-of-trade deterioration among commodity exporters, sharply slower GDP growth in SSA's two largest economies, diminished fiscal space, declining external financing, and rising policy uncertainty and insecurity in some countries.

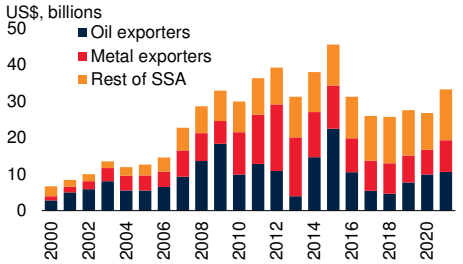
A. Investment growth



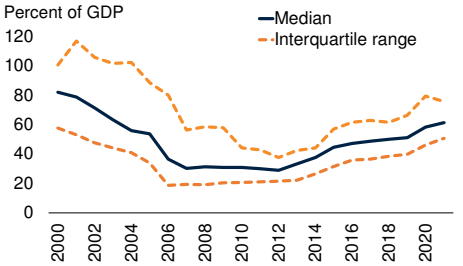
B. Share of SSA EMDEs with weak investment growth



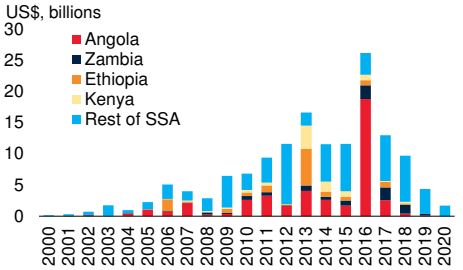
C. Gross foreign direct investment inflows to SSA, excluding South Africa



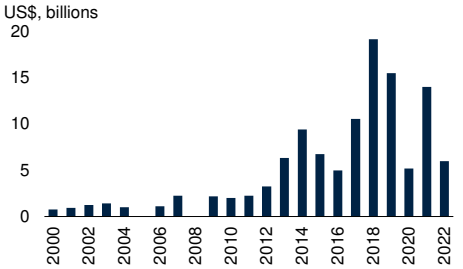
D. General government debt in SSA



E. Chinese loans to SSA economies



F. International bond issuance by SSA governments



Sources: Dealogic; Haver Analytics; Global Development Policy Center (Boston University); International Monetary Fund; World Bank; United Nations Conference on Trade and Development.

Note: EMDEs = emerging market and developing economies; SSA = Sub-Saharan Africa.

A. Weighted averages. Includes 98 EMDEs, of which 38 are SSA.

D. Median values. Dotted lines indicate interquartile range.

E. Loan commitments to SSA governments and state-owned enterprises from Chinese commercial banks, government entities, companies, and other financing sources.

F. Last observation is July 2022.

commodity prices fell during 2015-17. Other contributory factors included a weak economic recovery in the European Union (EU), slowing growth in China, tightening global financial conditions, and a weakening of SSA currencies. The EU, the United States, and China are the region's main sources of foreign investment, which cooled appreciably over the period and accelerated the decline in capital spending. Namibia, which relies on exports of such commodities as gold, copper, and uranium, illustrates these trends. In the early 2010s, investment accelerated amid a boom in mining and expansionary fiscal policy. But investment declined in every year between 2015 and 2021 as the government pursued fiscal consolidation to stabilize its debt-to-GDP ratio and as the growth of credit to the private sector slowed sharply (IMF 2019). As a result, investment in Namibia fell from about 36 percent of GDP in 2014 to just 14 percent of GDP in 2021.

Private investment in SSA was also held back by weakening FDI inflows to the region. FDI inflows to SSA excluding South Africa increased from 1.8 percent of GDP on average in 1990-99 to almost 3.0 percent of GDP in 2000-15. However, it fell back to 2.1 percent of GDP in 2016-20 as commodity prices declined. After falling sharply in 2020, FDI inflows recovered somewhat in 2021 on higher commodity prices and muted global risk aversion, but in relation to GDP they remained at their lowest level in almost two decades. In U.S. dollar terms, FDI inflows to SSA excluding South Africa in 2021 were still nearly 30 percent lower than in 2015 (figure 4.17.C).

In addition to the unfavorable external environment, the slowdown in investment growth after 2014 also reflected weakening domestic macroeconomic fundamentals and policies, and uncertainties related to poor institutional and legal frameworks in some countries. Deteriorating fiscal and external current account positions across the region limited the ability of policy makers in some countries to conduct countercyclical policies to support economic activity. In parallel, rising vulnerabilities weighed on capital inflows. Large current account deficits coupled with declining capital inflows put pressure on exchange rates. In several commodity exporters, increases in inflation, in some cases reflecting deep currency depreciations, prompted central banks to tighten policy, making it more costly for firms to invest.

In many countries, particularly among resource-rich economies, there has been a failure to implement basic reforms to improve the business environment and rule of law. Uncertainty about the enforcement of contracts and property rights, and the direction of policies, has added to weak capacity for investment planning and execution. These factors have played a significant role in depressing investment across the region.

On the fiscal side, debt-financed public investment spending failed to sustain investment growth momentum when commodity prices collapsed. In the early 2010s, a favorable external environment, increased financial market access, and growing bilateral lending by China encouraged many SSA governments to scale up public investment to help close large infrastructure gaps. These public investment booms temporarily supported growth in many countries but also resulted in sharp increases in public debt. Indeed, after declining significantly following the IMF and World Bank's Heavily Indebted Poor

Countries Initiative and the IMF's Multilateral Debt Relief Initiative, public debt in SSA began to rise again in 2013 (figure 4.17.D). As countries shifted towards non-concessional borrowing, debt servicing costs rose and currencies depreciated; in some countries, official development assistance declined (Agou et al. 2019).

The COVID-19 pandemic subsequently saw public debt-to-GDP ratios again rise sharply across the region, with many governments prioritizing current spending over public investment. In 2020, general government gross debt in SSA increased by over 10 percentage points of GDP, on average, reaching 72 percent of GDP in 2020, which was well above the 64 percent of GDP recorded in other EMDEs. Surging food, fertilizer, and fuel prices, partly owing to Russia's invasion of Ukraine, have heightened fiscal pressures in many countries, constraining the ability of governments to increase public investment. More recently, rising global borrowing costs, coupled with a drop in bilateral lending from China, have tightened access to external finance, posing further headwinds to investment (figure 4.17.E). Indeed, in 2022, international bond issuance by SSA countries fell by over 60 percent (figure 4.17.F). Although this mirrors the overall trend of weak EMDE bond issuance, the decline was the second steepest among EMDE regions, after the Middle East and North Africa.

Regional investment needs

SSA's strategic priority objectives—to reinvigorate economic growth and reduce poverty—will require investments in agriculture, infrastructure, health and education, and social protection (World Bank 2022k). The COVID-19 pandemic has dealt a serious blow to SSA's progress in poverty reduction and income convergence with advanced economies, hitting the region's low-income countries (LICs) particularly hard. Additional financing equivalent to 27-37 percent of SSA's 2022 GDP may be needed by 2025 to return SSA to its pre-pandemic income convergence path (IMF 2021b).

In *agriculture*, which provides a livelihood for almost two-thirds of SSA's population, investment in both physical capital and technology is needed to raise labor productivity. Increasing investment in agricultural R&D is not only essential for boosting growth in the region but also for accelerating the transformation of farming in SSA toward more productive and resilient food systems (Fuglie et al. 2020). Infrastructure investment is also needed to support agricultural productivity growth and export diversification. This includes investment to build or improve irrigation, road, and storage infrastructure, and to develop higher value chains in agriculture.

Infrastructure investment more broadly is a key driver of growth in SSA, where it has accounted for over half of the improvements in economic growth in SSA in the last decade (AfDB 2020). Several countries in the region have made progress in improving their infrastructure. Ethiopia and Tanzania, for example, increased public spending on large infrastructure projects and improved the quality of existing infrastructure assets, which contributed to their strong pre-pandemic growth performance.

Across the region, advances in *infrastructure for information and communications technology and connectivity,* primarily reflecting an unprecedented increase in mobile

phone subscriptions, have helped move millions of households out of extreme poverty, particularly in rural areas (Bahia et al. 2020; World Bank 2021i).

By contrast, progress in *power infrastructure* has been far more limited, with power shortages and blackouts continuing to constrain economic activity across the region, especially in South Africa. Only about one-half of households have access to electricity in SSA compared to over 90 percent worldwide. Deterioration in the quantity and quality of power infrastructure has increased the need for investment in renewable energies. These have the potential to improve access to electricity while addressing climate change challenges.

Transport infrastructure development has also been limited. In many countries, only a small proportion of the road network is paved, and railway development is broadly inadequate. Higher-quality transportation infrastructure will be key to boosting intra-Africa trade, fostering the development of regional supply chains, and enhancing SSA's integration into the global economy. The African Continental Free Trade Agreement (AfCFTA) could catalyze the modernization of SSA transportation networks and facilitate cross-country cooperation on large intra-regional transportation projects. For example, the implementation of AfCFTA could increase demand for intra-Africa freight by more than a quarter, which would require substantial improvement to road and rail connectivity in SSA (UNECA 2022).

The region's annual infrastructure investment needs are estimated at over 9 percent of GDP—the largest among all EMDE regions and nearly four times estimated current infrastructure spending in SSA (figure 4.18.A; Fay et al. 2019; Rozenberg and Fay 2019). The gap between needed and actual investment reflects insufficient funding for new projects, limited private sector participation, and inefficient spending on the operation and maintenance of infrastructure assets.

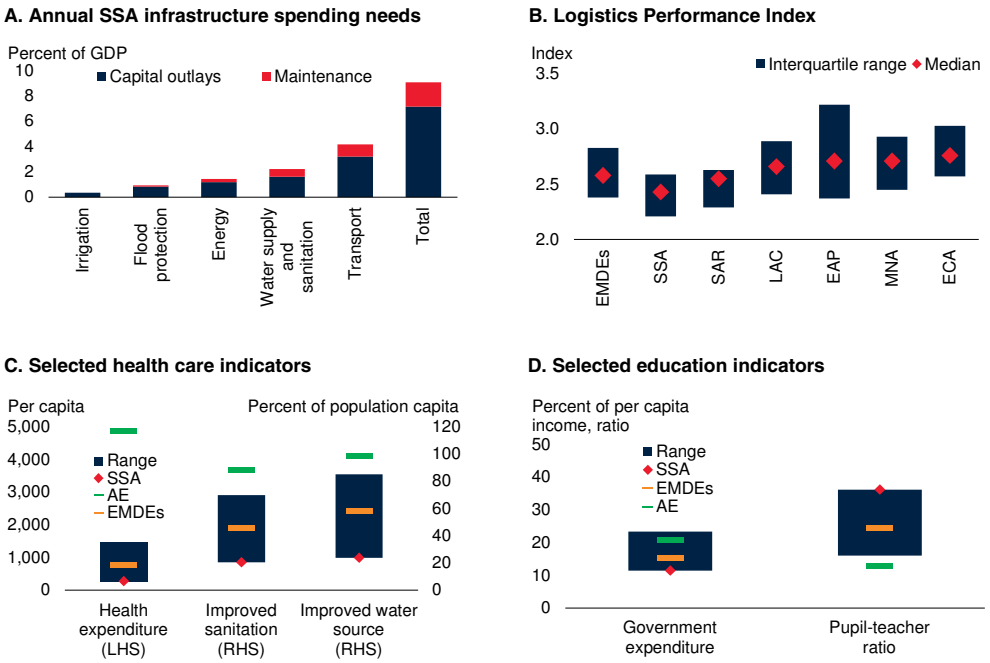
Many of the region's economies rely on official external funding sources—multilateral and bilateral—to help finance investment in infrastructure. Official development finance, led by the World Bank and the African Development Bank, has increased appreciably and is supporting transport and water and sanitation investments in a number of countries. China has also emerged as a major bilateral source of infrastructure finance, increasingly so in the energy sector, particularly in hydropower-related projects.

Private sector participation in infrastructure investment has also increased recently following a large decline in the mid-2010s. Private participation in 2020 accounted for nearly one-fourth of infrastructure funding commitments, compared to just 3 percent on average in 2016-17, with a large share of the investments going to the telecom, energy, and transport sectors (ICA 2022).

However, despite improved access to infrastructure financing in the late 2010s, bolstered by increased private sector participation, substantial infrastructure financing gaps remain (ICA 2018). The pandemic has widened these gaps further, while rising

FIGURE 4.18 SSA: Investment needs

Sub-Saharan Africa's investment needs are relatively high across a wide range of sectors. Despite some progress in improving infrastructure in the region, SSA continues to lag behind other EMDE regions, especially in energy and transport. It also lags in human capital accumulation.



Sources: Haver Analytics; International Monetary Fund; Rozenberg and Fay (2019); World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A. Average annual cost of investment in the "preferred scenario", 2015-30 (Rozenberg and Fay 2019).

B. Logistics Performance Index (LPI) measures the performance of trade logistics and is a weighted average of country scores on six key dimensions: customs performance, infrastructure quality, ease of arranging shipments, logistics services quality, consignments tracking and tracing, and timeliness of shipments. A higher value indicates better performance; for example, Germany's LPI (top performer) is 4.2.

C. Blue bars denote range of unweighted regional averages across EMDE regions. Health expenditure per capita in purchasing power parity terms, unweighted averages of 199 EMDEs (47 in SSA) and 34 advanced economies. Access to improved sanitation facilities (in percent of population), unweighted averages for 150 EMDEs (47 in SSA) and 33 advanced economies. Access to improved water sources (in percent of population), unweighted averages for 148 EMDEs (47 in SSA) and 34 advanced economies. Latest data available during 2011-15.

D. Blue bars denote range of unweighted regional averages across EMDE regions. Government expenditure per primary student (in percent of per capita income), unweighted averages of 87 EMDEs (29 in SSA) and 32 advanced economies. Pupil-teacher ratio in primary education (headcount basis), unweighted averages for 165 EMDEs (44 in SSA) and 31 advanced economies. Latest data available during 2011-15.

global fiscal pressures have seen multilateral and bilateral lending to SSA decline. Lending from China has also weakened substantially on growing concerns about mounting public debt and increasing credit risks in SSA.

Across the region, investments are needed to raise the quality of *education and skills*, improve the *health* of populations, and expand access to basic public services, notably sanitation. Despite recent progress, SSA is behind other regions in human capital

accumulation, partly because of insufficient investment spending on education and health (Figure 4.18.C and D).

Finally, the COVID-19 pandemic has illustrated the importance of *social safety nets* as an effective tool to respond to crises. Investments in social protection could improve economic resilience, reduce poverty, and decrease income inequality across the region. Many SSA governments have achieved some progress in building more responsive, efficient, and inclusive social safety nets. However, population coverage remains low, partly because of the high prevalence of informality, leaving many vulnerable populations exposed to income and consumptions shocks, such as, for example, during the recent surge in food and fuel prices.

Regional policy priorities

The COVID-19 pandemic and recent deterioration in the growth outlook for many SSA economies have created formidable challenges to the aim of strengthening the growth of investment, and particularly to the financing of infrastructure investment, in the region. In 2020, many countries diverted already limited public resources from infrastructure projects to emergency spending on health and support for demand. Lockdowns, travel restrictions, supply chain disruptions, and higher input costs resulted in delays in project preparation and implementation. Since 2021, tightening global financing conditions and investment rating downgrades have raised borrowing costs and complicated access to international financial markets. As a result, funding commitments for infrastructure investment in SSA, after exceeding $100 billion in 2018 for the first time, have declined, leaving many untapped opportunities, including in renewable energy, climate resilience, digitalization, and agriculture, among other areas that can support private sector development.

On a positive note, innovative financing solutions for infrastructure investment that mitigate key risk factors have been spreading rapidly in SSA. Tools such as blended finance, co-financing between private investors and development finance institutions, public-private partnerships, and climate finance instruments are being deployed in countries across the region (AfDB 2022).

Nevertheless, financing investment projects remains challenging. Private investment has become more significant in a broad range of countries, albeit mainly in information and communications technology. Despite the rising importance of private finance (with private funding commitments for infrastructure investment having reached $19 billion in 2020, its highest ever level) and external finance, public sector budgets remain the primary source of funding for infrastructure investment in the region, accounting for over 41 percent of all infrastructure spending commitments in 2020 (ICA 2022). Countries across the region finance about 65 percent of their infrastructure expenditures with domestic resources. In many countries, the fiscal space created by debt relief for heavily indebted poor countries, together with high commodity prices, facilitated these expenditures in the early 2010s. Other countries took advantage of improved access to markets and low interest rates to issue eurobonds to finance infrastructure in the late

2010s. However, fiscal space has since diminished substantially across the region, both because of the rapid public debt build-up during the COVID-19 pandemic and more recently due to tightening global financing conditions and budgetary pressures to offset surging living costs, especially in LICs.

The capacity of countries in the region to use resources effectively for infrastructure investment remains a critical issue as well. The efficiency of public investment in SSA lags that in other EMDEs, reflecting poor project selection; weak enforcement of procurement procedures; failure to complete more impactful long-term projects; inadequate infrastructure-policy frameworks; and weak capacity to assess key technical, financial, and fiscal risks associated with large-scale projects. These weaknesses point to a need to increase the capacity to scale up investment in public infrastructure.

SSA's infrastructure development faces major geographic and physical challenges, reflecting the region's low population density, low urbanization, large number of landlocked countries, and substantial vulnerability to climate change (Rigaud et al. 2018). Also, in the sizable number of small countries, it is difficult to exploit economies of scale. Adding to the challenges are inadequate trade logistics, which lag other EMDE regions. That said, large gains may still be possible through deeper regional integration of transportation and customs infrastructure, including simplification and standardization of regulations and procedures.

There are several policy areas where reforms can help address investment needs and ensure sustainable financing:

- *Sustaining public investment.* Domestic fiscal resources—tax and nontax revenues—are likely to remain the dominant source of financing for infrastructure investment. However, the median ratio of tax revenues to GDP is just 12 percent in SSA compared to 17 percent in other EMDEs. Enhancing domestic revenue mobilization would provide the most sustainable way of financing infrastructure investment. This would require improving tax collection as well as cost recovery. Without enhanced fiscal revenues, scaling up public investment spending will entail challenging tradeoffs to maintain debt sustainability, especially given that in many SSA countries public debt has increased over the past decade and that access to international borrowing has recently tightened substantially.

- *Encouraging greater private sector participation in infrastructure investment.* In 2021, investment commitments in infrastructure with private participation stood at just 0.3 percent of GDP in SSA compared to almost 0.5 percent of GDP in Europe and Central Asia and Latin America and the Caribbean (World Bank 2021j). Considering SSA's substantial infrastructure gaps, many countries need to expand the pipeline of projects that can attract private investors. Innovative funding and deal structures that utilize novel guarantees and risk-sharing mechanisms can be developed. Blended finance instruments can leverage private sector development financing. Public-private partnerships (PPPs) are a tested strategy that can be

applied to numerous sectors. However, SSA has one of the lowest average scores across many dimensions of PPP preparation, management, and enabling laws and regulations (World Bank 2018g). The terms of partnerships need to be monitored carefully to ensure PPPs deliver competitive returns, and to prevent abuse of market power where natural monopolies are the best way to deliver infrastructure services. Governments can establish autonomous regulatory agencies to oversee private agents accordingly.

- *Strengthening public investment management systems.* Increased capacity in public financial management is critical for scaling up infrastructure investment. Countries can strengthen technical capacity for project selection and appraisal, and enhance the monitoring of project execution to minimize inefficiencies and overspending. The fiscal implications of public investment projects, including PPP, are often not adequately addressed. Contingent liabilities linked to public investments need to be incorporated into fiscal expenditure frameworks. Failure to do so could raise concerns about the sustainability of public debt. Operation and maintenance expenditures for existing infrastructure can be fully integrated into a medium-term expenditure framework to ensure adequate budgetary resources. Long-term credible national infrastructure strategies can provide signals that lead to improved financing and supply chain capacity, improving delivery prospects. Regrettably, in some countries, policy uncertainties still lead to the selection of low-impact infrastructure projects because of short political cycles.

- *Promoting regional integration of infrastructure*. A regional approach to the provision of infrastructure services is needed to help overcome the region's geographic and physical challenges, which are often amplified by poor transport infrastructure and non-tariff barriers to trade (Gammadigbe 2021). This will require fostering effective regional institutions, setting shared regional investment priorities, harmonizing regulatory frameworks and administrative procedures, and facilitating cross-border infrastructure projects (Coulibaly, Kassa, and Zeufack 2022; World Bank 2020f). Further reductions in barriers to intra-regional trade—both tariff and non-tariff as is intended by the establishment of the African Continental Free Trade Area—can help facilitate intra-Africa trade and incentivize stronger cooperation on large intra-SSA infrastructure projects (World Bank 2020g).

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PART III

Policies: Recognition, Formulation, and Implementation

Structural reforms, deregulations… are very important in the long term and they will have significant impact for growth potential, but by nature they take time.

Haruhiko Kuroda, 2015
Governor of the Bank of Japan

From globalization to artificial intelligence, powerful forces are driving structural change in developed and developing economies alike.

Michael Spence, 2023
2001 Nobel Laurate in Economics,
William R. Berkley Professor in Economics and Business,
New York University

[...] though many experts fear that protectionism is undermining globalization, threatening to impede global economic growth, slower growth in global trade may be inevitable, and trade liberalization is decreasingly important.

Adair Turner, 2014
Chair, Energy Transitions Commission,
and Former Chairman of the U.K. Financial Services Authority

CHAPTER 5

Potential Growth Prospects: Risks, Rewards, and Policies

Potential output growth around the world slowed over the past two decades. This slowdown is expected to continue in the remainder of the 2020s: global potential growth is projected to average 2.2 percent per year in 2022-30, 0.4 percentage point below its 2011-21 average. Emerging market and developing economies (EMDEs) will face an even steeper slowdown, of about 1.0 percentage point to 4.0 percent per year on average during 2022-30. The slowdown will be widespread, affecting most EMDEs and countries accounting for 70 percent of global GDP. Global potential growth over the remainder of this decade could be even slower than projected in the baseline scenario—by another 0.2-0.9 percentage point a year—if investment growth, improvements in health and education outcomes, or developments in labor markets disappoint, or if adverse events materialize, related, for example, to climate change. A menu of policy options is available to help reverse the trend of weakening economic growth, including policies to enhance physical and human capital accumulation; to encourage labor force participation by women and older adults; to improve the efficiency of public spending; and to mitigate and adapt to climate change, including infrastructure investment to facilitate the green transition.

Introduction

Over the period 2011-21, global potential output growth declined 0.9 percentage point per year below its 2000-10 average, to 2.6 percent a year on average (chapter 1). The weakening of growth was widespread, occurring in both advanced economies and emerging market and developing economies (EMDEs). The trend decline raises concerns about the underlying strength of the recovery from the pandemic over the next several years. In addition, climate change is expected to increase the frequency of natural disasters, which could additionally weaken global potential growth unless policy action is taken.

Potential output refers to the output an economy would sustain at full capacity utilization and full employment. As discussed in chapter 1, the growth rate of potential output is a critical determinant of a wide range of macroeconomic and development outcomes, including sustained improvements in living standards and poverty reduction.[1]

Note: This chapter was prepared by Sinem Kilic Celik, M. Ayhan Kose, and Franziska Ohnsorge.

[1] Research suggests that two-thirds of cross-country differences in income growth for the poorest households are accounted for by differences in average income growth (Barro 2000; Dollar, Kleineberg, and Kraay 2013). Sustained growth can also help reduce inequality, including by raising the demand for agricultural output which helps poor land holders (Christiaensen, Demery, and Kuhl 2011; Pham and Riedel 2019; Ravallion and Datt 2002), and by expanding urbanization which disproportionately lifts wages for poorer workers (d'Costa and Overman 2014; Gould 2007; Yankow 2006).

In some EMDEs, especially commodity-exporting economies in Europe and Central Asia (ECA) and the Middle East and North Africa (MNA), the slowdown in potential growth could set back per capita income convergence with advanced economies by more than a decade (figure 5.1). The possibility of a continuation of the trend decline in potential growth is a major concern for future growth and convergence prospects in EMDEs and a formidable challenge for the international community's ability to meet its broader development goals.

This chapter addresses the following questions:

- What are the prospects for potential output growth?
- What are the main risks that could lower future potential growth?
- What policy options are available to lift potential growth?

To help answer these questions, this chapter utilizes estimates of potential growth in a large sample of countries from the comprehensive database presented in chapter 1. For clarity, and in keeping with a longer-term focus, this chapter uses the production function approach, whereas other measures of potential growth often incorporate short-term impacts of supply shocks.

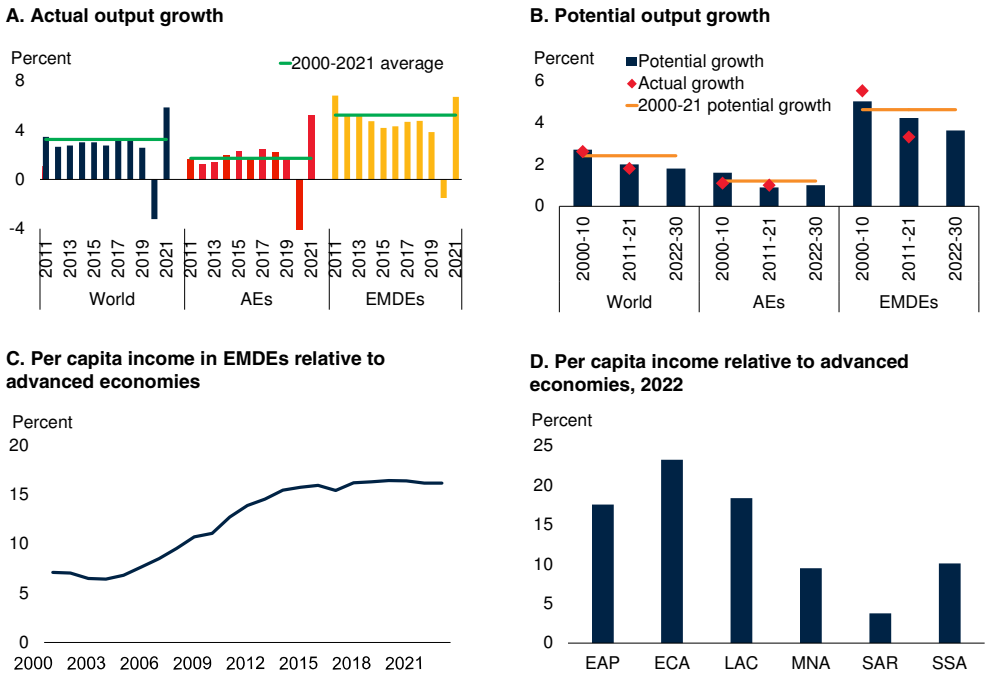
Contributions. This chapter makes at least three contributions to the literature on potential growth.

- *Prospects for potential growth.* The chapter presents the first comprehensive set of projections of potential output growth for the largest sample of countries for which data are available—83 countries (30 advanced economies and 53 EMDEs) accounting for 95 percent of global GDP. The use of potential growth estimates based on the production function approach permits a detailed analysis of the structural drivers of potential growth, which in broad terms are total factor productivity (TFP) growth, labor supply growth, and the growth of human and physical capital.[2] Since data for many EMDEs before 1998 are inadequate for application of the production function approach, the sample period begins in 2000. This exercise is also conducted at the regional level, with the results presented in chapter 2.
- *Climate change and potential growth.* The chapter analyzes the possible impacts of climate disasters, which are expected to become more frequent because of climate

[2] Much of the previous literature has focused on examining past trends but not prospects (ADB 2016; Dabla-Norris et al. 2015; IMF 2015a; OECD 2014). For European and OECD countries, respectively, the European Commission and the OECD have prepared long-term growth forecasts based on production function approaches (European Commission 2021; OECD 2014). For individual EMDEs or EMDE regions, the World Bank has estimated potential growth prospects (World Bank 2022, World Bank 2021a, World Bank 2021b, World Bank 2020a, World Bank 2018a, World Bank 2019a). Other studies have used a statistical approach to assess long-term growth prospects for a handful of countries (Modis 2013).

FIGURE 5.1 Global output growth and relative per capita incomes

Notwithstanding the strong rebound from the pandemic-induced global recession of 2020, projections for growth's fundamental drivers suggest that global potential growth will slow further in 2022-30 from 2011-21.



Sources: Penn World Tables, World Bank.
Note: AEs = advanced economies; EMDE = emerging market and developing economy; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
A. Sample of 181 countries.
B.-D. Based on production function approach. GDP-weighted averages for a sample of 29 advanced economies and 53 EMDEs.
C. Per capita income differential between EMDEs and advanced economies are defined as the GDP-weighted average of percent of GDP per capita of the EMDEs as a ratio of GDP-weighted average of advanced economies.

change. It also examines the possible effects on potential growth of investment to alleviate the effects of climate change. Several studies—reviewed in Shabnam (2014), Klomp and Valckx (2014), and Botzen, Deschenes, and Sanders (2019)—have found mixed evidence for both short-term and long-term impacts of natural disasters on incomes and output growth, with possibly larger and more lasting impacts in low-income countries (LICs). Broadly consistent with this literature, this chapter documents small, but statistically significant, damage to short-term growth, which dissipates quickly. The chapter goes on to estimate the impact on potential growth of investment to mitigate or reduce the damage from climate change, drawing on the estimated investment needs presented in chapter 3.

- *Policies to promote potential growth.* The chapter explores, in a consistent framework, policy options to lift potential output growth. A large literature has considered the

impact of different policies and institutional settings on growth, including human capital improvements (World Bank 2018b), governance improvements (World Bank 2017a), trade and global value chain integration (World Bank 2020b), new technologies (World Bank 2016; 2019b), and labor market changes (World Bank 2013). In contrast to these and other earlier studies, the discussion of growth-enhancing policy options in this chapter is directly derived from the empirical framework provided by the production function approach, which is used to link policy options to their impacts on growth prospects.[3]

Findings. The chapter presents several findings.

- *Weaker potential growth prospects.* The slowdown in potential growth in the past two decades, described in chapter 1, is projected in the baseline to extend into the remainder of this decade. Trends in the fundamental drivers of growth suggest that global potential output growth will slow further, by 0.4 percentage point a year on average, to 2.2 percent a year during 2022-30. Just under half of this slowdown is due to demographic factors, including slowing working-age population growth and declining labor force participation as populations age. EMDE potential growth is projected to weaken considerably more, by about 1.0 percentage point a year, to 4.0 percent a year during 2022-30. In advanced economies, potential growth is expected to slow by 0.2 percentage point a year, to 1.2 percent a year, on average, during 2022-30. The slowdown will be internationally widespread: Most EMDEs, and economies accounting for almost 70 percent of global GDP, are projected to experience a slowdown in potential growth between 2011-21 and 2022-30. Among EMDE regions, the slowdown will be most pronounced in East Asia and the Pacific (EAP) and ECA because of slowing labor supply, investment, and TFP growth, and least pronounced in Sub-Saharan Africa (SSA), where the multiple adverse shocks of the past decade are assumed to dissipate (chapter 2). Potential growth in Latin America and the Caribbean (LAC), MNA, and South Asia (SAR) is expected to be broadly steady, with slowing population growth offset by strengthening productivity growth. Global potential growth over the remainder of this decade could be even slower than projected in this baseline scenario—by another 0.2-0.9 percentage point a year—if investment growth, improvements in health and education outcomes, or developments in labor markets disappoint, or if adverse events materialize.

- *Sizable impact of climate change on potential output growth.* Natural disasters, which are expected to increase in frequency because of climate change, could reduce potential growth below the baseline projection. Over the past two decades, the average natural disaster has lowered potential growth in the affected country by 0.1 percentage point in the year of the disaster. However, increased infrastructure

[3] Several studies have investigated the link between the growth of output or productivity and structural reforms, focusing on the near-term benefits (Prati, Onorato, and Papageorgiou 2013) or productivity effects (Adler et al. 2017; Dabla-Norris, Ho, and Kyobe 2015). In some such studies, the sample has consisted mostly of advanced economies (Banerji et al. 2017; IMF 2015a, 2016b; de Haan and Wiese 2022).

investment to alleviate the effects of climate change could more than offset this damage. For example, the literature review of chapter 3 summarizes estimates of climate-related investment needs averaging 2.3 percentage points of GDP per year; for EMDEs, this is equivalent to about one-third of the investment boost if they repeated their best ten-year investment performance. Such additional investment over the remainder of this decade could raise global potential growth by 0.1 percentage point and EMDE potential growth by 0.3 percentage point a year.

- *Policies supporting potential growth.* A number of policies could help reverse the projected further weakening of global potential growth and return it to its 2011-21 average rate. Policies could help reverse the projected further slowdown in global potential growth. Reforms associated with higher physical capital investment, enhanced human capital, and faster labor supply growth could raise potential growth by 0.7 percentage point a year in 2022-30, globally and in EMDEs. This would offset the 0.4 percentage point decline in global potential growth between 2011-21 and 2022-30 projected in the baseline scenario and most of the 1.0 percentage point slowdown projected for EMDEs. The policy options considered here could raise potential growth even more in EAP, ECA, and SSA, where large investment needs remain or where countries have strong track records of boosting investment.

Building on the analysis of chapter 1, the next section examines potential growth prospects, followed by a section discussing risks to potential growth prospects, including from climate change. The penultimate section reviews a wide range of policy options to raise potential growth. The final section provides a summary and suggests avenues for future research.

Prospects for potential growth

Factors weighing on potential growth over the last decade are likely to persist in the remainder of the current decade. Potential growth prospects are estimated for a sample of 29 advanced economies and 53 EMDEs, unless otherwise specified (table 5.1). Demographic trends are expected to remain unfavorable, weighing on potential growth even while trend improvements in human capital investment and female labor force participation are expected to continue. Although growth of fixed investment in advanced economies is expected to pick up slightly from its pre-pandemic rates, it is unlikely to return to the rates seen in 2000-10, and in EMDEs it is expected to remain weak. Short of possible surges in productivity growth not assumed in the projections—which could occur as a result of technological breakthroughs or the exit of unproductive firms following the disruptions of the pandemic—these trends imply an outlook of mediocre potential growth.[4]

[4] Some studies for individual advanced economies have suggested that the pandemic could have raised aggregate productivity through exit of unproductive firms (Kozeniauskas, Moreira and Santos 2022 and Van den Bosch and Vanormelingen 2022).

Design of the baseline projections

The baseline projections presented here apply the production function approach to assumed paths for capital, population, and education and health outcomes. Projections for population-related variables (including age and gender structures of the population, fertility, and life expectancy) are based on UN Population Projections under the assumptions of median fertility, normal mortality, and "normal" (that is, trend) migration. Cohort effects are assumed to remain at their latest (2021) levels.[5]

Projections assume that education and health outcomes follow their long-term average trends. For example, gender-specific secondary and tertiary *enrollment* rates are assumed to continue rising through the forecast period at the average rates of the past two decades. Economy-wide averages are calculated as the population-weighted averages of these gender-specific rates. Similarly, gender-specific and age-specific secondary and tertiary education *completion* rates are assumed to rise at the average rates over the past two decades. Again, economy-wide averages are calculated as the population-weighted averages of these gender- and age-specific rates. These trends in education and health outcomes drive the projected growth of both TFP and labor supply.

Investment growth in the forecast period, 2022-30, is assumed to match the latest (October 2022) consensus forecasts for each economy for which they are available. For economies for which consensus forecasts are unavailable, investment growth in 2022 is assumed to equal economy-specific long-term average investment growth, while for 2023-30, it is assumed for each economy to be the same as the average for the group—advanced economies or EMDEs—to which it belongs.

Evolution of drivers of global potential growth

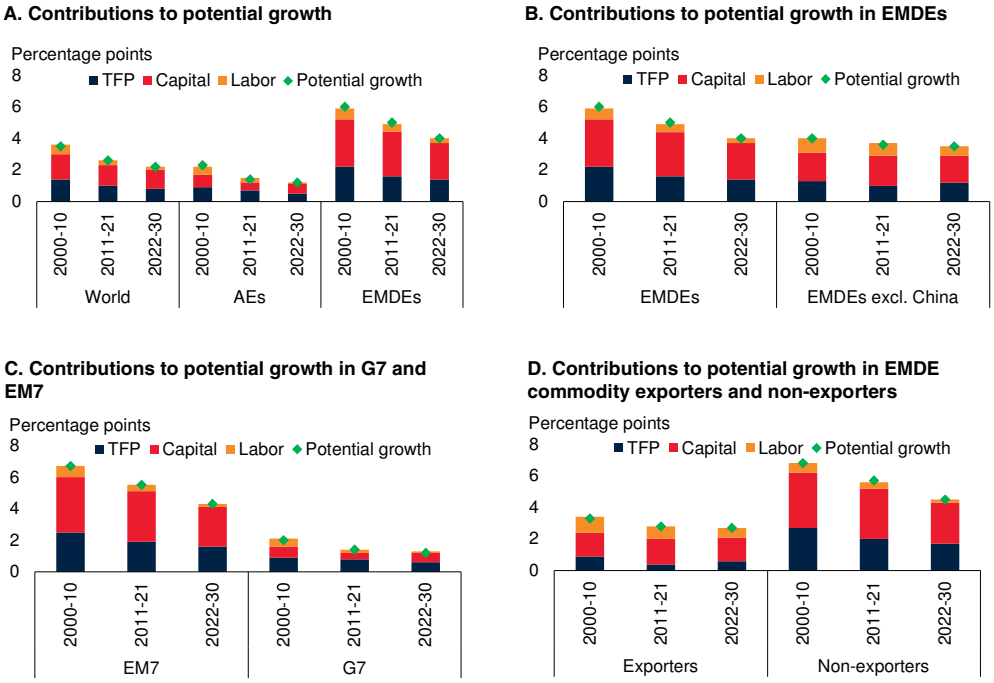
In the baseline projections, the contributions to potential output growth of its broad, fundamental drivers—capital accumulation, labor supply growth and TFP growth—weaken further, except for the contribution of capital accumulation in advanced economies (figure 5.2). In the seven largest advanced economies (G7; Canada, France, Germany, Italy, Japan, United Kingdom, United States), capital accumulation is expected to tick up over the remainder of the decade as major government investment plans get underway. In other advanced economies, capital accumulation is anticipated to remain stable and somewhat higher than in G7 countries.

Globally, slower capital accumulation in EMDEs, especially in China, is expected to be offset by faster capital accumulation in advanced economies. In China, the policy-promoted shift away from investment-driven growth is assumed to continue. In EMDEs other than China, the pace of capital accumulation is projected to remain broadly steady.

[5] Cohort effects refer to systematically different labor market participation rates between different cohorts of workers over their life cycles (Balleer, Gomez-Salvador, and Turunen 2014; Kudlyak 2013).

FIGURE 5.2 Contributions to potential growth

All drivers of potential growth (except investment in G7 countries and TFP growth in EMDEs other than China) point to slower potential growth over 2022-30 than in 2011-21.



Sources: Penn World Tables, World Bank.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies. Based on production function approach, GDP-weighted arithmetic averages for a sample of 29 advanced economies and 53 EMDEs. G7 is the GDP-weighted arithmetic average of Canada, France, Germany, Italy, Japan, the United Kingdom and the United States. EM7 is the GDP-weighted arithmetic average of Brazil, China, India, Indonesia, Mexico, and Türkiye. 2022-30 are projections.

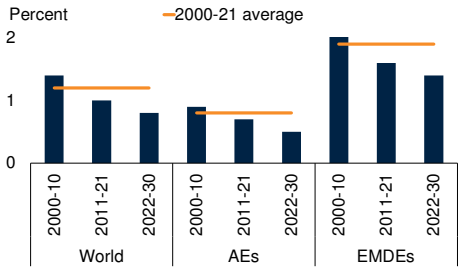
Subdued investment growth in China and reduced room for "catchup" productivity growth in EMDEs as per capita income differentials narrow, will sap EMDE productivity growth (figure 5.3). EMDEs excluding China start the period 2022-30 with per capita incomes averaging 14 percent of those in advanced economies, about 1 percentage point higher than in 2009. On the other hand, recoveries in TFP growth are assumed for those EMDEs, especially in LAC and SSA, that were hardest hit by adverse shocks, such as debt crises or natural disasters, in the past decade. These shocks reduced TFP growth to nil or even negative rates but, as they dissipate, TFP growth should recover. On balance, EMDE potential TFP growth is projected to be about 0.2 percentage point per year lower over 2022-30 than over 2011-21.

Even if education and health outcomes continue to improve in line with their long-term trends, as assumed, slowing working-age population growth combined with withdrawal from the labor market of older cohorts of workers could reduce both global and EMDE potential growth by another 0.2 percentage point a year on average in 2022-30 relative to 2011-21 (figure 5.4).

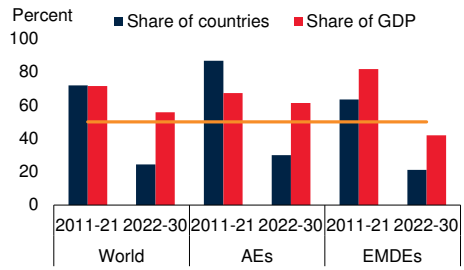
FIGURE 5.3 Total factor productivity growth

Subdued investment, along with a slowdown in catchup productivity growth in EMDEs as per capita income differentials narrow, is expected to sap productivity growth in 2022-30. Especially in LAC, SAR, and SSA, however, the effects of natural disasters and financial crises that weighed on productivity during 2011-21 are assumed to dissipate.

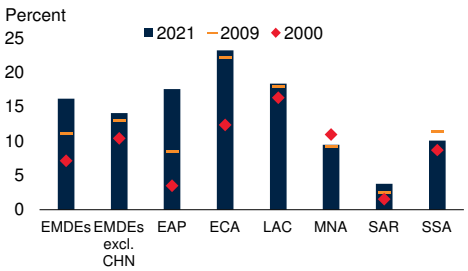
A. Average TFP growth



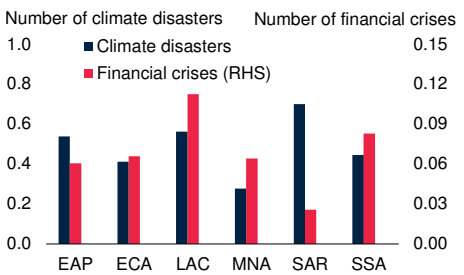
B. Share of economies and GDP with TFP growth below the previous decade average



C. Per capita income relative to advanced economies in 2000, 2009, and 2021



D. Average number of climate disasters and financial crises per year



Sources: EM-DAT; Penn World Tables, World Bank.
Note: AEs = advanced economies; EMDE = emerging market and developing economy; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; TFP = total factor productivity.
A. GDP-weighted arithmetic average of total factor productivity growth. Includes 53 EMDEs and 29 advanced economies.
B. Number of economies among 29 advanced economies and 53 EMDEs in which potential total factor productivity growth is lower than the previous decade average.
C. GDP-weighted average of GDP per capita differential to advanced economies between 2009 and 2021. In percent of advanced-economy per capita incomes.
D. Simple average of number of climate disasters (1980-2018) and financial crises (1980-2018) per year in each region.

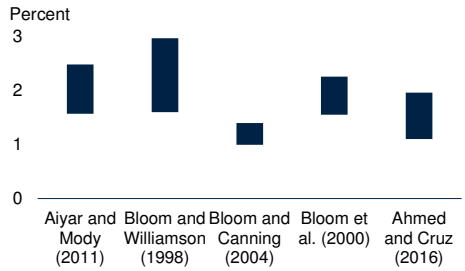
Global potential growth prospects

Absent unexpectedly favorable or adverse developments—such as significant productivity breakthroughs or natural disasters related to climate change—global potential growth in 2022-30 is projected in the baseline to weaken by 0.4 percentage point a year relative to 2011-21, to 2.2 percent a year (figure 5.5). Globally and among advanced economies, potential growth is projected to slow in almost one-half and more than one-third of economies, respectively, accounting for 70 percent of global GDP and 66 percent of advanced-economy GDP. More than one-half of the sample's EMDEs, accounting for 77 percent of EMDE output, are expected to experience slower potential

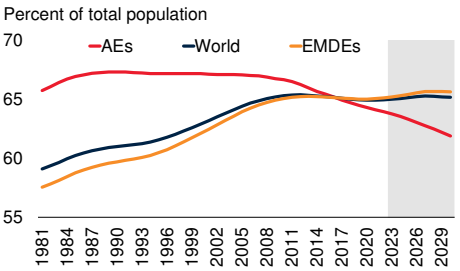
FIGURE 5.4 Demographics

Aging populations combined with withdrawal from the labor market of older cohorts of workers could reduce global potential growth. That said, in advanced economies, migration could dampen the slowdown in potential growth by supporting labor force growth.

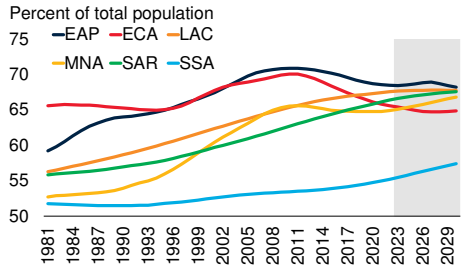
A. Impact of 1 percentage point higher working-age population share on per capita GDP growth



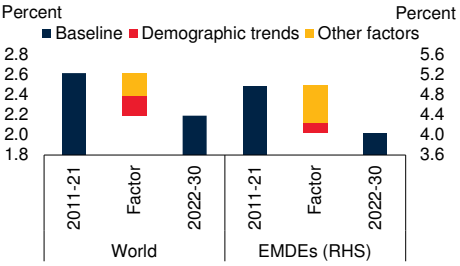
B. Working-age population



C. Working-age population



D. Potential growth



Sources: United Nations World Population Prospects: The 2022 Revision. World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A. The sample of each study differs. Aiyar and Mody (2011): Indian states,1961-2001; Bloom and Williamson (1998): 78 countries, 1965-90; Bloom and Canning (2004): over 70 countries, 1965-95; Bloom et al. (2000): 70 countries, 1965-90; Ahmed and Cruz (2016): 160 countries, 1960-2010. Bars show range of estimates.

B.C. Population weighted averages. The working-age population is defined as people aged 15-64 years.

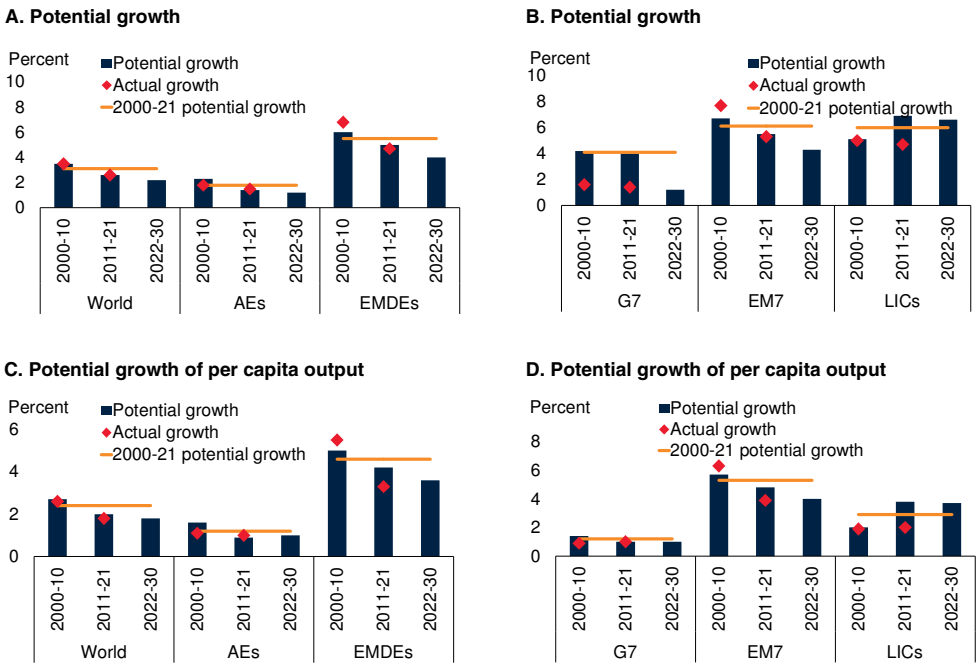
D. GDP-weighted arithmetic averages. Derived using production function-based potential growth. "Other factors" reflects declining population growth, convergence-related productivity growth, policy changes, cohort effects, and a slowdown in investment growth relative to output growth. "Factor" reflects the percentage-point changes between the averages of 2011-21 and 2022-30.

growth in the remainder of the current decade than in 2011-21. The economies where potential growth is projected to increase include smaller metal and energy commodity exporters, which are expected to benefit from increased investment growth.

Potential output growth in advanced economies is expected to slow by 0.2 percentage point to 1.2 percent a year in 2022-30. Further weakening of both TFP growth and, because of population aging, labor supply growth is expected to be partly offset by a slight pick-up in the pace of capital accumulation. The same applies to the G7 countries, where potential growth is also expected to be 0.2 percentage points per year slower in 2022-30 than in 2011-21.

FIGURE 5.5 Evolution of potential growth

TThe slowdown in global potential growth projected for 2022-30 in the baseline scenario cuts across the global economy, advanced economies, and EMDEs.



Sources: Penn World Tables, World Bank.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; EM7 = Brazil, China, India, Indonesia, Mexico, and Türkiye; G7 = Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States; LICs = four low-income countries; Based on potential growth derived using production function approach. GDP-weighted average. 2022-30 are projections.

A.C. Sample includes 29 advanced and 53 emerging market and developing economies.

EMDE potential growth is projected to slow by about 1 .0 percentage point a year in 2022-30, relative to 2011-21, to 4.0 percent a year. This slowdown mostly reflects demographic developments across most EMDEs and weaker capital accumulation, especially in China, as China's policy-guided decline in investment growth continues. In other EMDEs, capital accumulation is expected to slow only modestly. While China will account for 0.8 percentage point of the 1.0-percentage-point decline in EMDE potential growth, slower growth is projected for most of the EMDEs in the sample, with significant slowdowns expected for some other large EMDEs. These could generate adverse spillovers to other EMDEs that the production function approach does not explicitly account for.[6]

[6] For example, a 1-percentage-point decline in growth in the seven largest EMDEs has been estimated to slow growth in other EMDEs by 0.9 percentage point a year over the following three years. A similar-sized decline in G7 growth could have a one-half to three times larger impact than an EM7 slowdown (Huidrom, Kose, and Ohnsorge 2017).

Regional potential growth prospects

Potential output growth is expected to be slower in 2022-30 than in 2011-21 in three of the six EMDE regions and slower than in 2000-10 in all regions (figure 5.6, chapter 2). In EAP, ECA, and LAC, working-age shares of the population are expected to shrink. In MNA, SAR, and SSA, working-age shares of the population are expected to rise, but with a shift toward older cohorts with weaker labor market attachment.

In *EAP*, potential growth is expected to slow as policies in China continue to shift growth away from investment toward more sustainable engines, and the growth of the region's working-age population and TFP slows. China's potential growth is expected to slow to just under 5 percent per year on average in 2022-30, well below the average during 2000-21 that was well in excess of 7 percent and within the range of recent long-term growth forecasts.[7] Elsewhere in EAP, potential growth is expected to decline only marginally between 2011-21 and 2022-30 and remain over 4 percent a year.

In *ECA*, demographic trends and an expected further decline in investment growth are projected to shave off 0.6 percentage point a year from potential output growth between 2011-21 and 2022-30.

In *SSA*, slower labor supply growth and capital accumulation in 2022-30 are expected to be partly offset by a modest pick-up in TFP growth reflecting accelerated per capita income catchup after the setbacks caused by multiple adverse shocks over the past decade, including the COVID-19 pandemic. The projected decline in potential growth in SSA is therefore milder than in EAP and ECA. It is mainly accounted for by South Africa and, in particular, by population aging and weak investment growth in that country: elsewhere in SSA potential growth is expected to remain broadly steady, at 4.6 percent a year.

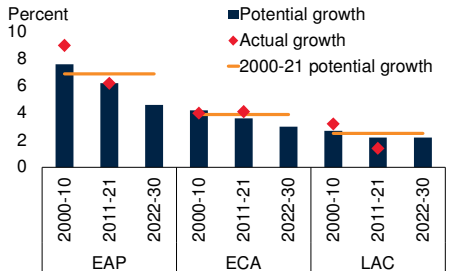
Potential growth in *LAC*, *MNA* and *SAR* in 2022-30 is expected to be little changed, at the relatively weak rates of just over 2 percent per year in LAC and MNA and at a robust pace of more than 6 percent a year in SAR. TFP growth in LAC and MNA is expected to pick up, reflecting recoveries from the effects of the currency and debt crises of the past decade in some countries and modestly stronger investment growth in others, but this boost is expected to be offset by diminishing demographic dividends. The contribution of capital accumulation to potential growth in LAC and MNA is expected to be broadly unchanged, assuming no major intensification of geopolitical risks and uncertainty. In SAR, a slowdown in labor supply growth is expected to be largely offset by a pick-up in TFP growth related to the expected gains in educational attainment and agricultural productivity as well as still robust growth of investment.

[7] October 2022 consensus forecasts are for 4.1 percent per year GDP growth in China on average over 2022-30. Rajah and Leng (2022) project growth slowing to the range of 2-3 percent by 2030; WEF (2021) forecasts growth of about 5 percent on average over 2022-30.

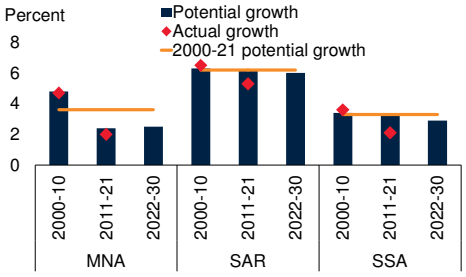
FIGURE 5.6 Regional potential output growth

Among EMDE regions, the slowdown in potential output growth in 2022-30 is expected to be most pronounced in EAP and ECA, with rapid population aging affecting both regions and the policy-guided slowdown in investment growth in China a key factor in EAP. In contrast, demographic dividends and catchup productivity growth are expected to support potential growth in SAR and SSA.

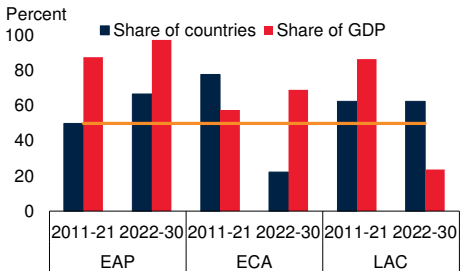
A. Potential growth in EMDE regions



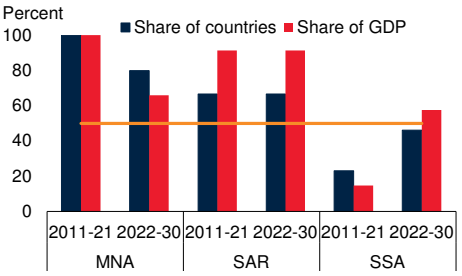
B. Potential growth in EMDE regions



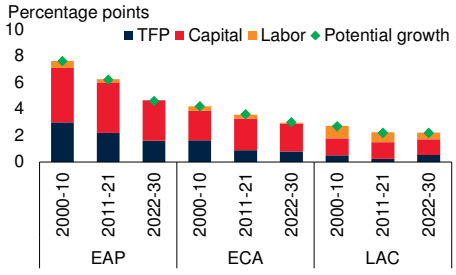
C. Share of countries and GDP with potential growth below the previous decade average in EMDE regions



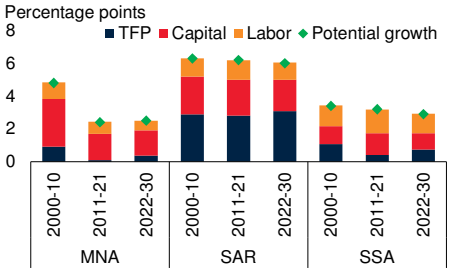
D. Share of countries and GDP with potential growth below the previous decade average in EMDE regions



E. Contributions to regional potential growth



F. Contributions to regional potential growth



Sources: Penn World Tables, World Bank.
Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia,
LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, and SSA = Sub-Saharan Africa.
A.B.E.F. GDP-weighted arithmetic averages using potential growth estimate based on production function approach.
C.D. Number of economies and their share of the region's GDP. Sample includes 61 EMDEs. 2022-30 are projections.

Risks to potential growth prospects: downside scenario

Several adverse developments could deepen the slowdown in potential growth that is projected in the baseline scenario. The investment growth forecasts underlying the baseline scenario could turn out to be overly optimistic. Natural disasters could increase in frequency and cause repeated shocks to output and productivity. A global recession in the near term could cause lasting setbacks to potential growth, in line with historical experience. Policy-induced improvements in such areas as education, healthcare, and female labor force participation could disappoint. This section examines the implications of each of these downside risks in turn.

If one of these risks materializes, potential growth could turn out lower than projected in the baseline, by 0.2-0.9 percentage point per year globally and 0.1-0.7 percentage point per year in EMDEs. This would be in keeping with the record of past long-term growth forecasts, which have had a significant optimism bias (Ho and Mauro 2016; Juhn and Loungani 2002; World Bank 2018c).

Investment disappointments

The baseline scenario assumes that investment growth over 2022-30 will match the latest (October 2022) one- to nine-year-ahead consensus forecasts. However, during 2010-22, consensus forecasts overestimated global investment growth over the subsequent ten years, on average, by 2.4 percentage points per year (figure 5.7).[8] For EMDEs, consensus forecasts in this period overestimated investment growth, on average, by 1.4 percentage points per year, with average forecast errors for LAC and ECA more than twice as large as those for EAP and SAR. Some of the forecast overoptimism reflected a failure to anticipate the global recessions of 2009 and 2020. But even excluding these two global recessions and their subsequent rebounds, consensus forecasts overpredicted global investment growth, on average, by 1.0 percentage point per year and EMDE investment growth by 1.4 percentage points per year over the subsequent ten-year period.

To take account of the possibility of forecast optimism in the baseline scenario for 2022-30, a risk scenario was constructed in which investment growth in every year of the forecast period is reduced from the baseline by the average forecast bias in 2010-22 for each respective forecast horizon. In this scenario, potential output growth in 2022-30 is 0.1 percentage point a year lower in EMDEs and 0.3 percentage point a year lower globally than in the baseline.

Climate disasters

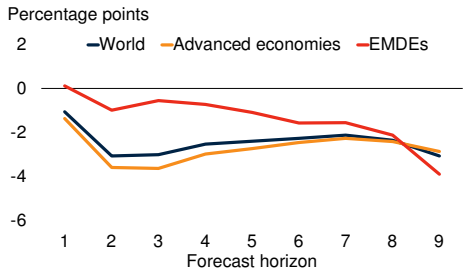
Climate change has become an increasingly urgent policy challenge as the frequency and impact of adverse climate events have increased (IPCC 2022). On average over 2000-18,

[8] Working-age population growth forecasts have also been shown to be biased (Keilman 2001).

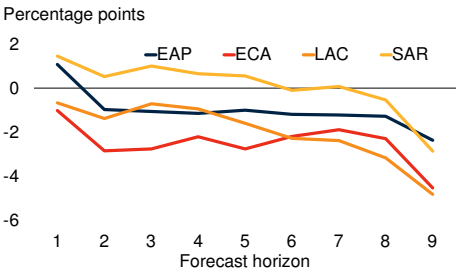
FIGURE 5.7 Risks to potential growth prospects

Consensus forecasts have systematically overpredicted investment growth since 2000. If current forecasts for 2022-30 again turn out to be over-optimistic, potential growth could be lower than projected in the baseline scenario. If trend policy improvements assumed in the baseline do not materialize or if there are more frequent natural disasters or a global recession, potential growth could also be lower.

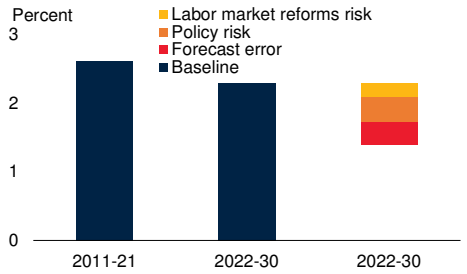
A. Forecast errors in global, advanced economy and EMDE investment growth



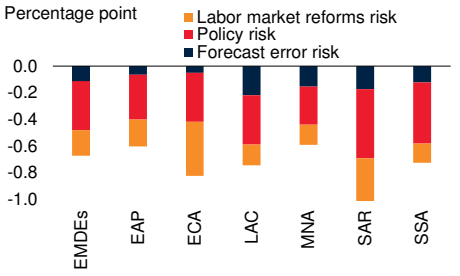
B. Forecast errors in EMDE regional investment growth



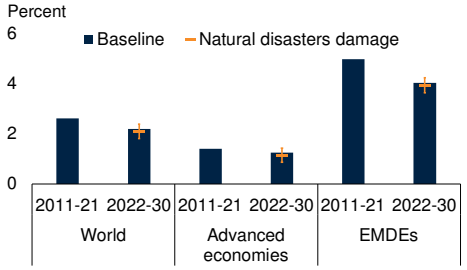
C. Global potential growth, adjusting for risks



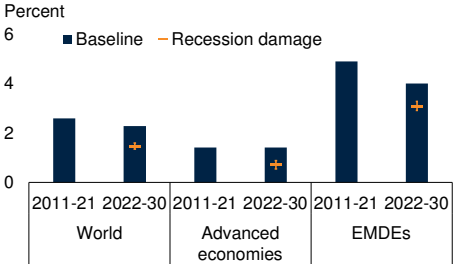
D. Deviation from baseline scenario for EMDE potential growth, adjusting for risks



E. Potential growth with more frequent natural disasters



F. Potential growth after a global recession in 2023



Sources: Consensus Economics; Haver Analytics; World Bank.

Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A.B. Data for 34 countries, of which 13 EMDEs (3 in EAP [Indonesia, Malaysia, Thailand], 3 in ECA [Hungary, Poland, Romania], 6 in LAC [Argentina, Brazil, Chile, Colombia, Mexico, Peru], India in SAR) since 2000. GDP-weighted averages (at 2010-19 exchange rates and prices). Forecast error is the difference between actual and forecast investment growth; a negative error indicates overoptimism.

C.D. GDP-weighted arithmetic averages. Baseline scenario assumes that investment growth will match consensus forecasts for one- to nine-year-ahead investment growth for 2022-30. Correction for forecast errors assumes that investment growth will fall by the country-specific average historical forecast error over 1-9-year horizons; correction for policy risk assumes that health and education outcomes will repeat the smallest increase on record over any ten-year period; correction for labor market reforms risk assumes that female labor force participation rate will repeat the smallest increase.

E. Impact of natural disasters assumes that the number of climate disasters in 2022-30 will increase as much as it rose between 2000-10 and 2011-21 for each country, that is, from once every two years to twice every three years, on average.

F. Recession impact based on estimated impact of recessions in chapter 1, table 1F.15.

E.F. Orange whiskers display one standard deviation of the impact of climate disasters and recessions, respectively.

the number of climate disasters—droughts, floods, and storms—per year was more than two-thirds higher than in the previous two decades (1980-99). Storms disrupted economic activity most severely in EAP and LAC, where there are many particularly vulnerable small island states. In LAC, floods also caused notable disruptions of activity in mining and agriculture. Droughts had their most severe effects in ECA and SSA.

The effects of climate disasters on TFP growth estimated by Dieppe, Kilic Celik, and Okou (2020) were used to construct a scenario representing the increased frequency of climate disasters relative to the baseline. The estimates were derived from a sample of 2,812 climate disasters over 1950-2018, of which 43 percent were floods, 30 percent storms, and 9 percent droughts, in 35 advanced economies and 89 EMDEs. Almost half of the disasters occurred in three EMDE regions—292 in 8 EAP countries, 479 in 28 SSA countries, and 636 in 20 LAC countries. Each climate disaster was estimated to have reduced TFP growth, on average, by 0.1 percentage point in the year of the disaster.

Over the medium-term, the impact of these disasters varied widely depending on the speed and magnitude of reconstruction efforts. For example, three years after a climate disaster, TFP growth was anywhere between nil and 10 percent lower than in countries and years without disasters (Dieppe, Kilic Celik, and Okou 2020). Some countries, especially small states, have suffered much larger damages than suggested by the average effect. The average small state has suffered losses and damages from climate-related disasters of 5 percent of GDP per year, on average (World Bank 2023). These losses did not occur in a predictable pattern. Instead, it was not uncommon for the damages from a single climate-related disaster to cost a substantial portion of a country's GDP, or even multiples of GDP in extreme cases.

The climate change scenario assumes that the number of climate disasters in 2022-30 will be higher than in 2011-21 in each country by the same amount as the increase between 2000-10 and 2011-21. On average, this means two disasters every three years in 2022-30, up from one every two years in 2011-21. The negative effect of the greater frequency of disasters on each country's TFP growth is then estimated by multiplying the assumed increase in the number of disasters per year by the average impact of each disaster on TFP growth, as estimated by Dieppe, Kilic Celik, and Okou (2020).[9] In this scenario, both global and EMDE potential growth over 2022-30 would be almost 0.1 percentage point a year lower than in 2011-21.

Recessions

With global output growth slowing sharply in 2022-23 amid tightening global financial conditions, there are risks of a global recession and of financial crises in EMDEs in the near term (World Bank 2023). In the past, slowing global growth and rising global

[9] Natural disasters have implications for output, productivity, and investment. The immediate effect might be damage to existing capital stock, followed by a rapid investment rebound in reconstruction. For the year as a whole, the net effect tends to be negligible. In contrast, output rebounds tend to be more muted than investment rebounds such that there are measurable output and TFP losses on an annual basis.

financing costs have been associated with a significantly higher probability of currency crises and sovereign debt crises in EMDEs (Koh et al. 2020).

Recessions and financial crises have been associated with lasting reductions in potential output growth. Chapter 1 shows that national recessions in the period examined have typically been associated with reductions of about 1.4 percentage points in potential growth even after five years.[10] Based on chapter 1's econometric estimates of the effect over different forecast horizons, recessions in EMDEs in 2023 could lower potential growth over 2022-30 by 0.7-0.9 percentage point per year globally, in EMDEs, and in advanced economies.

Disappointing policies

The baseline scenario assumes that education and health outcomes will continue to improve in 2022-30 in line with their country-specific long-term trends. However, such improvements slowed over the 2010s (Dieppe 2020). An alternative scenario therefore assumes that such improvements continue, not at their historical average pace, but at the slowest ten-year pace for every country.

Hence, instead of assuming that secondary school completion rates in EMDEs improve, on average, by 12.3 percentage points between 2011-21 and 2022-30, as in the baseline scenario, the alternative scenario assumes that they improve by only 3.4 percentage points. Similarly, in the alternative scenario, tertiary completion rate in EMDEs improve by only 1.4 percentage point in 2022-30 compared with 2011-21, instead of the 4.2 percentage points in the baseline scenario. In advanced economies, secondary and tertiary school completion rates are expected to improve by 10 and 7.2 percentage points, respectively, in the baseline scenario, whereas they would only pick up around half as much in the alternative risk scenario.

The alternative, less optimistic, assumptions for education and health outcomes make a significant difference to projected labor supply and TFP growth over 2022-30. Smaller improvements in life expectancy and education outcomes would discourage labor market participation by older and prime-age workers while encouraging participation of younger workers less markedly. They would also moderately dampen TFP growth. As a result, potential growth in both advanced economies and EMDEs could be 0.4 percentage point slower than in the baseline scenario.

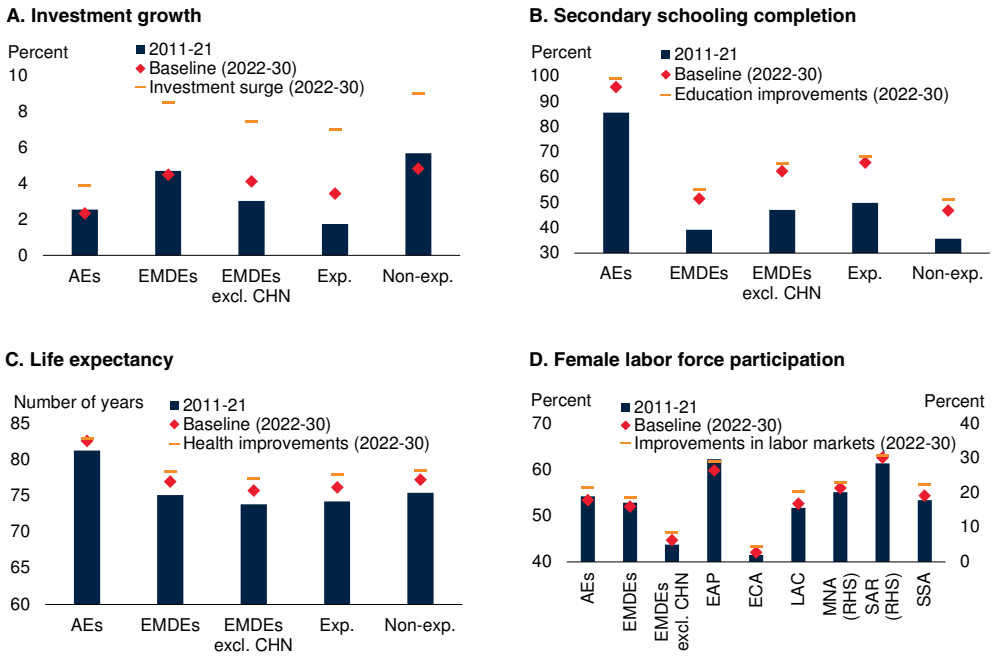
Policies to lift potential growth: upside scenarios

In this section, the production function framework is used to construct upside scenarios driven by the implementation of policies that improve potential growth prospects. Potential growth in each upside scenario, in which improved policies generate faster growth of physical or human capital, labor supply, or TFP, is compared with the baseline projections described earlier.

[10] See chapter 1 for a review of the related literature.

FIGURE 5.8 Policies to strengthen drivers of potential growth

A major policy effort, on a par with previous achievements, could reverse the weakening of the drivers of potential growth projected in the baseline.



Sources: Penn World Tables, World Bank.

Note: AEs = advanced economies; CHN = China; EMDEs = emerging market and developing economies; Exp. = commodity exporters; Non-exp. = Commodity importers; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; and SSA = Sub-Saharan Africa.

A. Baseline investment growth assumes investment forecasts of Consensus Economics, and investment surge assumes best ten-year improvement record for each country.

B. Baseline secondary school completion rate assumes the trend improvements in education and education improvements assumes best ten-year improvement record for each country.

C. Baseline life expectancy assumes the trend improvements in education and health improvements assumes best ten-year improvement record for each country.

D. Baseline female labor force participation (LFPR) assumes the predicted value of female LFPR based on the trend improvements in determinants of the LFPRs and improvements in labor market assumes best ten-year improvement record in female LFPR for each country.

Design of an upside scenario

The general approach used in the construction of each upside scenario is to assume for each economy over the course of 2022-30 a repetition of its best ten-year improvement in a particular policy-related variable during 2000-21, up to reasonable ceilings (figure 5.8). The potential growth dividend estimated in each scenario therefore depends on each country's track record as well as its room for improvement. The estimates do not take into account possible nonlinearities in reform impacts or possible synergies between different reform measures, so that they may be lower bounds of the reform impact.

Investment growth in each economy is assumed to rise over the course of 2022-30 by the most that it increased in any ten-year period during 2000-21. Such an investment surge

would also help countries address needs for investment to adapt to, and mitigate, climate change.

Educational outcome indicators—secondary and tertiary enrollment and completion rates—are assumed to rise in each country by the largest improvement seen in any ten-year period during 2000-21, except that enrollment rates are capped at 100 percent and completion rates are capped at the highest levels observed in advanced economies in 2019, the latest available data point. Life expectancy is assumed to rise in each country by the largest increase in any ten-year period during 2000-21, but not above the median advanced-economy life expectancy in 2019.

For each age group in each country, the female labor force participation rate is assumed to rise by the largest increase over any ten-year period during 2000-21, but not to exceed the male labor force participation rate in the same age group. Separately, a social benefit reform with labor market implications is modelled. For each gender and each country, labor force participation rates for workers in age groups 55-59, 60-64, and 65 years or older are assumed to rise to the participation rates of age groups that are five years younger, that is, those of age groups 50-54, 55-59, and 60-64 years. The increase is assumed to occur gradually over 20 years for each gender in each country.

Raising the growth rate and efficiency of physical capital

Scaled-up fixed investment can raise potential output growth both directly through the contribution of capital accumulation and indirectly by boosting TFP growth, since TFP-enhancing technological progress tends to be embodied in new investment. Potential output can also be raised through more efficient investment spending.

Scaling up investment

To achieve the sustainable development goals, it has been estimated that global investment needs to be raised by up to 3 percent of global GDP (UNCTAD 2014). All EMDEs and EMDE regions have sizable investment needs (chapter 3 and chapter 4). These could be filled through either public or private investment or combinations of both, including in public-private partnerships. Increasing public investment and promoting private investment can be effective policies to support aggregate demand and activity in the short term as well as to raise potential output growth in the longer term (Calderón and Servén 2010a, 2010b, 2014; World Bank 2017b).

Although the rapid increase in public debt over the past decade has constrained fiscal space in most EMDEs, there generally remains scope to shift government expenditures toward productive, growth-promoting public investment and away from less productive spending such as subsidies (World Bank 2017c). In many EMDEs, government revenue ratios relative to GDP remain low, indicating that they could be raised, including by expanding tax bases and improving the quality of tax administration (World Bank 2015).

In addition, policies can support growth-enhancing private investment. Innovation-promoting investment tends to be low in EMDE firms, partly because of limited

availability of complementary inputs such as trained engineers and effective organization techniques (Cirera and Maloney 2017). Policies to expand the supply of complementary inputs and improve management skills could therefore promote private investment, as could improved protection of intellectual property rights.

If, over the remainder of this decade, each economy raised its investment growth rate by as much as its largest increase over any ten-year interval in 2000-21, investment would rise by 5.2 percentage points of GDP globally and by 7.4 percentage points of GDP in EMDEs over the course of 2022-30.[11]

Such an investment boost would raise global potential growth during 2022-30 by 0.3 percentage point per year above its 2011-21 average, almost reversing the 0.4 percentage point slowdown from 2011-21 in the baseline scenario (figure 5.9). EMDE potential growth would rise by 0.4 percentage point a year, reversing almost half of the slowdown from 2011-21 in the baseline.[12] Over the course of 2022-30, these higher growth rates would cumulate to increase potential output in 2030 by 3.3 percent globally and 3.5 percent in EMDEs relative to the baseline.

A package to adapt to, and mitigate, climate change could be part of such an investment push. To limit climate change to 2°C and stay on track to achieve infrastructure-related sustainable development goals, Rozenberg and Fay (2019) estimated that EMDEs needed to raise infrastructure investment by 1.1-3.5 percent of GDP per year just to meet flood protection goals and climate goals in the area of renewable power generation. Most of this would be needed to improve renewable energy supply and energy efficiency, to adopt appropriate standards of coastal protection for cities, and to address increased risks from river floods.

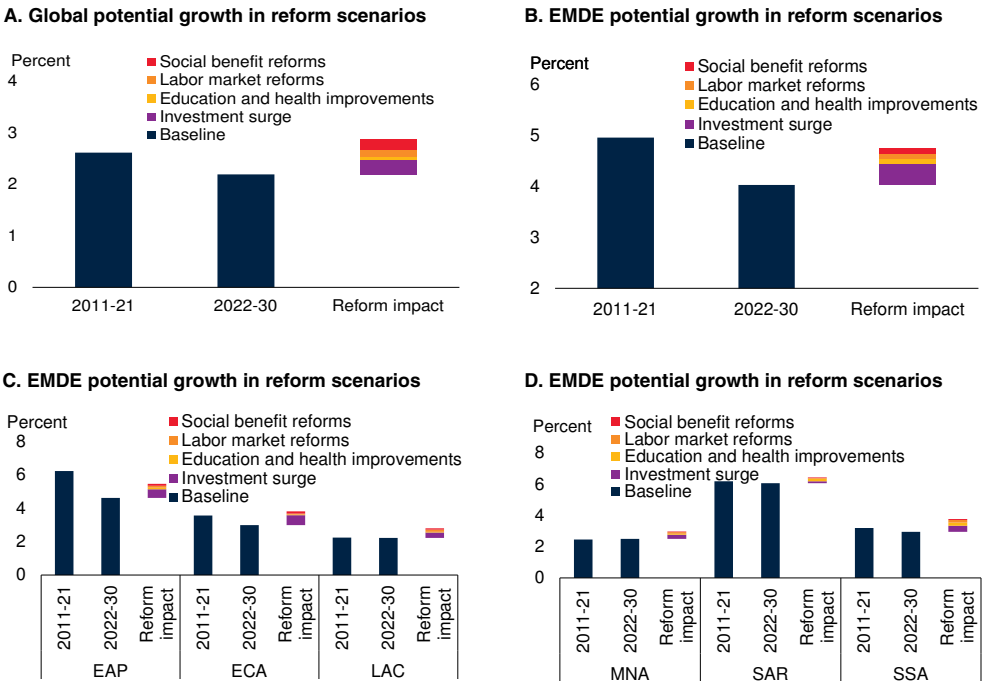
Estimates of investment needs for climate change have spanned a wide range, as discussed in chapter 3. The World Bank's *Country Climate and Development Reports* estimate the additional need for investment for 13 countries (Argentina, China, Egypt, Ghana, Iraq, Jordan, Kazakhstan, Morocco, Peru, Philippines, South Africa, Türkiye, and Vietnam). The average of these 13 estimates is 2.3 percent of GDP per year—an estimate that is also around the average of the broader literature review shown in chapter 3. Region-specific climate needs are assumed to be distributed across six regions based on the regional distribution in Rozenberg and Fay (2019). An investment boost of this magnitude could raise global potential growth by 0.1 percentage point, EMDE potential

[11] Since the investment surge is assumed to cumulate gradually over the period 2022-30, the increase in annual average investment growth over 2022-30 (shown in figure 5.8) is less than the cumulative increase over the whole period.

[12] This impact lies within the range of other estimates. For example, China's 16 percentage points of GDP expansion of infrastructure investment between 2002 and 2016 (about three times the magnitude of the thought experiment conducted in this chapter) has been estimated to have raised output growth by 0.8-2.3 percentage point per year (Dinlersoz and Fu 2022). The lower bound of this range is broadly in line with the estimate derived in this chapter. That said, cross-country estimates yield somewhat larger impacts. For example, estimates by Abiad, Debuque-Gonzales, and Sy (2018) suggest that a 5 percentage point of GDP increase in infrastructure investment in almost 100 EMDEs during 1960-2017 was associated with up to 6 percentage point higher output after 7 years, or 0.9 percentage point per year on average.

FIGURE 5.9 Effect of policies on potential output growth

A repeat of past major reform efforts could prevent the projected slowdown in potential growth globally and in most EMDE regions.



Source: World Bank estimates.
Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
A.-D. GDP-weighted arithmetic averages. Scenarios assume a repeat, in each country, of each country's best ten-year improvement.

growth by 0.2 percentage point, and potential growth in advanced economies by 0.1 percentage point (figure 5.10).

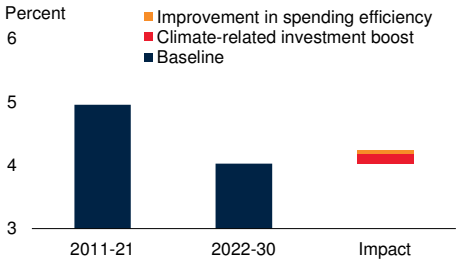
Improving spending efficiency

Implicit in these scenarios, as well as the baseline scenario, is the premise that the additional investment will be used productively. In the context of EMDEs, particularly, there is evidence that absorptive capacity can limit the success of rapidly scaling-up public investment, although less so in lower-income and capital-scarce countries (Presbitero 2016). One study of a large number of road construction projects in almost 100 EMDEs during 1984-2008 found that unit costs were significantly higher when a project was undertaken during a major scaling-up of public investment (Gurara et al. 2021). Another found that projects undertaken while public investment was being scaled up were subject to longer delays (Espinoza and Presbitero 2021). It has also been found that investment tends to yield the greatest growth dividends when it eases bottlenecks to growth (Romp and de Haan 2007).

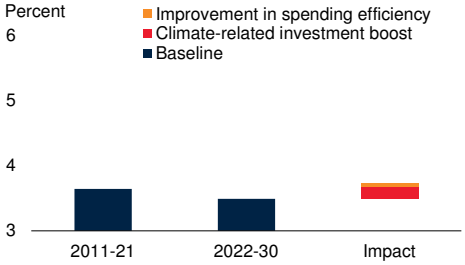
FIGURE 5.10 Effects of climate-related investment on potential growth

A major investment boost to mitigate and adapt to climate change could lift potential growth, especially if it was accompanied by efforts to improve infrastructure spending efficiency.

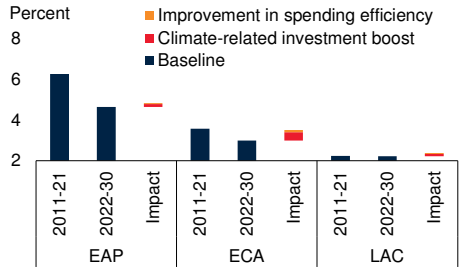
A. EMDEs: potential growth in climate-related investment scenarios



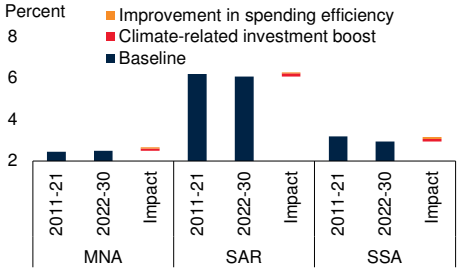
B. EMDE excluding China: potential growth in climate-related investment scenarios



C. EMDEs: potential growth in climate-related investment scenarios



D. EMDEs: potential growth in climate-related investment scenarios



Source: World Bank estimates.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A.-D. GDP-weighted arithmetic averages. Climate-related investment boost assumes an increase in average annual investment between 2011-21 and 2022-30 of 2.3 percentage points of GDP in line with the average of World Bank's Country Climate and Development Reports of 13 countries (Argentina, China, Egypt, Ghana, Iraq, Jordan, Kazakhstan, Morocco, Peru, Philippines, South Africa, Türkiye, and Vietnam) The regional differences are in line with Rozenberg and Fay (2019). Improvement in spending efficiency assumes that each quartile of the spending efficiency moves two quartiles among emerging market and developing economies (EMDEs).

For climate-related infrastructure investment, in particular, the benefit in terms of potential output may be less than estimated above without complementary policies. The energy transition is likely to require major structural transformation. Government policies that delay or deter reallocation of labor and capital toward 'green' sectors may slow this transformation, reduce the productivity gains from the investment, and thus lower its growth dividends. Likewise, a failure to implement such complementary reforms as metering and the enforcement of appropriate payment for energy use could dampen incentives to take up and make the best use of climate-related new investment.

To get a sense of the potential gains from improved investment efficiency, a scenario is estimated which assumes that the efficiency of investment is improved as follows. Countries are ranked in quartiles based on recent spending efficiency as estimated by

Herrera and Ouedraogo (2018). It is assumed that countries in the first quartile, with the lowest investment efficiency, raise investment efficiency to the level of third quartile; that countries in the second quartile raise investment efficiency to the level of the fourth quartile; and that all other countries raise investment efficiency to that of the country with the highest spending efficiency. The effect of increased investment on TFP is then scaled up by the increase in spending efficiency.[13] The efficiency improvement is applied only to the climate-related investment boost of 2.3 percentage points of GDP. If the improvement in the efficiency of investment accompanied the climate investment boost, it is estimated that potential output growth in EMDEs would be raised by an additional 0.1 percentage point per year on average during 2022-30. The impact varies across countries with a range from nil to 0.3 percentage point depending on the initial level of spending efficiency and the magnitude of additional investment needs.

Raising human capital

In the framework used here, human capital has two dimensions: educational attainment and health outcomes (proxied by life expectancy). Policies to enhance human capital can increase not only labor supply but also TFP. A better educated and healthier workforce is more securely attached to the labor market and more productive. A better-educated workforce may be better able to adjust to technological disruptions that reduce employment and wages for workers in certain sectors or with certain skills (Acemoglu and Restrepo 2017a).[14]

Education policies

While secondary school enrollment rates in the average EMDE are near advanced-economy levels, tertiary enrollment rates (46 percent) and secondary and tertiary completion rates (39 and 8 percent, respectively) in 2011-21 were, on average, less than two-thirds of advanced-economy averages. This indicates the scope for expanding access to education in EMDEs, but increasing the quality of education is also critical to improve education outcomes (World Bank 2018b).

Policies to improve education outcomes are especially important at the current juncture, as school closures caused by the pandemic have resulted in lasting damage to the human capital of a generation of students (Azevedo et al. 2021; Mizunoya et al. 2021; UNICEF 2022). The development of metrics to assess progress toward learning goals is a prerequisite for effective policy actions to improve educational outcomes (World Bank 2018b). At the national level, such actions generally include policies to improve teacher training, increase teacher accountability, and enhance teachers' performance incentives

[13] Implicitly, the baseline exercise captures the "effectiveness" of investment associated with the average spending efficiency.

[14] The impact of such technological disruptions on output may not be clear-cut. For example, in aging societies, technological change that makes certain jobs redundant may relieve pressures from a shrinking labor supply (Acemoglu and Restrepo 2017b, 2017c). But automation may also expand labor demand by creating new tasks for which labor has a comparative advantage (Acemoglu and Restrepo 2016).

(Evans and Popova 2016).[15] At the student level, policies include efforts to tailor teaching methods to the requirements of students (Kremer, Brannen, and Glennerster 2013); grants to encourage school attendance by disadvantaged students (Glewwe and Maralidharan 2015); and better early childhood nutrition and cognitive development to improve students' capacity to learn (Tsimpo Nkengne, Etang Ndip, and Wodon 2017).

In a stylized policy scenario, education-related policy indicators—secondary and tertiary enrollment and completion rates—are assumed to rise over the course of 2022-30 in each country by as much as their largest improvement in any ten-year period during 2000-21. This means that EMDEs, on average, would raise secondary school completion rates by almost 4 percentage points and secondary and tertiary enrollment rates by 12 and 5 percentage points, respectively, on average, in the remainder of this decade. In EMDEs that have made particularly large strides in improving education outcomes but still have ample room for further improvements, such as those in SAR, secondary school completion rates could rise as much as 20 percentage points in 2022-30, of which 6 percentage points would be due to such reforms. Advanced economies also have room for improvement, especially in higher level of education: tertiary enrollment rates would rise by 11 percentage points, on average during next decade, compared to the baseline scenario.

Rapid technological change and greater needs for interdisciplinary skills may also require new strategies for life-time education and retraining that enable workers to be more mobile and adaptable through their careers. For example, analysis of jobs posting suggests that a growing number of jobs across a range of industries required soft skills as well as communications and artificial intelligence-related skills (Liu and Lyu 2021; Squicciarini and Nachtigall 2021). Hence, an ability to acquire new skill sets may be a critical competency for workers to meet the demands of future labor markets (OECD 2018).

Healthcare policies

Average life expectancy in EMDEs is still lower than in advanced economies: in 2011-21, they averaged 75 and 81 years, respectively. While life expectancy in some EMDEs, particularly in SAR and SSA, has risen significantly—by 4-7 years over the past two decades—it remains about one-fifth below advanced-economy levels in SSA and about one-seventh below in SAR.

Policies to improve public health, and to promote longer, healthier, and more productive working lives, range widely. In many EMDEs, better sanitation and access to clean water remain key to improvements in public health. The communities most affected by poor sanitation tend to be the poorest (Andres 2021). However, improvements in sanitation have to be accompanied by high sanitation usage and

[15] Other measures, such as reducing student-teacher ratios or additional years of schooling, have had effects that have differed widely among countries (Evans and Popova 2016; Hanushek and Woessmann 2008).

widespread handwashing to yield health benefits such as lower malnutrition and disease burdens (Carter 2017).

Improvements in healthcare provision can be spurred by well-defined and regularly monitored performance indicators (Bradley et al. 2010). In countries with higher per capita incomes, comprehensive provision of healthcare services has been followed by better health outcomes (Maeda et al. 2014). Programs carefully targeted at local health service providers or groups of patients have generated considerable improvements in healthcare services and outcomes. For example, in Rwanda, performance-based incentive payments helped significantly improve health indicators for children (Gertler and Vermeesch 2012). In India, enhanced training of primary healthcare providers led to better identification and treatment of ailments (Das et al. 2017).

In a stylized scenario of improved health outcomes, life expectancy is assumed to rise over the course of 2022-30 in each country by as much as its largest improvement over any historical ten-year period during 2000-21. This would imply an increase in average life expectancy in EMDEs of 1.4 years on top of the trend increase of almost 2 years, on average, but an additional increase of 4 years in SSA.

Effects on potential growth

These stylized scenarios suggest that improvements in education and health outcomes—via their effects on the growth of the labor supply and TFP—could lift EMDE potential growth by 0.1 percentage point a year above the baseline, on average, in 2022-30.[16] In EMDEs with strong track records of, and ample room for, improving education and health outcomes, such as many of those in SSA, potential growth could be increased by more than twice as much. In contrast, the impact on potential growth for advanced economies would be negligible.

Raising labor supply growth

A country's labor supply can be increased by raising the active share of the working-age population. This can be achieved through policies to "activate" discouraged workers or groups with historically low participation rates, such as women and younger or older workers.[17] In advanced economies and EMDEs, active labor market policies and reforms to social benefits have often been followed by higher labor force participation rates (Betcherman, Dar, and Olivas 2004; Card, Kluve, and Weber 2010). In contrast, less rigid employment protection regulation and lower minimum wages have had mixed

[16] This modest effect is in line with the meta regression analysis of 57 studies of the link between education and growth by Benos and Zotou (2014). They find an economically small, although statistically significant, link between standardized enrolment rates on growth. The small average effect disguises a wide range of impact estimates that also reflect different quality of schooling (Glewwe, Maiga, Zheng 2014). The empirical literature on the link between life expectancy is even more mixed, with results varying widely depending country circumstances and with the direction of causality debated (Acemoglu and Johnson 2007; He and Li 2018; Desbordes 2011).

[17] The impact of such labor market reforms might depend on circumstances and country specifics. For example, De Haan and Wiese (2022) finds that labor market reforms in 25 OECD countries in 1985-2013 were associated with higher growth only when they were introduced during periods of expansionary fiscal policy.

effects on employment and labor force participation and, at times, unintended side effects such as lower labor force participation by disadvantaged groups (Betcherman 2014). In any event, the effects of such policies on output will depend on circumstances and country specifics. For example, De Haan and Wiese (2022) find that labor market reforms in 25 OECD countries in 1985-2013 were associated with higher output growth only when they were introduced during the periods of expansionary fiscal policy.

Data suggest that there is significant scope for increasing labor force participation particularly by women and older workers. Globally, average female labor force participation in 2011-21, at 54 percent, was three-quarters of that of men, which stood at 72 percent, and the gap between male and female participation was even larger in EMDEs, at 25 percentage points. Similarly, in both EMDEs and advanced economies, the average participation rate of workers aged 55 years or older was about half that of 30-45-year-old workers, and labor force participation among those aged 19-29 years was only four-fifths that of their 30-45 year olds.

Raising female labor force participation is a formidable task for policy makers because it depends on many factors, including economic structure and its transformation over time (especially shifts towards tradable sectors) as well as social norms and values (Klasen 2019; Erten and Metzger 2019). That said, in EMDEs, policies aimed at other objectives have sometimes raised labor force participation by women and older adults. For example, in Nigeria, improved access to finance and training programs increased female labor force participation by encouraging firm startups (Brudevold-Newman et al. 2017). In Uruguay, the extension of the school day was associated with higher adult labor force participation (Alfaro, Evans, and Holland 2015). In Mexico and Colombia, subsidized daycare was associated with increased female labor force participation (World Bank 2013). In ECA, improvements in healthcare services for the elderly have helped extend productive life spans, and improved support services for women with families has encouraged female participation (Bussolo, Koettl, and Sinnott 2015). Improved transport and communications, including improved road systems and access to power and telecommunications infrastructure have also facilitated labor force participation and promoted job creation (World Bank 2013).

The upside scenario for labor force participation by older workers assumes a social benefit reform that gradually raises participation rates in each five-year age group from 55-59 years onwards. In each country and for each gender, participation rates for workers in the age groups of 55-59 years, 60-64 years, and 65 years or older are assumed to rise to the rates of the age groups that are five years younger—the age groups of 50-54, 55-59, and 60-64 years, respectively. The increases are assumed to occur gradually over 20 years. Such an increase in participation—roughly equivalent to raising the average effective retirement age by five years—would be sizable: for comparison, between 2000 and 2020, the effective retirement age in the average advanced economy rose by 2.4 years for men (and fell in EMDEs with available data) and 3 years for women.

In this scenario, global and advanced-economy potential output growth would rise by 0.2 and 0.3 percentage point a year, respectively, on average, in 2022-30. For EMDEs, the effect is smaller, at 0.1 percentage point a year. The largest boost to growth would materialize in EAP and ECA, the two regions with the most rapidly aging populations.

Raising TFP growth

The scenario analysis thus far has considered enhancements to the growth of the factors of production, capital and labor, and how they might be brought about by policy action. But in the framework of the production function, output growth can also be raised through faster growth of TFP, which again can be promoted by policies. Policies that improve institutional quality, such as stronger application of the rule of law and better control of corruption; greater political stability; and policies that improve business climates could all raise TFP, including by encouraging a shift from informal to more productive formal activities. Policies that promote spending on research and development (R&D) can also raise TFP growth by fostering technological progress.

There is broad consensus in the literature that market-friendly institutional reforms have been associated with stronger economic growth, albeit with varying results across countries and disagreements about optimal institutional arrangements (Bluhm and Szirmai 2011; Nawaz 2015; Prati, Onorato, and Papageorgiou 2013). Institutional change can raise investment and productivity growth both directly, by raising private returns to productivity-enhancing investment in human and physical capital, and indirectly, by removing obstacles to other drivers of productivity growth, such as innovation, openness to international trade and investment, competition, and financial development (Acemoglu et al. 2005; Botero, Ponce, and Shleifer 2012; Glaeser et al. 2004; Glaeser, Ponzetto, and Shleifer 2007). Institutional reforms can encourage private sector investment and innovation by establishing secure and enforceable property rights, minimizing expropriation risk, promoting competition and limiting market concentration, creating a stable and confidence-inspiring policy environment, lowering the costs of doing business, and encouraging participation in the formal sector where productivity tends to be higher (World Bank 2018c, 2019c).

Poor business climates allow anticompetitive practices to flourish, perpetuate corruption, discourage innovation, and distort the efficient allocation of factors of production (Aghion and Schankermann 2004; Bourles et al. 2013; Buccirossi et al. 2013). Burdensome and unnecessary business regulations can amplify the adverse effect of corruption on productivity (Amin and Ulku 2019). Conversely, good governance ensures competitive and flexible markets with limited market concentration, effective regulation, and the efficient and equitable provision of public services, including healthcare, education, and public infrastructure (Acemoglu and Johnson 2005; Dort, Méon, and Sekkat 2014; Gwartney, Holcombe, and Lawson 2006).

The potential benefits of reforms in these areas are underscored by the fact that, in many EMDEs, institutions and governance remain weak (World Bank 2018b). The lack of secure and enforceable property rights, pervasive corruption and crime, and large

informal sectors often limit the ability of private firms to invest and innovate and thus the ability of many EMDEs to close productivity gaps with the advanced economies. This means that institutional reforms provide considerable scope for EMDE governments to stem and reverse the slowdown in the growth of productivity and potential output.

Reforms of institutions and business climates: Literature review

The literature reviewed in annex 5A indicates that substantial improvements in the quality of regulations, institutions, and business climates have often been associated with significant increases in long-term economic growth.

Regulatory reforms have encouraged the entry of more productive firms, including multinational companies, and stimulated research and development spending (Alam, Uddin, and Yazdifar 2019; Egan 2013). Reforms to increase labor market flexibility have helped improve firm-level productivity, increase labor force participation, reduce informality, and encourage a more efficient allocation of labor.[18] EMDEs with business-friendly regulations have tended to have greater economic inclusiveness and smaller informal sectors, and have grown faster (Djankov, McLiesh, and Ramalho 2006; World Bank 2014). Conversely, trade restrictions have been associated with lower firm-level productivity, especially when accompanied by intrusive domestic industrial policy (Topalova and Khandelwal 2011). Weak business environments have also diminished complementarities between public, foreign direct, and domestic investment (Kose et al. 2017). Major improvements in business environments have been associated with increased output growth (Divanbeigi and Ramalho 2015; Kirkpatrick 2014).

A number of factors have affected the impact and success of institutional reforms, including the country's stage of development and distance to the technological frontier (Dabla-Norris, Ho, and Kyobe 2016). Thus investment in physical and human capital has often been associated with stronger long-term outcomes when the quality of institutions exceeded certain thresholds (Hall, Sobel, and Crowley 2010; Jude and Levieuge 2017). EMDEs with stronger institutions and better regulations may have achieved greater output gains from financial liberalization and trade openness (Atkin and Khandelwal 2020; Slesman, Baharumshah, and Azman-Saini 2019; Williams 2019).

The ability of governments to maintain the pace of institutional reforms has often been uneven, in part because the growth dividends from reforms have often materialized with substantial lags and reforms may have initially been unpopular and politically costly, including at election times (Alesina et al. 2020). Major growth downturns have sometimes been associated with subsequent reform accelerations; conversely, growth-enhancing reforms have often been delayed or even reversed during times of economic stress and in economies with high debt burdens (Gokmen et al. 2020; Muller, Storesletten, and Zilibotti 2019). Even during more tranquil times, meaningful reforms

[18] See Blanchard, Jaumotte, and Loungani (2013); Bruhn (2011); La Porta and Shleifer (2014); Loayza, Oviedo, and Serven (2005); and Loayza and Serven (2010).

have often been postponed or abandoned because of their redistributive effects, including their costs to vested interests. (Gradstein 2007).

Reforms to institutions and business climates: Empirical estimation

A local projection approach is used to estimate the impact of major, sustained institutional reform advances and setbacks on the growth of TFP and investment in EMDEs. Sustained institutional advances (or setbacks) are defined as increases (or decreases) in the unweighted average of four indicators from the International Country Risk Guide (ICRG)—bureaucracy quality, law and order, corruption, and investment profile—provided the increase (or decrease) is not unwound for at least three consecutive years. The local projection model estimates the effect of the reform event on the cumulative growth of investment and TFP over horizons of two and four years after the start of the event (annex 5B).

The estimates suggest that reform advances were associated with significant and, in some cases, lasting increases in the growth of TFP and investment whereas the impacts of setbacks were highly heterogeneous. TFP was, on average, about 1.9 percent above the baseline two years after reform advances (figure 5.11). Over time, this impact became more heterogeneous and more difficult to estimate precisely. By contrast, the impact on investment strengthened over time: four years after reform advances, investment was, on average, 16-17 percent above the baseline. Sustained reform setbacks were followed by a wide range of TFP outcomes. Investment also evolved in too heterogeneous a manner for a well-defined estimate of the impact but often fell well below the baseline over several years.

Reforms to fiscal frameworks

Fiscal reforms can also yield important productivity dividends. Several studies have highlighted the long-term growth benefits of fiscal reforms, especially when combined with other structural reforms (IMF 2016a). In OECD countries, the growth-enhancing effects of a budget-neutral shift in government spending towards health, education, and transport often becomes apparent after five years (Barbiero and Cournède 2013). On the revenue side, a budget-neutral increase in the efficiency of the tax system could raise long-term growth. One study found that sixty percent of fiscal reform episodes in 112 countries—such as switching from labor taxation to consumption taxation and shifting spending towards health, education, and infrastructure—were followed by growth accelerations of more than 1 percentage point a year (IMF 2016b). Over the longer term, fiscal reforms such as the establishment of fiscal rules have also proven to be growth-enhancing in EU countries (Afonso and Jalles 2012; Castro 2011; Miyazaki 2014).

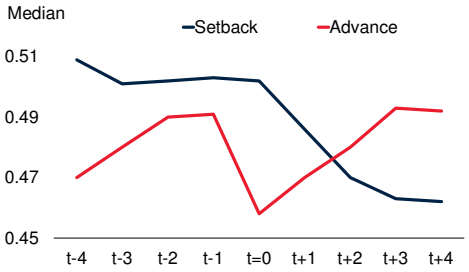
Implications of policies for potential growth prospects

The stylized scenarios above suggest that a combination of measures—policies to promote investment, better educational and health outcomes, more efficient product and labor markets, an improved business climate, and higher quality of governance—or

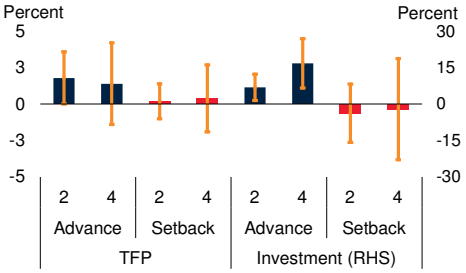
FIGURE 5.11 Institutional reforms

Past institutional reforms have been associated with higher TFP growth and higher investment growth. Reform setbacks have been associated with a wide range of outcomes but in many cases, growth of both TFP and investment fell steeply.

A. ICRG indicators around sustained reform advances and setbacks in EMDEs



B. Cumulative change in EMDE investment and TFP two to four years after a sustained change in institutional quality



Sources: Penn World Tables, World Bank.

Note: EMDEs = emerging market and developing economies; TFP = Total factor productivity. Sustained institutional advances or setbacks are defined as an increase or decrease, respectively, in the unweighted average of four ICRG indicators—bureaucracy quality, law and order, corruption, and investment profile—provided the increase is not unwound for at least three consecutive years. A detailed methodology is available in annex 5B.

A. Average of four indicators: bureaucracy quality, law and order, corruption, and investment profile. t=0 indicates the year when a sustained reform advance or setback started.

B. Sample starts in 1985. Chart shows regression coefficients on TFP and investment growth with dummies for the start of sustained reform advances and setbacks from local projection estimation for lags of two and four years. Vertical lines show the 90 percent confidence intervals.

various subsets of them could more than reverse the projected decline in potential growth in the remainder of this decade. The scenarios with scaled-up physical capital, enhanced human capital, and faster labor supply growth alone are associated, together, with 0.7 percentage point a year higher global potential growth, sufficient to reverse the 0.4 percentage point slowdown projected for 2022-30 (figure 5.9).

Policies could help reverse the projected further slowdown in global potential growth. Reforms associated with higher physical capital investment, enhanced human capital, and faster labor supply growth could raise potential growth by 0.7 percentage point a year in 2022-30, globally and in EMDEs. This would offset the 0.4 percentage point decline in global potential growth between 2011-21 and 2022-30 projected in the baseline scenario, and most of the 1.0 percentage point slowdown projected for EMDEs.

One of the options for a major investment boost is climate-related infrastructure investment, especially if this infrastructure investment is accompanied by improved spending efficiency (figure 5.10). A climate-related infrastructure investment surge amounting to 3.5 percentage points of GDP alone could raise potential growth globally by 0.1 percentage point per year and in EMDEs by 0.3 percentage point. If this was accompanied by improved spending efficiency in EMDEs, potential growth could rise by another 0.1 percentage point.

Conclusion

Global potential output growth is projected in the baseline to slow further in 2022-30, by 0.4 percentage point per year from 2011-21, to 2.2 percent per year, with all the main drivers of growth weakening. EMDE potential growth, too, is expected to slow, by 1.0 percentage point per year to 4.0 percent per year in 2022-30. The slowdown would come on the heels of the slowing of potential growth between 2000-10 and 2011-21—globally, by 0.9 percentage point per year. The slowdown in the remainder of this decade could be even more pronounced than projected in the baseline, by 0.2-0.9 percentage point per year, if improvements in investment, education and health outcomes, or female labor force participation, which are assumed in the baseline, fail to occur or if such adverse events as a global recession or more frequent natural disasters materialize.

A comprehensive reform package that replicates past successes could more than reverse the decline in global potential growth projected for the remainder of the 2020s. Such a package could include an investment boost (including for climate-related purposes); reforms of labor markets, education and healthcare; and institutional and business climate reforms.

The design of any reform package should take into account several considerations. First, implementing multiple reforms simultaneously rather than piecemeal can generate mutually-reinforcing synergies (annex 5A). For example, in OECD countries, labor and product market reforms, measures to promote FDI, and trade liberalization have yielded important synergies (OECD 2017). Also in OECD countries, labor market reforms have been more growth-enhancing when combined with an expansionary fiscal stance (de Haan and Wiese 2022). There may also be cross-country synergies from reforms that are coordinated internationally. The potential for growth spillovers puts a premium on reform efforts in advanced economies that can have large beneficial repercussions for their EMDE trading partners.

Second, reform payoffs may take more time to materialize than in the stylized scenarios discussed above and they are also likely to depend on the timing of reform. There is some evidence that reforms have had the largest growth dividends when they were well-timed—at least in the context of advanced economies. For example, labor market reforms may lift growth more during economic upswings or during periods of expansionary fiscal policy, when job entrants can more easily find jobs appropriate to their skills (de Haan and Wiese 2022; IMF 2016b).

Third, reform priorities naturally differ across countries—one of the reasons reform packages have to be tailored to the circumstances and features of individual countries (Dabla-Norris 2016). For example, school enrollment and completion rates in several economies in MNA exceed the EMDE average. However, education reforms continue to be needed to address poor scores on international tests and pervasive skills mismatches in the labor market.

Future research on the questions discussed in this chapter could take several directions. We list a few below.

- *Benefits from reforms involving state-owned enterprises.* First, many EMDEs host large state-owned enterprises or poorly regulated private monopolies. Reforms to these could trigger increases in productivity as capital and labor are reallocated towards more productive uses. A better understanding of the impact on potential growth for EMDEs (beyond individual case studies) as well as the identification of conducive preconditions and complementary reforms would be helpful.

- *Benefits from improvements of governance and business climates.* Second, many EMDEs have weak governance and business climates. A fuller quantitative assessment of the effects of improvements in various dimensions of governance and business climates on potential growth, including through firm productivity and household decisions on labor force participation and informal employment, would be helpful.

- *Better understanding of longer-term impact of reforms.* Third, the exercise conducted for this chapter rested on as wide a cross-country sample of data as possible, in order to be representative of the heterogeneity of EMDEs. Data constraints prohibited analysis of developments before 1990. However, for a smaller set of countries, earlier data should be obtainable which could allow analysis of the longer-term effects of the profound structural policy changes that occurred in the 1970s and 1980s. Analysis of a longer time period may also allow for a better assessment of the possible cleansing effects of adverse shocks at the macroeconomic level.

- *Additional analysis on climate-related infrastructure investment.* Fourth, the climate change scenario explored in this chapter is based on regional estimates of infrastructure investment needs because of data limitations for a large number of individual EMDEs. Given the wide heterogeneity in climate challenges, these regional estimates should ideally be supplemented or replaced by country-specific estimates that can provide more precision. For some countries, country-specific infrastructure investment goals are available, including, for EU countries, in the national Recovery and Resilience plans funded by NextGeneration EU investments. For other regions, however, such country-specific data are for now unavailable.

TABLE 5.1 Sample and region coverage

Advanced Economies	Emerging Market and Developing Economies	
Austria	**East Asia and Pacific**	**Middle East and North Africa**
Belgium	China	Bahrain
Canada	Indonesia	Egypt, Arab Rep.
Cyprus	Philippines	Iran, Islamic Rep.
Czech Republic	Thailand	Jordan
Denmark	**Europe and Central Asia**	Kuwait
Estonia	Bulgaria	Saudi Arabia
Finland	Croatia	Tunisia
France	Hungary	**South Asia**
Germany	Kazakhstan	India
Greece	Moldova	**Sub-Saharan Africa**
Hong Kong SAR, China	Poland	Benin
Iceland	Russia	Botswana
Ireland	Türkiye	Cameroon
Israel	Ukraine	Côte d'Ivoire
Italy	**Latin America and the Caribbean**	Kenya
Japan	Argentina	Lesotho
Korea, Rep.	Barbados	Mauritius
Latvia	Brazil	Mozambique
Luxembourg	Chile	Niger
Netherlands	Colombia	Rwanda
Norway	Costa Rica	Senegal
Portugal	Ecuador	South Africa
Slovak Republic	Guatemala	Swaziland
Slovenia	Honduras	
Spain	Jamaica	
Sweden	Mexico	
Switzerland	Panama	
United Kingdom	Paraguay	
United States	Peru	
	Uruguay	

Source: World Bank.

ANNEX 5A Literature review: effects of economic reforms on growth

An extensive literature has explored the effects on economic growth of various structural reforms in recent decades. This annex reviews the main findings of the literature on reforms to enhance human capital, increase and improve infrastructure investment, and raise female labor force participation.

Human capital and growth

Conceptual links. In the production function framework, human capital is a factor of production, and human capital accumulation raises output growth directly (Mankiw, Romer, and Weil 1992). But it can also raise output growth indirectly by stimulating technological progress, technology adoption, and knowledge spillovers, and thus raising TFP growth.[19] In both ways, human capital accumulation is a key driver of growth in labor productivity, the key to sustained growth in living standards.[20] The literature is divided on the degree to which human capital can explain cross-country differences in per capita incomes.[21] Two dimensions of human capital accumulation have been studied for their impact on output growth: education and health.

Education and growth: Empirical evidence. A large literature has established that a better educated population is associated with higher incomes or faster income growth. Both school enrollment and the quality of education have been shown to benefit the growth or levels of income, especially when combined with a supporting environment.

Higher school enrollment or educational attainment—especially in primary and secondary education—has been found to be associated with stronger growth.[22] Primary and secondary education appears to be more important for knowledge diffusion, and post-secondary education for innovation and creation of new knowledge (Vandenbussche, Aghion, and Meghir 2006). The growth-enhancing effect of better-quality education is even stronger than that of more schooling as captured in enrollment and attainment rates.[23] For example, measures of acquisition of specific skills or

[19] The role of education in encouraging technological progress is discussed in Acemoglu and Autor (2012); its role in technology adoption is discussed in Danquah and Amankwah-Amoah (2017), Che and Zhang (2018), and Huffman (2020); and its role in knowledge spillovers is discussed in Kienow and Rodriguez-Clare (2005), Easterly (2005), and Ehrlich and Pei (2020).

[20] See Dieppe (2020), de la Fuente (2011), Flabbi and Gatti (2018), and World Bank (2018c).

[21] Some studies find that only 10-50 percent of cross-country income variation can be explained by human capital accumulation (Caselli 2005; Caselli and Ciccone 2013; Kienow and Rodriguez Clare 1997; Mankiw, Romer, and Weil 1992). Other studies, which differentiate between different types of human capital and skill complementarity, find that the majority of cross-country differences can be attributed to human capital (Hendricks and Schoellman 2017; Jones 2014; Malmberg 2016; Sasso and Rirzen 2016).

[22] See Barro (1991, 1997); Krueger and Lindahl (2001); Mankiw, Romer, and Weil (1992); Sala-i-Martin, Doppelhofer, and Miller (2004); Sianesi and Van Reenen (2003); Topel (1999); and Temple (2001). For the impact of primary and secondary schooling, see Barro and Sala-i-Martin (1995).

[23] See Barro (2001); Bosworth and Collins (2003); Coulombe and Tremblay (2006); Hanushek (2002); Hanushek and Woessmann (2008); and Woessmann (2003a, 2003b).

academic achievement, such as test scores, are statistically significantly associated with higher growth.[24] This is especially true for LICs (Hanushek, Ruhose, and Woessmann 2017a, 2017b).

Other factors can slow human capital accumulation or dampen its growth-enhancing effects. These include unsupportive household environments (Hanushek 2002; Woessmann 2003a). It also includes weak institutional environments that can divert highly skilled labor into unproductive activities such as rent-seeking.[25] Similarly, a stagnating economy with limited job creation may struggle to employ productively a better educated workforce and thus fail to reap the full gains in terms of growth (World Bank 2018c). Some studies find evidence of self-reinforcing feedback loops from higher growth to higher investment in human capital.[26]

Health, nutrition, and growth: Empirical evidence. Both at the individual worker level and at the country level, improved health has been found to be associated with greater productivity and higher incomes. Early childhood interventions appear to be particularly beneficial (Grantham-McGregor et al. 2007). For children, better nutrition has been associated with better educational performance and, once they enter the labor market, higher incomes.[27] As with education, there appear to be positive feedback loops as higher incomes allow more investment into healthcare and related infrastructure (Weil 2014).

Infrastructure and growth

Conceptual links. Like human capital accumulation, infrastructure investment can raise output growth both directly through growth of the capital stock, which is a factor of production, and indirectly through its collateral benefits for TFP growth. Good infrastructure investment can encourage innovation and knowledge diffusion, enhance human capital and TFP, and thus lower production costs, improve a country's international competitiveness, and facilitate trade (Agenor 2013; Demetriades and Mamuneas 2000). For example, better transportation networks can reduce the cost of, and time taken in, new construction and the installation of new equipment (Turnovsky 1996), while improved access to electricity and better sanitation can help to raise educational attainment and public health standards (Agenor 2011; Getachew 2010). The growth-enhancing effects of infrastructure investment depend on its quality and, for some types of infrastructure investment, the interconnectedness of networks and freedom from congestion.[28]

Infrastructure investment and growth: Empirical evidence. Studies of the effects of infrastructure investment spending typically find that it raises output, but only modestly and without accompanying productivity increases (Straub and Terada-Hagiwara

[24] See Hanushek and Kimko (2000) and Hanushek and Woessmann (2015a, 2015b, 2016).
[25] See Easterly (2001); Pritchett (2001); and Murphy, Shleifer, and Vishny (1991).
[26] See Bils and Klenow (2000), Pritchett (2001, 2006), and Weil (2014).
[27] See Galasso et al. (2017), Luo et al. (2012), and Taras (2005).
[28] See Hulten (1994), OECD (2007), and Sanchez-Robles (1998).

2010).[29] These mixed results have been attributed to uncaptured spillovers, weak institutions, corruption, and inadequate public spending management that impairs the overall efficiency of public investment management.[30] However, studies using physical measures of infrastructure investment have found that it has been associated with significantly higher output.[31] Access to specific infrastructure services, such as electricity, better roads, or telephones, has also been associated with higher growth or higher income.[32]

Female labor force participation and growth

Empirical evidence. Greater female labor force participation raises labor supply and thus output. However, women often face restrictions in freely pursuing occupations or engaging in economic transactions, or face gaps in education or healthcare (Gonzalez et al. 2015; World Bank 2012). To the extent that this holds them back from realizing their most productive employment, it weighs on output. Increased female labor force participation may also generate long-lasting effects by improving education outcomes of children or encouraging other women to enter the labor market (Duflo 2012; Fogli and Veldkamp 2011).

Reinforcing interactions between reforms

Interactions between reforms in multiple areas tend to strengthen their growth dividends. Infrastructure investment in safe water, sanitation, electricity, and transportation improves population health, increases school attendance, and improves learning outcomes (Agénor 2010). Healthier students perform better in school and are more likely to attend, while healthier populations are associated with better-qualified staff in the education sector (Behrman 2010). In turn, better education of mothers improves infant health and prospects (Fuchs, Pamuk, and Lutz 2010). Higher

[29] Surveys of the literature include Pereira and Andraz (2013), Bom and Ligthart (2014), and Romp and de Haan (2007). IMF (2014) finds long-term output elasticities of infrastructure investment in excess of 1. In contrast, more recent studies find that infrastructure investment either does not significantly raise output or growth, or raises output by less than its cost (Ganelli and Tervala 2016).

[30] In a meta-analysis of 68 studies over 1983-2008, Bom and Ligthart (2014) find that output elasticities of public capital at the regional level are considerably less than those of public capital at the central government level, suggesting that cross-regional spillovers are not taken into account. IMF (2015b) argues that countries with stronger public investment management institutions have more predictable, credible, efficient, and productive investments, and that strengthening these institutions could close up to two-thirds of the public investment efficiency gap. IMF (2018) argue that better public sector asset management is associated with higher revenues, greater effectiveness and returns on assets, and lower risk. Pritchett (2000) casts doubt on the robustness of econometric estimates of output elasticities.

[31] Canning (1999); Calderon and Serven (2003); and Calderon, Moral-Benito and Serven (2015) find output gains from electricity generation capacity, transportation networks, and telephone networks. Easterly (2001) finds an association between telephone lines and growth. Fernald (1999) shows that road infrastructure investment raised U.S. productivity. Roller and Waverman (2001) find a positive link between telecommunications networks and growth.

[32] For access to electricity, see Khandker et al. (2012), Kumar and Rauniyar (2011), and Rud (2012). For access to better roads, see Datta (2012), Hu and Liu (2010), and Queiroz and Gautam (1992). For access to telephones, see Canning and Pedroni (2008).

educational attainment is associated with greater labor force participation (Eckstein and Lifshitz 2011; Steinberg and Nakane 2012). Infrastructure investment in electricity, clean water, and sanitation also facilitates female labor force participation by freeing women's time for gainful employment (Ghani, Kerr, and O'Connell 2013; Norando 2010). Better governance is also associated with better education (Gerged and Elheddad 2020) and greater and better-quality infrastructure investment (Aghion et al. 2016; Chen, Liu, and Lee 2020; d'Agostino, Dunne, and Pieroni 2016).[33]

ANNEX 5B Methodology: institutional reform impact

The local projection estimation of changes in potential TFP growth and investment after reform episodes draws on an event study of reform episodes (World Bank 2021c). The identification of institutional reform events is based on the duration of changes in ICRG indicator. After a positive change (for reform advances) or negative change (for reform setbacks) is identified, it is considered an event if no changes in the opposite direction are found within three years of the beginning of changes. The initial years are then chosen as event years. If the initial year of the next episode in the same direction is within five years, the next one is merged with the previous episode. If an episode is ongoing, that episode is used in the analysis, regardless of its length.

Reform events are defined as sustained increases in the average of four indicators of institutional quality produced by the International Country Risk Guide (ICRG)—bureaucracy quality, rule of law, corruption, and investment profile. This yields 106 episodes of sustained reform advances and 85 episodes of sustained reform setbacks in 100 EMDEs during 2004-19.

A local projection estimation as in Jorda (2005) using the bias correction specification of Teulings and Zubanov (2014) is estimated to identify the effects of reform events on TFP and real investment growth over time. The main advantages of local projection estimations include their simplicity of estimation, robustness to model misspecifications, ease of inference, and flexibility to incorporate highly nonlinear specifications and interactions of various regressors. In impulse responses, the model estimates the effect of reform events in country i in year t (the dummy variable $shock_{it}$) on cumulative growth in TFP or real investment over a horizon h:

$$y_{i,t+h} - y_{i,t} = \alpha^h + \beta^h shock_{i,t} + \sum_j^2 \theta_{1,j}^h shock_{i,t-j}$$
$$+ \sum_j^{h-1} \theta_{2,j}^h shock_{i,t+h-j} + \sum_j^2 \theta_{3,j}^h dy_{i,t-j}$$
$$+ \theta_{4,i}^h X_i + \mu_i^h + \tau_t^h + \varepsilon_{i,t} \ ,$$

where y_{it} refers to the log level of TFP (or real investment) in county i in year t, dy_{it} to its annual growth rate, and m_i^h and t_i^h to country and year fixed effects. Additional

[33] See Hulten (1994), OECD (2007), and Sanchez-Robles (1998).

controls X_i include a dummy indicating whether a country is a commodity exporter, dummies for financial crises occurring during the period h and the log level of real GDP per capita a t. Since $y_{i,t+h} - y_{i,t}$ is cumulative growth in either TFP or real investment over horizon h, the coefficient β_h represents an estimate of the cumulative response of growth in TFP (or real investment) by time $t + h$ to the reform advance (setback) that happened at time t.

The results are robust to using non-overlapping episodes. That said, like any regression, the possibility remains that the events selected here coincided with other favorable or adverse developments that spurred or slowed growth and the methodology cannot disentangle these two forces.

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CHAPTER 6

Trade as an Engine of Growth: Sputtering but Fixable

International trade has been an important engine of output and productivity growth historically, helping to lift millions out of poverty in recent decades. But since the global financial crisis, world trade growth has slowed, reflecting cyclical and structural forces. The COVID-19 pandemic and Russia's subsequent invasion of Ukraine have further disrupted global supply chains and the trade that accompanies them. A removal of impediments that raise trade costs could reinvigorate world trade. Trade costs, on average, roughly double the cost of internationally traded goods relative to domestically sold goods. Tariffs amount to only one-twentieth of average trade costs; the bulk are incurred in shipping and logistics, and trade procedures and processes at and behind the border. Despite a decline since 1995, trade costs remain about one-half higher in EMDEs than in advanced economies; about two-fifths of this gap appears to be due to higher shipping and logistics costs and a further two-fifths due to trade policy. A comprehensive reform package to lower trade costs would include trade facilitation measures; deeper trade liberalization; efforts to streamline trade processes and clearance requirements; improvements in transport infrastructure; more competition in domestic logistics and in retail and wholesale trade; and less corruption. Some of these measures could yield large dividends: it is estimated that among the worst-performing EMDEs, a hypothetical reform package to improve logistics performance and maritime connectivity to the standards of the best-performing EMDEs would halve trade costs.

Introduction

Global trade, powered by trade liberalization and falling transport costs, has historically been an important engine of output and productivity growth. In recent decades, it has helped to lift around 1 billion people out of poverty and many developing countries to integrate into the world economy. Empirical studies indicate that a 1 percentage point of GDP increase in trade openness has lifted per capita income by 0.2 percent (World Bank 2020a). A large part of the gains from trade can be attributed to the expansion of global value chains (World Bank 2020a). Participation in global value chains generates efficiency gains and supports the transfer of knowledge, capital, and other inputs across countries, thereby boosting productivity. Global value chain integration has also been associated with reduced vulnerability of economic activity to domestic shocks, although it has come with increased sensitivity to external shocks (Constantinescu, Mattoo, and Ruta 2020; Espitia et al. 2021).

In the past decade and a half, global trade growth has slowed as global value chains have matured, investment weakness has weighed on goods trade, and trade tensions have

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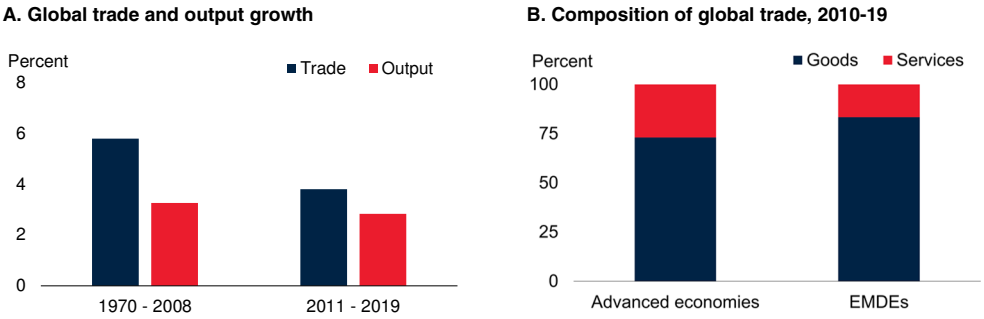
Note: This chapter was prepared by Franziska Ohnsorge and Lucia Quaglietti, with contributions from Cordula Rastogi.

FIGURE 6.1 Global trade

The growth of global trade in goods and services was almost twice as fast as global output growth during 1970-2008, but less than one-half faster during 2011-19. Goods trade accounted for 75 percent of global trade in goods and services during 2010-19.



Source: World Bank.

Note: EMDEs = emerging market and developing economies.

A. Bars indicate annual average growth. World output growth is real GDP growth computed as a weighted average (at 2010-19 average prices and exchange rates) as reported in the January 2023 *Global Economic Prospects* report. Trade growth refers to the average growth of import and export volumes.

B. Shares of global goods and services trade in global trade, average of 2010-19.

emerged between major economies (World Bank 2015, 2017, chapter 3). As a result, instead of being twice as fast as global output growth, as it was during 1990-2011, the growth of global trade in goods and services in 2011-19 was just about as fast as global output growth (figure 6.1). During the COVID-19 pandemic, global trade was hit particularly hard, falling by nearly 16 percent in the second quarter of 2020. The subsequent rebound was swift, however, especially for goods trade, and much faster than after the 2007-09 global financial crisis. That said, in 2021, global trade growth slowed again, disrupted by lockdowns and closures in the midst of new COVID-19 outbreaks and the emergence of significant supply chain strains in a number of sectors. A further blow to supply chains and trade was dealt by Russia's invasion of Ukraine in February 2022, which dislocated global commodity markets and manufacturing processes that rely on specialized inputs from Russia or Ukraine.

Absent a major policy effort, trade growth is likely to weaken further over the remainder of the 2020s, given the prospect of slower output growth and the fact that some of the key structural factors that supported rapid trade expansion in the past have largely run their course. Although supply chains have been remarkably resilient given the magnitude of recent shocks, the COVID-19 pandemic and Russia's invasion of Ukraine could accelerate changes in supply chains that were already underway, including by further in-sourcing or regionalizing production networks and increasing digitalization (chapter 4). A contraction of supply chains may lower the output elasticity of trade further, continuing a process that has been underway since 2010 (Timmer et al. 2021). Multinational corporations operating in EMDEs have already increased the use of digital technologies and enhanced their diversification of suppliers and production sites to increase their resilience to supply-chain shocks (Saurav et al. 2020). As multinationals

seek to diversify, EMDEs may have new opportunities to integrate into global supply chains, provided they can offer a conducive business environment, such as a skilled workforce and adequate infrastructure (Butollo 2021; Arunyanart et al. 2021).

As discussed in chapter 5, potential output growth is expected to slow in many EMDEs in the coming decade amid unfavorable demographics and slowing investment and productivity growth. One way in which policy makers in EMDEs can boost long-term growth of output and productivity is by promoting trade integration through measures to reduce trade costs.

This chapter examines the following questions:

- What is the link between trade growth and long-term output growth?
- What are the prospects for trade growth in the coming decade?
- How large are trade costs?
- What are the correlates of trade costs?
- Which policies can help to reduce trade costs?

This chapter contributes to the literature in a number of ways. First, it expands on World Bank (2021b) with a new, comprehensive review of the theoretical and empirical literature on the links between trade and output growth. Second, it presents an event study of the evolution of trade in goods and services through global recessions, including the pandemic-induced global recession of 2020.

Third, the chapter revisits an earlier literature that reported estimates of trade costs and their correlates (Arvis et al. 2016; Novy 2013; World Bank 2021b). It uses estimates of the costs of goods trade for up to 180 countries (29 advanced economies and 151 EMDEs) from the World Bank/UNESCAP database for 1995-2019. The drivers of the costs of goods trade, which accounts for about 75 percent of world and EMDE trade in goods and services, are estimated econometrically. The chapter also quantifies the contribution of one type of services trade—logistics and shipping services—to the costs of goods trade. In addition, the chapter goes further than previously published research in assessing the role of trade policy—tariffs, participation in trade agreements—in trade costs.

Fourth, the chapter builds upon its analytical findings to discuss policy options for lowering trade costs. In particular, it offers scenarios indicating the potential impact of a range of policy measures on trade costs.

This chapter offers the following findings.

First, the theoretical literature indicates that international trade boosts the long-term growth of output and productivity by promoting a more efficient allocation of resources,

technological spillovers, and human capital accumulation. The empirical literature supports the theory by finding statistically significant positive relationships between trade openness and output growth, although they may be conditional on the presence of sound institutions and a supportive business environment in exporting countries. Overwhelmingly, empirical studies find a positive impact of trade on productivity growth.

Second, the COVID-19-induced global recession of 2020 triggered a collapse of global trade in goods and services. Within six months, however, before end-2020, global goods trade had recovered to pre-pandemic levels, and, by September 2021, global services trade had reached pre-pandemic levels even though travel and tourism services trade was still 40 percent lower than before the pandemic. The decline in services trade was considerably more pronounced and the recovery more subdued than in past global recessions, whereas movements in goods trade were broadly comparable to past global recessions.

Third, looking ahead, global trade growth is likely to weaken further in the coming decade owing partly to slower global output growth and partly to the further waning of structural factors that supported rapid trade expansion in the past. The disruptions caused by the pandemic and Russia's invasion of Ukraine may also continue to dampen trade growth over the medium term. A major policy effort to reduce trade costs could help reverse the trade slowdown.

Fourth, trade costs for goods are high: on average, they are almost equivalent to a 100 percent tariff, so that they roughly double the costs of internationally traded goods relative to domestic goods. Tariffs amount to only one-twentieth of average trade costs; the bulk of trade costs are incurred in transport and logistics, non-tariff barriers, and policy-related standards and regulations. Despite a one-third decline since 1995, trade costs in EMDEs remain about one-half higher than in advanced economies.[1] Panel-regression analysis suggests that about two-fifths of the explained difference in trade costs between EMDEs and advanced economies can be accounted for by higher shipping and logistics costs, and a further two-fifths by trade policy (including trade policy uncertainty). Services trade costs tend to be considerably higher than goods trade costs; they can, to a large extent, be attributed to regulatory restrictions.

Fifth, to reduce elevated trade costs in EMDEs, comprehensive reform packages are needed to streamline trade processes and customs clearance requirements; enhance domestic trade-supporting infrastructure; increase competition in domestic logistics, and in retail and wholesale trade; lower tariffs; lower the costs of compliance with standards and regulations; and reduce corruption. Trade agreements can also reduce trade costs and promote trade, especially if they lower nontariff barriers as well as tariffs. The chapter's empirical analysis suggests that an EMDE in the quartile of EMDEs with the highest shipping and logistics costs could halve its trade costs if it improved these

[1] Differences in trade costs across regions might also stem from differences in domestic trade costs.

conditions to match the quartile of EMDEs with the lowest costs of shipping and logistics.

For the purposes of this chapter, trade costs are broadly defined to include all costs of international trade, whether at the border (such as tariffs), behind the border (such as standards and labelling requirements), or between borders (such as shipping and logistics). Trade costs are defined as the excess cost of an internationally traded good compared with a similar good traded domestically (box 6.1). Hence, trade costs cover the full range of costs associated with trading internationally, including transportation and distribution costs, tariffs and nontariff barriers arising from policies, costs of information and contract enforcement, legal and regulatory costs, as well as the costs of doing business across cultures, languages, and economic systems (Anderson and van Wincoop 2003).

The chapter is organized in five sections. The first section reviews the theoretical and empirical literature on the linkages between international trade and long-term output growth and the main channels of transmission. The subsequent section discusses developments in global trade over the past decade, with a particular focus on developments during the COVID-19 pandemic. The following section presents patterns of trade costs across sectors and regions, while the penultimate section discusses the correlates of trade costs, including by means of an estimated gravity panel model. The final section focuses on policies to reduce trade costs, where a wide range of policy options available to policy makers are presented.

Trade and growth: a review of the literature

An extensive theoretical literature has traced out the channels through which international trade can lift output and productivity growth. The positive association between growth and trade has largely been confirmed in the empirical literature, although some studies have found that its strength depends on country characteristics.

Theoretical literature

The link between international trade and economic activity has long been a major subject of enquiry in theories of international trade and economic growth. Much traditional trade theory explains how trade raises output levels but is silent about effects on long-term output growth (Feenstra 2003; Ricardo 1817). In contrast, more recent trade and growth theories describe a positive relationship between the two, tracing out the mechanisms through which trade lifts long-term productivity and output growth (Helpman 1981; Krugman 1979; Lucas 1993).

Three main channels have been explored. First, access to foreign markets allows countries to acquire new technologies, especially when trade occurs between countries with different technological endowments. Second, openness to international trade offers opportunities to exploit economies of scale and "learning by doing", which enhance both productivity growth and the variety of goods produced and consumed. Third, the

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Shipping and logistics, tariffs, and membership in regional trade agreements are statistically significant contributors to trade costs.

Introduction

Elevated trade costs remain a significant impediment to cross-border trade. On average, trade costs roughly double the cost of an internationally traded good over a similar domestic good. In EMDEs, trade costs are more than one-half higher than in advanced economies despite a decline since 1995.

This box considers the determinants of trade costs empirically by examining the following questions.

- How are trade costs measured in the literature?
- What are the main determinants of trade costs empirically?

The results suggest that geographical distance and high bilateral tariff rates are positively associated with trade costs, including in the manufacturing sector. In contrast, common borders (proximity), common language, and membership in a common regional trade agreement tend to reduce trade costs. Policies aimed at facilitating trade, including maritime connectivity and stronger logistics performance, are also associated with lower bilateral trade costs.

Measures of trade costs

Conceptually, trade costs may be defined as the excess cost of an internationally traded good compared with a similar good traded domestically. By construction, trade costs can therefore move without any change in external costs of trading, simply as a result of changes in domestic trading costs. To measure trade costs, two main approaches have been developed in the literature: direct and indirect approaches (Chen and Novy 2012).

Direct approaches rely on observable data that serve as a proxy for individual components. For instance, measures of costs faced at the border are often based on counting the average number of days that is needed for a good to cross the border, while transport costs are often inferred from the cost of ocean and air shipping (Hummels et al. 2007). Policy barriers such as tariffs and nontariff measures are directly available from a range of statistical sources. Direct approaches suffer from a series of limitations, including the fact the underlying variables are only partially observable and may not be easily converted to plausible ad-valorem tariff equivalents, which makes it difficult to compare them but also to aggregate them into a summary measure of trade costs (Anderson and van

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Wincoop 2004). Therefore, trade cost estimates taken from such measures tend to be only partial.

Indirect approaches aim to circumvent these difficulties. These infer trade impediments top-down, from measures of trade flows and aggregate value added. Under this approach, trade costs correspond to the difference between the trade flows that would be expected in a hypothetical "frictionless" world and what is observed in the data and are computed relative to domestic trade costs. Measures built through the indirect approach can be tracked over time and include all observed and unobserved factors that explain why trading with another country is more costly than trading domestically. Novy (2013) developed a micro-founded measure of aggregate bilateral trade costs using a theoretical gravity equation for the trade cost parameters that capture the barriers to international trade. The resulting solution expresses the trade cost parameters as a function of observable trade data, providing a micro-founded measure of bilateral trade costs. The measure is easy to implement empirically for a number of countries with readily available data. One drawback is that the contribution of the individual cost factors cannot be easily disentangled by simple inspection of the measure. A way proposed in the literature to overcome this is to combine indirect and direct measurements into a single regression (Arvis et al. 2013).

Determinants of trade costs

To estimate the contribution of different determinants of trade costs, a gravity model is estimated for a panel of up to 23 advanced economies and 72 EMDEs with annual data for both trade costs and all determinants of trade costs over 2007-18. The sample includes 25 industrial commodity (energy and metals) exporters, all of which are EMDEs.

Data

The estimation relies on bilateral trade costs from the UNESCAP-World Bank Trade Costs Database. Following Novy (2013) and Arvis et al. (2013), bilateral trade costs are obtained as geometric averages of flows between countries i and j. They are computed according to the formula below:

$$(X_{ii}\, X_{jj})/(X_{ij}\, X_{ji})^{1/2\,(\sigma-1)},$$

where X_{ij} represents trade flows between countries i and j (goods produced in i and sold in j) and σ refers to the elasticity of substitution. This measure captures international trade costs relative to domestic trade costs. Intuitively, trade costs are higher when countries trade more domestically than they trade with each

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other, that is, as the ratio $(X_{ii}\, X_{jj})/(X_{ij}\, X_{ji})$ increases. Intra-national (that is, domestic) trade is proxied by the difference of gross output and total exports.

Trade costs thus computed implicitly account for a wide range of frictions associated with international trade, including transport costs, tariffs, and nontariff measures, and costs associated with differences in languages, currencies and import or export procedures. Trade costs are expressed as ad valorem (tariff) equivalents of the value of traded goods and can be computed as an aggregate referring to all sectors of the economy, but also specifically for the manufacturing and agriculture sectors.

Estimation

Gravity equations are widely used as a workhorse to analyze the determinants of bilateral trade flows. Chen and Novy (2012) and Arvis et al. (2013) also employ a gravity specification to analyse the determinants of bilateral trade costs in a cross-sectional dataset. In line with Moïsé, Orliac, and Minor (2011), this study estimates determinants of trade costs in a panel specification.

The regression equation takes the following form:

$$TC_{ijt} = \beta_1\, RTA_{ijt} + \beta_2\, tariff_{ijt} + \beta_3\, LSCI_{ijt} + \beta_4\, LPI_{ijt} + \beta_5\, Trade\ Policy\ Uncertainty_{ijt} + \beta_6\, Gravity_{ij} + \eta_t + \varepsilon_{ijt} \quad (1)$$

where for any given country pair *ij*, bilateral trade costs *TC* observed at time *t* are regressed on a wide range of candidate drivers. These include membership in a regional trade agreement (RTA); sector-specific bilateral tariffs; shipping connectivity (UNCTAD's Liner Shipping Connectivity Index, or LSCI) and logistics (the World Bank's Logistics Performance Index, or LPI); a proxy for trade policy uncertainty; and standard gravity indicators (distance, a common language, and a common border). In line with Osnago, Piermartini, and Rocha (2018), trade policy uncertainty is defined as the gap between binding tariff commitments and applied tariffs. To ascertain the role of policies aimed at facilitating trade, indexes of logistic performance and maritime connectivity are included.

Specifically, the World Bank's Logistics Performance Index (LPI) is based on surveys of global freight operators and express carriers on customs, logistics and transport infrastructure, international shipments, logistics competence, tracking and tracing, and delays. UNCTAD's Liner Shipping Connectivity Index (LSCI) is derived from the number of ships, their container-carrying capacity, maximum vessel size, number of services, and number of companies that deploy container

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ships in a country's ports. The choice of variables in the panel is informed by Arvis et al. (2013), but also by findings from the stylized facts presented in the main text. Full details of data and sources are presented in table 6.1.[a]

Since trade costs data are obtained as bilateral geometric averages, trade facilitation indicators available at individual country level are transformed into bilateral measures by taking the geometric average of each country pair direction. Therefore, the unit of analysis is each individual country pair. Time fixed effects η_t are included in the estimation to control for global trends. As the measures of trade costs already net out multilateral resistance components, in line with Novy (2013), the estimation does not include additional fixed effects.[b] Instead, to control for possible correlation of error terms, clustered standard errors by country pairs are used.

Two models are estimated: a general model for the determinants of trade costs in all sectors of the economy, and a sectoral model for the determinants of trade costs in the manufacturing sector. The two models follow the specification presented in equation 1, but trade costs and tariff rates are sector specific. Table B6.1.1 shows results from the estimations.

Results

All estimated coefficients have signs and magnitudes in line with prior expectations based on the literature. Geographical distance and high bilateral tariff rates are positively associated with trade costs. In contrast, adjacency, common language, and membership in a common regional trade agreement tend to reduce trade costs. Policies aimed at facilitating trade, including maritime connectivity and stronger logistics performance, are also associated with lower bilateral trade costs, both overall and in the manufacturing sector. Trade uncertainty is also positively associated with trade costs, including in the manufacturing sector. With an R-squared above 50 percent, the regression explains most of the variation in trade costs in the sample.

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a. Nontariff barriers or exchange rate volatility would ideally have been included in the regression estimation. However, these are difficult to measure and the available cross-country, over-time panel measures were too crude to yield statistically significant results. Ideally, the regression would also be applied to services; however, the database does not include trade costs for services.

b. Multilateral resistance captures global trends. Specifically, outward multilateral resistance measures the degree to which trade flows between *i* and *j* depend on trade costs across all potential markets for *i*'s exports, while inward multilateral resistance measures the degree to which bilateral trade depends on trade costs across all potential import markets. Therefore, the two indexes summarize third-country effects that might affect bilateral trade flows between i and j. Novy (2013) shows that simple algebra makes it possible to eliminate the multilateral resistance terms from the gravity equations, and in so doing he derives an expression for trade costs.

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TABLE B6.1.1 Panel regression results

	All Sectors	Manufacturing Sector
Liner Shipping Connectivity Index	-0.2299*** (0.007)	-0.2271** (0.007)
Logistics Performance Index	-0.5004*** (0.032)	-0.5156*** (0.356)
Tariffs	0.3449*** (0.044)	0.4265*** (0.057)
Regional trade agreement membership	-0.0487*** (0.006)	-0.0567*** (0.006)
Trade policy uncertainty	0.0907** (0.004)	0.0902** (0.005)
Distance	0.2605*** (0.007)	0.2687*** (0.007)
Common border	-0.4070*** (0.033)	-0.4125*** (0.035)
Common language	-0.1516*** (0.013)	-0.1369*** (0.141)
Observations	56,038	52,060
R2	0.569	0.569

Source: World Bank.
Note: * p<0.05, ** p<0.01, ***p<0.001. Robust standard errors are shown in parentheses. The table shows estimated coefficients from a gravity panel regression estimated for up to 95 countries using annual data for 2007-18 where the dependent variable is the log of bilateral trade costs. The regression includes time fixed effects. Standard errors are clustered by country pairs.

The panel estimation also explains most of the difference in trade costs between the average EMDE and the average advanced economy, and attributes about two-fifths of this gap to higher shipping and logistics costs in EMDEs and a further two-fifths to trade policy (including trade policy uncertainty). The regression also explains most of the decline in average trade costs between 2008 and 2018 and attributes three-fourth of it to falling shipping and logistics costs and another one -fourth to trade policy.

There are significant differences in the drivers of trade costs between advanced economies (which are mostly industrial commodity importers) and EMDEs, and between industrial commodity exporters and importers. The regression is re-estimated for a sample of bilateral trade costs among EMDEs only, a sample of bilateral trade costs among advanced economies only, and a sample of bilateral trade costs between EMDEs and advanced economies. It is also re-estimated for a sample of bilateral trade costs between industrial commodity importers or

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commodity exporters only as well as a sample of bilateral trade costs between industrial commodity exporters and importers. Table B6.1.2 shows the results.

For trade between advanced economies only, logistics performance and distance are critical sources of trade costs, whereas the roles of tariffs and regional trade agreement membership are negligible. By comparison, better logistics performance reduces trade costs between an advanced economy-EMDE country pair or between a pair of EMDEs by only one-fifth as much between a pair of advanced economies. Instead, membership in regional trade agreements significantly reduces trade costs between pairs of EMDEs (but not between pairs of advanced economies or in advanced economy-EMDE country pairs).

Logistics performance and distance are also more important sources of trade costs among commodity importers than between commodity importers and exporters. For tariffs, the reverse is true. For example, an improvement in logistics performance lowers trade costs between commodity importers by almost twice as much as between commodity importers and exporters. Conversely, a cut in tariffs lower trade costs between commodity exporters and importers by twice as much as between commodity importers only. These patterns are evident both for trade costs in all sectors and in manufacturing alone.

Robustness

The estimations are robust to different specifications, lag structures, and estimators. An alternative estimation performed with the Poisson Maximum Likelihood estimator, which is often employed in the literature on gravity models (Santos Silva and Tenreyro 2006) to control for heteroskedasticity produces similar results to those presented in table B6.1.1.

Adding further variables, including bilateral real exchange rates, GDP per capita, institutional variables, and a dummy characterizing landlocked country pairs, does not alter the regression results, and the variables turn out to be statistically insignificant. Likewise, adding country fixed effects does not alter the stability of the model, with both the gravity and trade policy variables retaining the expected sign and statistically significant effects. While there are concerns about multicollinearity (including regarding the 0.5 correlations between the LPI with the LSCI), a variable inflation factor test (a standard diagnostic test) does not detect the presence of significant multicollinearity among regressors.

A few caveats apply to the analysis. The effect of policies on trade costs can be difficult to disentangle. Changes in trade costs between two countries can be due to actions taken by one government or the other, or both together. The fact that the variables featuring in the regression (including the measure of trade costs) are

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TABLE B6.1.2 Panel regression results for subsamples

	All sectors					
	Advanced economies only	Advanced economies and EMDEs	EMDEs only	Commodity importers only	Commodity importers and exporters	Commodity exporters only
Liner Shipping Connectivity Index	-0.195*** [0.0237]	-0.230*** [0.0111]	-0.209*** † [0.0093]	-0.230*** [0.00886]	-0.231*** ‡ [0.0109]	-0.198*** ‡ [0.0226]
Logistics Performance Index	-1.526*** [0.107]	-0.298*** † [0.055]	-0.277*** † [0.048]	-0.596*** [0.0438]	-0.317*** ‡ [0.0471]	-0.273*** ‡ [0.097]
Distance	0.343*** [0.0157]	0.221*** † [0.0112]	0.233*** † [0.00993]	0.306*** [0.0103]	0.223*** ‡ [0.00962]	0.241*** ‡ [0.0202]
Tariffs	-0.0998 [0.239]	0.517*** † [0.0916]	0.203*** † [0.0488]	0.189** [0.0878]	0.453*** ‡ [0.0647]	0.238*** [0.0682]
Regional trade agreement membership	-0.00793 [0.0125]	-0.0289*** [0.00714]	-0.0850*** † [0.0117]	-0.0326*** [0.00789]	-0.0545*** [0.00844]	-0.0796*** [0.0265]
Trade policy uncertainty	0.0383*** [0.0128]	0.0897*** † [0.00706]	0.0583*** † [0.00684]	0.0799*** [0.00633]	0.0794*** ‡ [0.00666]	0.0103 ‡ [0.0132]
Common border	-0.389*** [0.114]	-0.380*** [0.136]	-0.453*** [0.0334]	-0.327*** [0.0581]	-0.494*** ‡ [0.0566]	-0.356*** [0.0541]
Common language	-0.166***	-0.0878*** †	-0.186***	-0.117***	-0.145***	-0.273*** ‡
Observations	504	668	102	802	450	408

Source: World Bank.
Note: * p<0.05, ** p<0.01, ***p<0.001,. Robust standard errors are shown in parentheses. † indicates statistically significant difference of the coefficient estimate from the coefficient estimate for a sample of advanced economies only. ‡ indicates statistically significant difference of the coefficient estimate from the coefficient estimate for a sample of commodity importers only. The table shows estimated coefficients from a gravity panel regression estimated for 86 countries using annual data for 2007-18 where the dependent variable is the log of bilateral trade costs. The regression includes time fixed effects. Standard errors are clustered by country pairs.

computed as country-pair geometric averages does not allow a disentangling of the source of policy actions. In addition, due to the lack of sufficiently long time series data, the approach taken here does not take into account the possibility that the regression coefficients have changed over time, as has been found in other studies for the effect of distance (Yotov 2012) or trade agreements (de Sousa 2012).

Conclusion

The estimation results suggest that policies can have a statistically significant and economically sizable impact on trade costs. Better shipping connectivity, better

BOX 6.1 Understanding the determinants of trade costs

TABLE B6.1.2 Panel regression results for subsamples (*continued*)

	Manufacturing					
	Advanced economies only	Advanced economies and EMDEs	EMDEs only	Commodity importers only	Commodity importers and exporters	Commodity exporters only
Liner Shipping Connectivity Index	-0.215*** [0.0266]	-0.235*** † [0.0117]	-0.206*** † [0.0104]	-0.234*** [0.00947]	-0.227*** ‡ [0.0119]	-0.198*** ‡ [0.0258]
Logistics Performance Index	-1.788*** [0.123]	-0.298*** † [0.058]	-0.336*** † [0.0539]	-0.686*** [0.0486]	-0.327*** ‡ [0.0525]	-0.237** ‡ [0.107]
Distance	0.353*** [0.0179]	0.239*** † [0.0122]	0.247*** † [0.0103]	0.303*** [0.011]	0.236*** ‡ [0.0107]	0.255*** ‡ [0.0199]
Tariffs	-0.225 [0.302]	0.804*** [0.11]	0.218*** [0.0569]	0.243** [0.107]	0.621*** [0.0827]	0.258*** [0.099]
Regional trade agreement membership	-0.005 [0.0131]	-0.0243*** [0.00791]	-0.108*** † [0.0122]	-0.0478*** [0.00841]	-0.0515*** [0.00981]	-0.107*** [0.0255]
Trade policy uncertainty	0.0287* [0.0171]	0.0744*** [0.00867]	0.0382*** [0.00701]	0.104*** [0.0069]	0.0615*** [0.00748]	-0.000122 [0.0132]
Common border	-0.283** [0.111]	-0.371** [0.145]	-0.466*** † [0.0364]	-0.325*** [0.0561]	-0.511*** ‡ [0.0609]	-0.354*** [0.0626]
Common language	-0.136***	-0.0924***	-0.183***	-0.153***	-0.146***	-0.254*** ‡
Observations	642	538	632	134	382	408

Source: World Bank.

Note: * p<0.05, ** p<0.01, ***p<0.001,. Robust standard errors are shown in parentheses. † indicates statistically significant difference of the coefficient estimate from the coefficient estimate for a sample of advanced economies only. ‡ indicates statistically significant difference of the coefficient estimate from the coefficient estimate for a sample of commodity importers only. The table shows estimated coefficients from a gravity panel regression estimated for up to 95 countries using annual data for 2007-18 where the dependent variable is the log of bilateral trade costs. The regression includes time fixed effects. Standard errors are clustered by country pairs.

logistics performance, and less trade policy uncertainty are associated with statistically significantly lower trade costs. More challenging shipping and logistics account for about two-fifths of the predicted gap between trade costs in EMDEs and advanced economies, and trade policy accounts for a further two-fifths. Improved shipping and logistics also account for about three-fourths of the predicted decline in trade costs since 2008.

competitive pressures that arise from trade encourage innovation and factor reallocation, including the exit of the least productive firms, thus lifting overall productivity.

Technological progress, by enhancing the productivity of labor and other factors of production, is a critical driver of long-term output growth and poverty reduction. Apart from their immediate impact on productivity, the creation, application, and diffusion of technological advances tend to generate positive externalities and increasing returns to scale (Arrow 1962; Romer 1990). However, as technological innovation tends to occur in a limited number of countries, advances globally depend on international spillovers (Keller 2004). International trade, like foreign direct investment (FDI), is one of the primary channels of diffusion of new technology as it makes available to importers processes and products that embody foreign knowledge and that would otherwise be unavailable or very costly (Helpman 1997; Grossman and Helpman 1991).

The literature identifies two types of externalities generated through trade: pure knowledge spillovers and rent spillovers. Pure knowledge spillovers arise mostly through licensing agreements or through firms that are multinational. Rent spillovers occur when the prices of imported intermediate and capital goods do not fully reflect the costs of innovation embedded in them, so that part of the rents from innovation are transferred from the innovating firm to trading partners (Keller 2021).

International trade also allows countries to exploit economies of scale and network effects in areas where they have a comparative advantage (Helpman 1981; Helpman and Krugman 1985; Krugman 1979). Trade causes output to expand and, in the presence of increasing returns to scale, firms' fixed costs are spread over a larger number of units produced. This results in more efficient production at smaller average cost. Through a similar mechanism, the output expansion associated with trade may also allow greater product variety, which can enhance productivity (Feenstra 2010). In addition, innovations resulting from international trade often allow workers to acquire new human capital through learning by doing as workers take up new tasks. This also boosts productivity and helps countries move up the product-quality ladder (Lucas 1993).

By increasing competition, trade also promotes productivity growth by reallocating resources toward more efficient firms as the least productive firms are encouraged to exit (Bernard et al. 2007; Melitz 2003). Since entering foreign markets imposes an up-front cost for exporting firms, only relatively productive firms can generally engage in exporting. Once they have entered a new market, exporting firms can expand and attract workers and capital, thus tending to force out firms limited to the domestic market by inferior efficiency. In addition, by raising competitive pressures in the domestic market, international trade lowers firms' markups over marginal cost and encourages organizational change and production upgrades to boost within-firm productivity (Melitz and Ottaviano 2008).

Empirical literature

The relationship between international trade and long-term output growth has been investigated by a large empirical literature, using cross-country and firm-level data. In

addition to aggregate effects, studies have identified specific channels through which trade integration boosts productivity, capital accumulation, and employment growth—the fundamental drivers of long-term economic growth.

Trade and output growth. Most cross-country studies have found a positive link between international trade and output growth.[2] However, the direction of causality and the role of third factors remain matters of debate. Some studies find clear growth-enhancing effects of trade liberalization (Dollar 1992; Bhagwati and Srinivasan 2002) whereas others find that the effects depend on the measure of trade openness used (Rodriguez and Rodrik 2001). This may, in part, reflect omitted variables. For example, some authors find a large positive impact of trade on growth only when this is accompanied by high levels of education, well-developed financial systems, and institutional reforms (Chang, Kaltani, and Loayza 2009). Likewise, regulatory reforms have been found to enhance the impact of trade on growth (Bolaky and Freund 2004).

Trade and productivity. A number of cross-country and firm-level studies find a positive link between trade and labor or total factor productivity.[3] A cross-country study of 138 countries for 1985 finds that a 1 percentage point increase in trade openness is associated with 1.2 percent higher labor productivity (Alcala and Ciccone 2004). A more recent study of a large number of advanced economies and EMDEs finds that around 15 percent of the increase in total factor productivity growth during 1994-2003 was accounted for by rising trade openness, while for developing countries alone, the proportion was larger, at 32 percent (Broda, Greenfield, and Weinstein 2017). Studies that address firm heterogeneity also point to trade-induced productivity gains. For example, one study finds that firms facing international competition enjoy 3-10 percent higher productivity than those that sell only in domestic markets (Pavcnik 2002). A study for Brazil finds evidence of reductions in inefficiencies in firms that engaged in international trade (Muendler 2004).

Trade and capital accumulation. Several studies find evidence of a positive relationship between trade openness and capital accumulation (Alvarez 2017; Sposi, Yi, and Zhang 2019). A study covering the period 1950-98 indicates that countries that liberalized their trade regimes subsequently experienced 1.5 percentage points higher annual investment growth than before liberalization, on average (Wacziarg and Welch 2008). The literature also points to a close association between trade openness and FDI inflows, which are a source of funding for investment in addition to domestic saving (Shah and Khan 2016; Sharma and Kumar 2015; Stone and Jeon 2000). For example, one study found that among 36 developing economies between 1990 and 2008, trade openness was associated with higher FDI inflows in the long run (Liargovas and Skandalis 2012). Trade policies and the quality of infrastructure have been found to affect the strength of the link between trade and FDI. Thus, a study of Asian countries during 2008-13 found that

[2] See Alesina, Spolaore, and Wacziarg (2000); Dollar and Kray (2004); Frankel and Romer (1999); Noguer and Siscart (2005); and Sachs and Warner (1995).

[3] See Alcala and Ciccone (2004); Chen, Imbs, and Scott (2009); Edwards (1997); and Frankel and Romer (1999).

countries with fewer restrictions on imports and exports had a higher chance of attracting FDI, with a 10 percent reduction in bilateral trade costs being accompanied by an 8 percent increase in FDI inflows (Duval, Saggu, and Utoktham 2015).

Trade and employment. Theoretical models often assume long-run full employment, allowing trade to have only limited, short-term effects on jobs. But a number of empirical studies point to positive effects on employment. For example, a cross-country study of OECD economies over 1983-2003 finds that a 10 percent increase in trade openness was associated with a 1 percentage point lower rate of unemployment (Felbermayr, Prat, and Schmerer 2009). There is also country-specific evidence suggesting significant employment creation following greater trade integration, such as in China, Madagascar, and Singapore (Hoekman and Winters 2005). And another study, however, found that in the United States, rising imports from China raised unemployment and reduced labor force participation in import-competing manufacturing industries, and that such imports explained one-quarter of the decline in U.S. manufacturing employment (Autor, Dorn, and Hanson 2013). In general, the effects of trade integration on employment differ across countries and depend importantly on the functioning of labor markets, the efficiency of capital markets, and social policies (OECD et al. 2010).

Recent trade growth and prospects

The slowdown in trade growth in the decade following the global financial crisis reflected weaker global output growth but also a lower responsiveness of international trade to global economic activity (the output elasticity of trade). The subsequent COVID-19 pandemic triggered a goods trade collapse on par with those in earlier global recessions but the services trade collapse was much deeper and was followed by an exceptionally slow recovery. Looking ahead, all major drivers of trade growth point to a period of prolonged weakness.

Weakness of trade growth in the 2010s

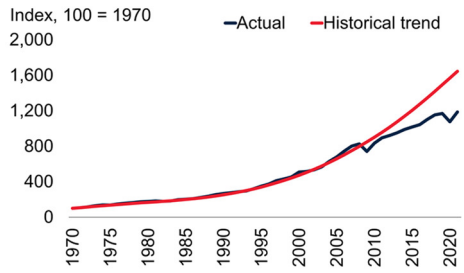
The growth of global trade in goods and nonfactor services was sharply weaker in the pre-pandemic decade, at just 3.8 percent a year during 2011-19, than during 1970-2008, when it averaged 5.8 percent a year. If global trade had expanded at its 1970-2008 trend rate during 2011-19, it would have been around one-third above its actual level in 2019 (figure 6.2). With the exception of Europe and Central Asia (ECA), the slowdown in trade growth extended across all EMDE regions. In Sub-Saharan Africa (SSA), trade growth was particularly weak, at about half the EMDE average over the 2010s. The slowdown was concentrated in goods trade; services trade continued to outpace world output growth, by 1.5 percentage points a year on average during 2011-19, before the pandemic hit.

The slowdown in trade growth in the decade following the global financial crisis reflected both weaker output growth and a lower responsiveness of trade to global

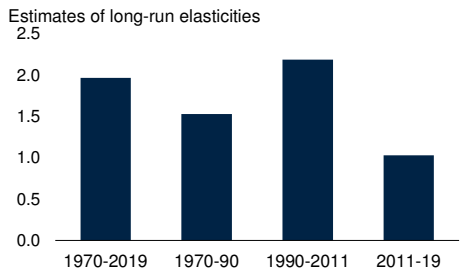
FIGURE 6.2 Factors lowering the elasticity of global trade with respect to global output

Global trade growth has slowed since 2011, in part due to slowing output growth. In addition, the elasticity of trade with respect to global economic activity has fallen amid slowing global investment, maturing global value chains, and mounting trade tensions.

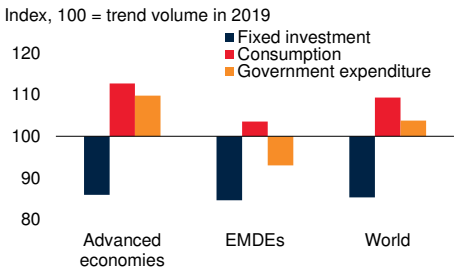
A. World trade, actual and trend



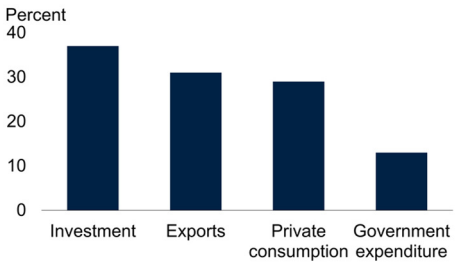
B. Elasticity of global trade with respect to global output



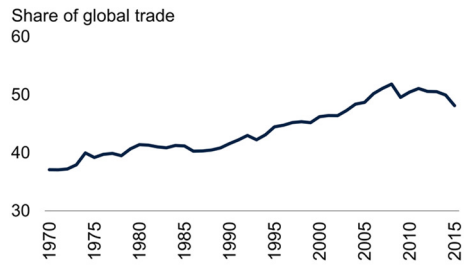
C. Aggregate demand components relative to historical trend, 2019



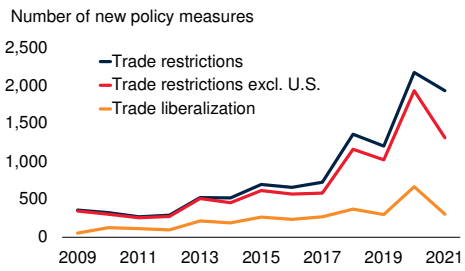
D. Import content of components of aggregate demand, 2014



E. Share of global value chain-related trade in global trade



F. New trade measures



Sources: Auboin and Borino (2018); Constantinescu, Mattoo, and Ruta (2020); Global Trade Alert Database; World Bank.

Note: EMDEs = emerging market and developing economies.

A. World trade refers to average of imports and exports, indexed to 1970 = 100. The historical trend is computed over 1970-2008, smoothed using a Hodrick-Prescott filter.

B. Estimates from an error correction model estimated over the period 1970-2019. The model allows both the long-run elasticity of trade with respect to income (which captures trend, or structural, factors) and the short-run elasticity (which is relevant to short run or cyclical developments). For further details on the model specification, see Constantinescu, Mattoo, and Ruta (2020).

C. Trend levels in 2019 are obtained on the basis of the historical average trend growth computed over the period 1995-2008 and rebased to 100. Bars below 100 show deviations of actual 2019 levels from trends. Investment is aggregate investment.

D. Data for 2014 as estimated in Auboin and Borino (2018).

E. Share of global value chain-related trade in global trade as defined in *World Development Report* 2020. Data available through 2015.

F. Data exclude late reports for the respective reporting years (the cut-off date is 31 December of each year).

economic activity (the output elasticity of trade). Estimates from an error correction model for 1970-2019 suggest that the long-run output elasticity of trade—the trade increase associated with a 1-percent output increase—declined from 2.2 during 1990-2011 to around 1.0 during 2011-19.[4] In EMDEs, the ratio of import growth to output growth declined from 1.7 during 1990-2008 to 0.9 during 2011-19. The decline in the global output elasticity of trade in the decade before the pandemic reflected several factors (World Bank 2015).

- *Changes in the composition of global demand.* The composition of global demand shifted away from advanced economies toward EMDEs and toward less trade-intensive components of aggregate demand. EMDEs, which typically have a lower trade-intensity than advanced economies, accounted for just under two-fifths of global output during 1980-2008 but for about three-fifths during 2010-19 (Cabrillac et al. 2016; World Bank 2015). Investment, which tends to be more trade-intensive than other components of demand, was weak over the past decade, especially in EMDEs (Bussière et al. 2013; Kose et al. 2017). This reflected a number of factors, including a policy-guided shift away from investment-led growth in China and the effects of prolonged weakness of commodity prices on investment in commodity exporters (World Bank 2017, 2019).

- *Maturing global value chains.* Over the past decade, the expansion of global value chains slowed (Antras and Chor 2021; World Bank 2015, 2020a). The share of global value chain-related trade in total world trade grew significantly in the 1990s and early 2000s but has stagnated or even declined since 2011. This has in part reflected rising labor costs in key emerging market economies, a greater appreciation by firms of supply risks in the wake of natural disasters, and mounting trade tensions over the past five years (Cabrillac et al. 2016; Cigna, Gunella, and Quaglietti 2022; World Bank 2020a). Trade in construction and services, which tend not to be embedded in deep global value chains, increased their shares of global trade after 2010 (WTO 2019a).

- *Trade tensions.* A slowing pace of trade liberalization may also have contributed to a lower trade elasticity (World Bank 2015). Tariff rates levelled off in both advanced economies and EMDEs in the early 2000s. At the same time, there was increased use of regulatory measures and other nontariff barriers such as export subsidies, restrictions on licensing or foreign direct investment, and domestic clauses in public procurement (Niu et al. 2018).

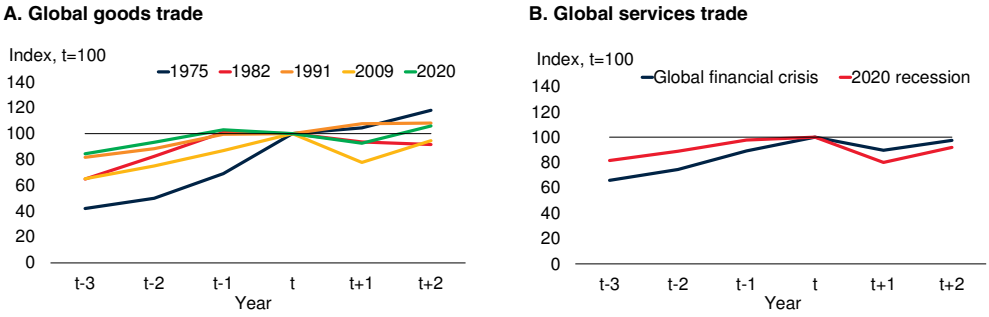
Pandemic-triggered collapse and recovery: Historical comparison

The global recession of 2020 was the deepest since World War II and was accompanied by a collapse in global trade in goods and nonfactor services of nearly 16 percent in the

[4] The model allows estimation of both the long-run elasticity of trade with respect to income (which captures trend, or structural, factors) and the short-run elasticity (which is relevant to short-run or cyclical developments). For further details on the model specification, see Constantinescu, Mattoo, and Ruta (2020).

FIGURE 6.3 Trade during global recessions

Global goods trade collapsed during the pandemic but rebounded quickly. Services trade declined much more sharply than in previous recessions and has recovered much more slowly.



Source: World Bank.
A B. Figures show annual levels of goods and services trade in the run-up to and aftermath of past recessions and in 2020. t refers to the year before the recession.

second quarter of 2020—6 percentage points steeper than the drop in the first quarter of 2009, at the nadir of the global recession triggered by the global financial crisis. In 2020 as a whole, goods trade fell by 7 percent, considerably more than in the average global recession since 1975 (figure 6.3). Unusually for global recessions, the collapse in global services trade was larger than the collapse in global goods trade. The decline in services trade was considerably more pronounced and the recovery more subdued than in past global recessions, partly reflecting the collapse in global tourism as countries closed their borders to stem the spread of the pandemic. In 2020, services trade fell by 20 percent, more than twice the average drop of 8 percent in global recessions since 1975.

The post-pandemic trade recovery fell just a little short of the average of past global recessions. In 2021 as a whole, goods trade stood at 6 percent above its pre-pandemic level, which compares with 8 percent in the first year of recovery after the average past global recession. The recovery in global trade since 2020 partly reflected a rotation of global demand toward trade-intensive manufactured goods—especially durable goods—and away from services, which tend to be non-tradable. The increase in industrial production has been mirrored almost one for one by trade growth. This is consistent with both being lifted by a common factor such as a rebound in global demand (World Bank 2022a). The recovery in goods trade has been fairly broad-based, with global imports of cars, capital goods, consumer goods, and industrial supplies all back at or above pre-pandemic levels by January 2021 (IMF 2021). However, global goods trade stalled in the second half of 2021, amid slowing demand growth and tightened supply bottlenecks. It was dealt a further blow in February 2022 by Russia's invasion of Ukraine, which has disrupted trade flows from the Black Sea and especially curtailed trade in commodities.

Through most of 2021, global services trade remained below pre-pandemic levels, in contrast with earlier global recessions when it typically recovered quite rapidly. Aggregate

services trade only reached pre-pandemic levels in September 2021. By January 2022, most components of services trade, including telecommunications and financial services, had fully recovered to pre-pandemic levels, but travel services remained 40 percent lower. The recovery in services trade was fastest in East Asia and the Pacific (EAP), where China's services trade had already returned to pre-pandemic levels by December 2020. Services trade, including travel and tourism, has played an increasingly important role in the global economy. For example, since 2000, global travel and tourism revenues have nearly tripled, with the sector in 2021 accounting for 10 percent of global GDP, 30 percent of global services trade, and 10 percent of all jobs worldwide (World Bank 2020b).

Spillovers through global value chains are likely to have amplified the fall in world trade associated with the COVID-19 pandemic (Cigna, Gunnella, and Quaglietti 2022). Companies increasingly turned to digital technologies and diversified suppliers and production sites to mitigate disruptions caused by the pandemic (Saurav et al. 2020). In 2021, strains in global supply chains worsened significantly. The rapid recovery in global goods consumption from mid-2020 put acute pressure on the trade-intensive manufacturing sector. At the same time, COVID-19 outbreaks continued to disrupt production at many points along complex global value chains, creating significant obstacles to final goods production. COVID-19 outbreaks have also shut down some key port facilities, disrupting ocean shipping and air freight and leading to an unprecedented lengthening of supplier delivery times (figure 6.4). Regression analysis that controls for the effect of demand conditions suggests that global trade could have been 3.5 percent higher in 2021 were it not for supply chain strains (figure 6.4).[5]

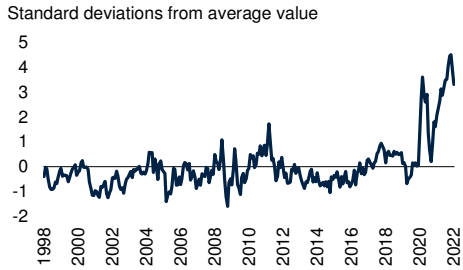
Global goods and services trade was dealt a further blow in February 2022 by Russia's invasion of Ukraine, which has disrupted trade flows from the Black Sea and especially curtailed trade in commodities. Commodity market disruptions—including delivery delays in natural gas and coal associated with Russia's invasion of Ukraine—have throttled the production of electricity in several countries, curbing energy-intensive manufacturing activities. Disruptions to wheat shipments from the Black Sea have put pressure on supplies of food staples globally (World Bank 2022b). Some car production lines were temporarily closed down for lack of specific components ordinarily produced in Ukraine, such as car wiring. Shortages and unprecedented increases in the prices of key commodities produced in Russia and Ukraine have rippled through global value chains, leading to production standstills and elevated producer prices globally. Having just returned to pre-pandemic levels in late 2021, services trade is also likely to have been dampened again by Russia's invasion of Ukraine: The war has disrupted shipping, especially through the Black Sea, driven up insurance and shipping costs globally,

[5] The impact of supply bottlenecks is estimated in an ordinary least squares regression of global trade on the manufacturing purchasing managers' index (PMI) for new export orders, the manufacturing PMI for supplier delivery times (a proxy for supply bottlenecks), and relevant lags of global trade and PMI new export orders. Counterfactual scenarios assume that the PMI supply delivery times indicator in the period January 2020-November 2021 had remained at the average 2019 level. Estimations are performed over the period 2000-19. The estimation methodology is similar to the one developed by Celasun et al. (2022).

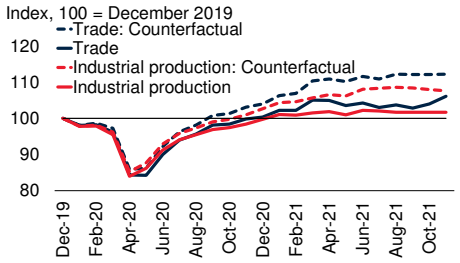
FIGURE 6.4 Supply chain bottlenecks and trade integration

Global value chains have been severely disrupted since 2020, weighing on trade growth and industrial production.

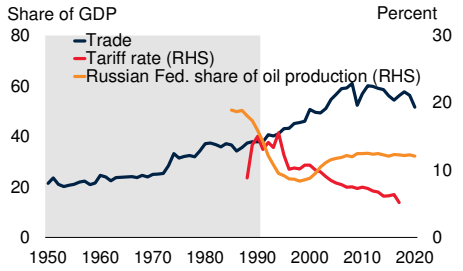
A. Supply chain pressures



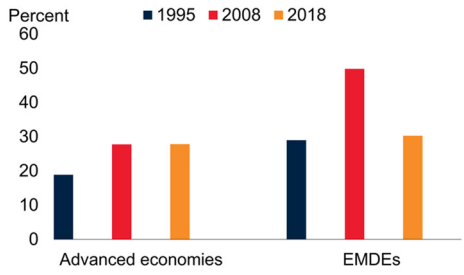
B. Impact of supply bottlenecks on goods trade and industrial production



C. Global trade, tariffs, and Russia's share in global oil production



D. Foreign value added content of gross exports



Sources: Benigno et al. (2022); BP Statistical Review; Organisation for Economic Co-operation and Development; Federal Reserve Bank of New York; Penn World Tables; World Bank.

Note: EMDEs = emerging market and developing economies.

A. Chart shows the New York Federal Reserve's Global Supply Chain Pressure Index on a monthly basis since 1998. The index is normalized such that a zero indicates that the index is at its average value, with positive/negative values representing how many standard deviations the index is above/below average.

B. The effect of supply bottlenecks is derived from an ordinary least squares regression of global trade on the manufacturing PMI for new export orders, the manufacturing PMI for supplier delivery times, and two lags. Dotted lines show counterfactual scenarios derived by assuming that the PMI for supply delivery times (a proxy for supply bottlenecks) in January 2020-November 2021 had remained at its average 2019 level. Estimations are performed over the period from 2000-19.

C. Blue line shows global trade in percent of global GDP. Red line shows unweighted average tariffs for all products. Orange line shows oil production in the Russian Federation in percent of global oil production. Shaded area indicates cold war period of 1950-1990.

D. Chart shows the share of foreign value added content of gross exports in advanced economies and EMDEs, as defined in the OECD's TiVA database.

diverted trade to more expensive routes, and discouraged tourism from and to several countries in the ECA region. A prolonged conflict in Ukraine could lead to additional dislocations and fragmentation of global value chains, further exacerbating the marked slowdown in the pace of EMDE integration into global value chains since 2008.

Prospects for global trade growth

In the January 2023 *Global Economic Prospects* report, global trade growth is projected to slow to under 4 percent in 2022 from more than 10 percent in 2021, and slow further

in 2023. This forecast reflects slower projected global output growth, but also the diminished trade intensity of global output: the structural factors that supported the rapid expansion of trade in the decades preceding the global financial crisis seem to have largely lost their force, so that the recently reduced elasticity of global trade with respect to global output seems likely to constitute a "new normal."

Since global output growth itself is projected to be about 0.4 percentage point slower in the forecast period (2022-30) than in previous decade, world trade growth is also expected to slow (chapter 5; World Bank 2021a). Thus, assuming the trade elasticity to output growth remains around 1 as it was during the 2010s and assuming no major policy change, trade growth over the remainder of the 2020s is likely to be slower by another 0.4 percentage point a year than in the preceding decade, broadly in line with the projected weakening of global potential output growth (World Bank 2021a). The weakness may be more pronounced in the growth of goods trade. In goods trade, new technologies may allow more localized and more centralized production. In services trade, rapidly growing data services promise a return to rapid expansion as the pandemic is brought under control (chapter 7; Coulibaly and Foda 2020; World Bank 2021c; Zhan et al. 2020).

The four decades prior to the global financial crisis saw a steady increase in global economic integration through trade, assisted partly by falling tariffs (figure 6.4). Since the global financial crisis, however, trade integration has stalled, with the COVID-19 pandemic and Russia's invasion of Ukraine having added further obstacles. With Russia's share of global oil production having increased considerably in recent decades, there is now a material risk that the disruptions caused by Russia's invasion of Ukraine could lead to a major reconfiguration of global trade and investment networks, as countries look for alternative sources of energy. While this may boost trade in some parts of the global economy, it is likely to disrupt trade elsewhere. Since such a reconfiguration would be motivated by political and security rather than economic considerations, it is likely to reduce global economic welfare as well as trade in the long term (Ruta 2022).

Patterns in trade costs

The fading momentum of global trade growth is diminishing its role as an engine of output and productivity growth. Countries therefore need to find new ways to reap the benefits from trade. One possibility is to cut trade costs to boost exports and encourage imports in a manner that is growth-enhancing. A number of studies have documented the negative impact of trade costs on trade growth (Anderson and van Wincoop 2003) and the boost to productivity that can result from lowering trade costs (Bernard, Jensen, and Schott 2006). Trade costs have also been recognized as an important factor in firms' decisions to choose out-sourcing over in-sourcing (Hartman et al. 2017).

Definition

The analysis in this paper relies on a comprehensive UNESCAP-World Bank dataset of bilateral trade costs. Following Novy (2013), Arvis et al. (2013) derive measures of

annual trade costs for the period 1995-2018. For any given country pair i and j, trade costs are obtained as geometric averages of trade flows between countries i and j. They are computed according to the formula:

$$(X_{ii}X_{jj})/(X_{ij}X_{ji})^{1/2(\sigma-1)},$$

where X_{ij} represents trade between countries i and j (goods produced in i and sold in j) and σ refers to the elasticity of substitution. This measure assumes that international trade costs relative to domestic trade costs are reflected in international trade flows relative to domestic trade flows: when international trade costs are higher than the costs of domestic trade, countries will trade more domestically than internationally, that is, the ratio $(X_{ii}X_{jj})/(X_{ij}X_{ji})$ will be higher. In the application of this methodology, domestic trade is proxied by the difference between gross output and total exports. Trade costs thus estimated are expressed as a proportion of the value of traded goods (comparable with an ad valorem tariff rate) and can be computed for the economy as a whole, or specifically for such sectors as manufacturing and agriculture.

Such trade cost estimates refer to bilateral trade. To obtain country and regional measures of multilateral trade costs, bilateral trade costs from the UNESCAP-World Bank database are aggregated using 2018 bilateral country export shares from the UNCTAD database. Regional and sectoral aggregates are obtained as unweighted averages of individual country measures.

Literature view

Trade costs and trade. A growing literature has documented evidence that lower trade costs raise trade growth (Anderson and van Wincoop 2003). A study of data for the period 1870-2000 found that declines in trade costs explain roughly 60 percent of the growth in global trade in the pre-World-War 1 period and around 30 percent of trade growth in the period after World War II (Jacks, Meissner, and Novy 2011). Studies of firm-level data have found that lower trade costs have encouraged firms to locate abroad (Amiti and Javorcik 2008), and to choose out-sourcing over in-sourcing and intra-firm rather than arm's-length trade(s).

Trade costs and productivity. A link between lower trade costs and higher productivity has also been substantiated. For advanced economies, one study found that a 1 percentage point lower tariff rate was associated with a 2 percent gain in total factor productivity during 1997-2007 (Ahn et al. 2019). Analyses of firm-level and sector-level data have shown similar results. Industries with larger declines in trade costs had stronger productivity growth; lower-productivity plants in industries with falling trade costs were more likely to close; and non-exporters were more likely to start exporting in response to falling trade costs (Bernard et al. 2007).

Patterns across regions and sectors

Despite a sharp decline in the past two and a half decades, recent data show that trade costs in EMDEs raise the prices of goods traded internationally to more than double the

prices of goods traded domestically and that they remain about one-half higher than in advanced economies (figure 6.5). Among EMDE regions, average trade costs range from tariff equivalents of 96 percent in ECA to 142 percent in South Asia (SAR), with wide heterogeneity within regions. This heterogeneity is particularly pronounced in the Middle East and North Africa (MENA), where trade costs range from 86 to 136 percent among different countries. Trade costs have declined since 1995 in all sub-regions except East Asia and Pacific (EAP), with the fastest decline occurring in SSA. Within ECA, average trade costs of countries that are members of the European Union or geographically close to it are two-thirds of the average trade costs of other countries, which are less integrated into EU supply chains.

Trade costs remain particularly elevated in agriculture—about four-fifths higher than in manufacturing. Agricultural trade costs are particularly high in SSA where they stand at 270 percent tariff equivalent. Likewise, manufacturing trade costs are particularly high in SSA and in Latin America and the Caribbean (LAC). Trade costs declined less in agriculture than in manufacturing over 1995-2019, falling from 194 percent to 170 percent, in part because of slower progress in reducing tariffs and the narrower coverage of trade agreements.

Goods and services trade are complementary. Tradable services are key links between stages of value chains and "enablers" of trade in goods, particularly communications, finance, business and logistics services. As a result, services account for almost one-third of the value added of manufacturing exports (Ariu et al. 2019; OECD 2022). Comparable cross-country data on services trade costs and on policies affecting trade in services are scant. The few attempts in the literature to quantify trade costs in services either rely on observed trade and value-added flows, akin to the methodology embedded in the UNESCAP/World Bank database for goods trade costs (Miroudot, Sauvage, and Shepherd 2010), or rely on an inventory of services trade restrictions (Benz 2017). Both types of studies suggest that trade costs for services are considerably higher than trade costs for goods, and that, unlike trade costs for goods, they have not fallen since the 1990s.

Correlates of trade costs

Trade costs include the full range of costs associated with trading across borders. These include transportation and distribution costs (Marti and Puertas 2019; Staboulis et al. 2020), trade policy barriers (Bergstrand, Larch, and Yotov 2015), the costs of information and contract enforcement (Hou, Wang, and Xue 2021), legal and regulatory costs, as well as the cost of doing business across cultures, languages, and economic systems (Anderson and van Wincoop 2003).

A number of plausible correlates may be considered.

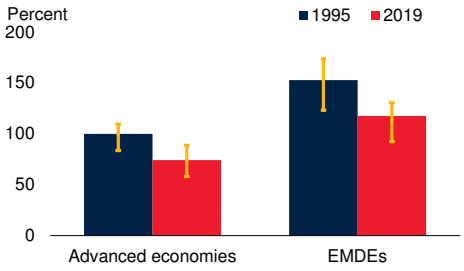
Candidate correlates

A number of correlates of trade costs have been identified. They include trade policies, shipping and logistics, regulations, uncertainty, and other factors.

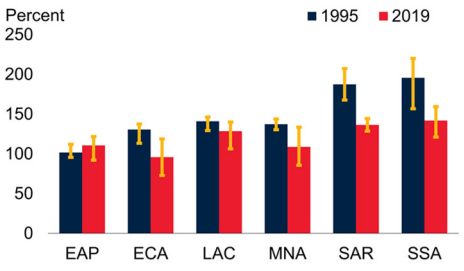
FIGURE 6.5 International trade costs relative to domestic trade costs

On average, globally, international trade costs are roughly equivalent to a 100 percent tariff—far above actual average tariff rates. Despite declines over the past three decades, trade costs remain high, especially for agricultural products and in EMDEs. Trade costs for agricultural products are highest in South Asia and Sub-Saharan Africa, while trade costs in the manufacturing sector are highest in Latin America and the Caribbean and Sub-Saharan Africa.

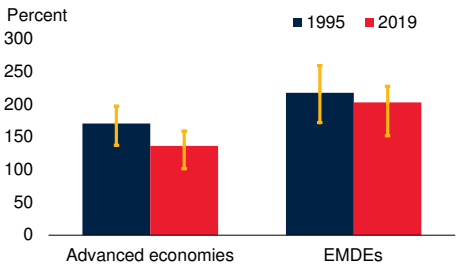
A. Average trade costs in 1995 and 2019



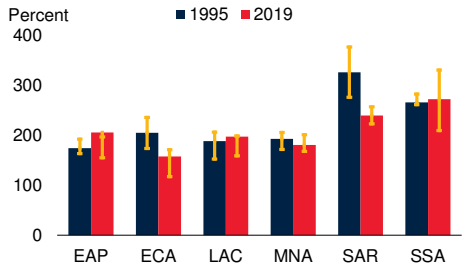
B. Average trade costs in EMDE regions



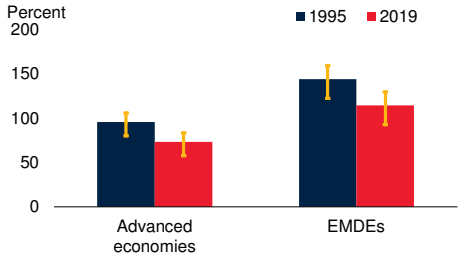
C. Average trade costs for agriculture in 1995 and 2019



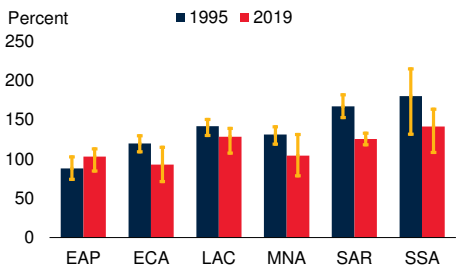
D. Average trade costs for agriculture for EMDE regions in 1995 and 2019



E. Average trade costs for manufacturing in 1995 and 2019



F. Average trade costs for EMDE regions for manufacturing in 1995 and 2019



Sources: Comtrade (database); ESCAP-World Bank Trade Costs Database; World Bank; World Trade Organization.

Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. Bilateral trade costs (as defined in the UNESCAP/World Bank database) measure the costs of a good traded internationally in excess of the same good traded domestically and are expressed as ad valorem tariff equivalent. Bilateral trade costs are aggregated into individual country measures using 2018 bilateral country exports shares from the Comtrade database. Regional and sectoral aggregates are averages of individual country measures. Bars show unweighted averages, whiskers show interquartile ranges. Sample in 1995 includes 33 advanced economies and 46 EMDEs (4 in EAP, 8 in ECA, 15 in LAC, 4 in MNA, 2 in SAR, and 13 in SSA). Sample in 2019 includes 23 advanced economies and 53 EMDEs (9 in EAP, 12 in ECA, 16 in LAC, 4 in MNA, 2 in SAR, and 10 in SSA).

Trade policies: tariffs and trade agreements

Import tariffs raise trade costs. The contribution of tariffs to total trade costs has decreased in the post-war period, including through steep reductions since 1990 in tariffs imposed by EMDEs. Thus tariffs in EMDEs averaged 7.7 percent of the value of imports in 2020, down from 16.0 percent in 1995, although this is still much higher than the average tariff of around 1.9 percent in advanced economies (figure 6.6). As a result of tariff reductions, tariffs now amount to a small portion of trade costs—about one-twentieth. Agricultural tariffs remain higher than manufacturing tariffs, by one-fifth in EMDEs and two-fifths in advanced economies.

The decline in tariffs in recent decades has been accompanied by the establishment and expansion of regional trade agreements (RTAs). The number of RTAs more than quintupled between the early 1990s and the mid-2010s and their focus has shifted from tariff cuts to the lowering of nontariff barriers (World Bank 2016). The EU alone participates in 46 RTAs, and other advanced economies are members of up to 75. Among EMDEs, membership of RTAs is less common, although all but a handful are members of at least one. Such agreements are most common in ECA, where some countries are EU members and others are members of the free trade area between members of the Commonwealth of Independent States, and in LAC, where most countries are members or associates of MERCOSUR or signatories to trade agreements with the United States, such as the U.S.-Mexico-Canada Agreement (USMCA) or the Dominican Republic-Central America Free Trade Agreement (CAFTA-DR).

Shipping and logistics

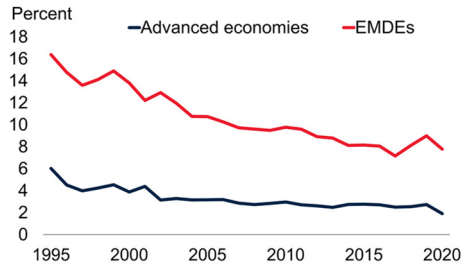
A multitude of trade costs arise from the transport of goods and from associated administrative border and customs procedures (Moïsé and Le Bris 2013). Transport costs, much like tariffs, penalize goods produced in multiple stages across different countries, since producers have to pay to move components at each stage of the production process. They can be thought of as services costs—the costs of services related to shipping and logistics. These costs depend on the efficiency and reliability of transport facilities and the burden of administrative procedures.

Transit delays have been identified as important deterrents to trade flows, together with poor shipping connectivity and inadequate logistics infrastructure and services (Freund and Rocha 2011). For most of U.S. trading partners, transport costs are higher than tariff costs, and for the broader group of advanced economies, poor logistics have resulted in larger trade costs than geographic distance alone (Marti and Puertas 2019; Staboulis et al. 2020). Transport costs, much like tariffs, penalize goods produced in multiple stages across different countries, since producers have to pay to move components at each stage of the production process. Estimates of the tariff equivalent of transit time find that each day in transit is equivalent to a 0.8 percent tariff (Hummels et al. 2007). For a 20-day sea-transport route (the average for imports to the United States), this amounts to a tariff rate of 16 percent—much higher than the actual average tariff rate. Using gravity models, studies find that a 10 percent increase in the time taken

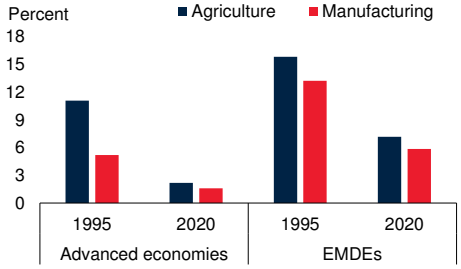
FIGURE 6.6 International trade policy, border processes, and logistics

Tariffs declined sharply over the 1990s and early 2000s, in part because of regional and multilateral trade agreements, but began to tick upward again in 2017, especially in EMDEs. They are higher in EMDEs than in advanced economies and in agriculture than in manufacturing. Connectivity and logistics tend to be easier, and shipping connectivity better, in advanced economies than in EMDEs.

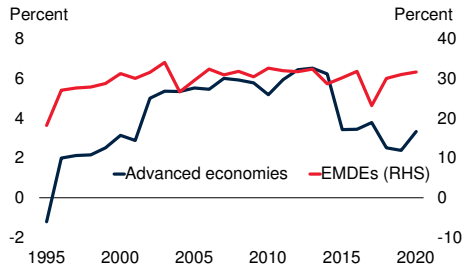
A. Tariff rates in AEs and EMDEs



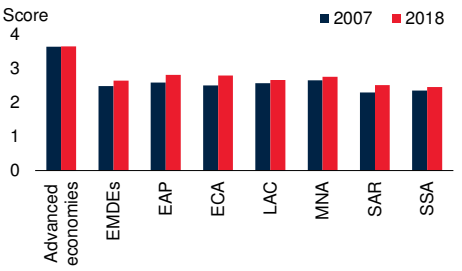
B. Tariff rates by different sectors



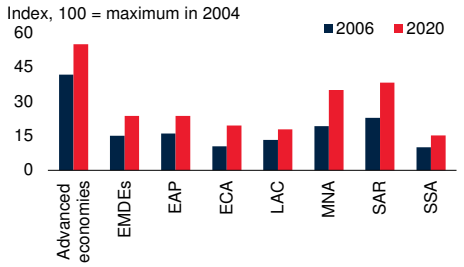
C. Trade uncertainty for AEs and EMDEs



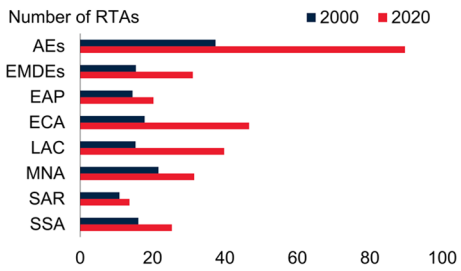
D. Logistics performance index



E. Liner shipping connectivity index



F. Regional trade agreement participation



Sources: CEPII (Gravity database); Gurevich and Herman (2018); World Bank; World Trade Organization: UNCTAD.

Note: AEs = advanced economies; EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; RTA = regional trade agreement.

A. B. Average tariff rates are computed as unweighted cross-country averages of applied weighted tariff rates. Sample includes up to 35 advanced economies and 123 EMDEs. Primary tariffs are used as a proxy for agriculture tariffs.

C. Proxy for trade uncertainty is the difference between the bound and applied tariff rates, as defined by the WTO. Data through 2020. Sample includes up to 27 advanced economies and 97 EMDEs.

D. World Bank's logistics performance index is a summary indicator of logistics sector performance, combining data on six core performance components into a single aggregate measure. The indicator is available for a sample of 160 countries. Sample includes 36 advanced economies and 123 EMDEs.

E. UNCTAD's liner shipping connectivity index is an average of five components and captures how well countries are connected to global shipping networks. The index value 100 refers to the country with the highest average index in 2004. Sample includes up to 30 advanced economies and 118 EMDEs.

F. Regional trade agreements are reciprocal agreements between two or more partners and include both free trade agreements and custom unions. The EU Treaty, United States-Mexico-Canada Agreement, and Pacific Agreement on Closer Economic Relations Plus are included. Regional aggregates are computed as averages of individual country participation in RTAs.

to transport exports reduces trade by 5-25 percent, depending on the sector and export destination (Djankov, Freund, and Pham 2010; Hausman, Lee, and Subramanian 2005; Kox and Nordas 2007, Nordas 2007).

Transport costs in real terms have declined over time, as land, sea, and air shipping costs have fallen. Technological improvements in transport services, such as jet engines and containerization, have reduced both transport costs per unit of time and transport times. Average shipping time for imports to the United States declined from 40 to 10 days between 1950 and 1998 (Hummels 2001). Evaluated at an average cost per day of 0.8 percent ad valorem (see previous paragraph), this increase in the speed of transport is equivalent to a reduction in the tariff rate of 24 percentage points.

In addition, advances in communication technologies have allowed the development of more effective multi-modal transport systems, which have helped both to reduce delivery times and to increase the reliability of deliveries. However, such advances have been uneven among countries, and global shipping connectivity and logistics remain considerably poorer for EMDEs than for advanced economies (figure 6.6), with trade costs correspondingly higher (figure 6.7).

Regulations

Trade costs can be lowered significantly by streamlining trade and customs compliance procedures and processes (Staboulis et al. 2020). Reductions in regulations have been associated with significantly higher trade volumes: each additional signature that has to be collected for exports has been found to cost almost as much as the average tariff (Hillberry and Zhang 2015; Sadikov 2007).

Regulatory requirements for trading across borders have been streamlined significantly over the past decade, especially in ECA, SAR, and SSA. In ECA and SSA, these developments appear to be linked to automation and digitalization of trade processes in a number of countries, which have reduced the time taken for compliance assessments at the location of customs clearance. In SAR, they appear to be related to the upgrading of port infrastructure in India, coupled with the introduction of a new system of electronic submission of import documents. In EAP, better governance and less burdensome customs procedures have been associated with somewhat lower trade costs.

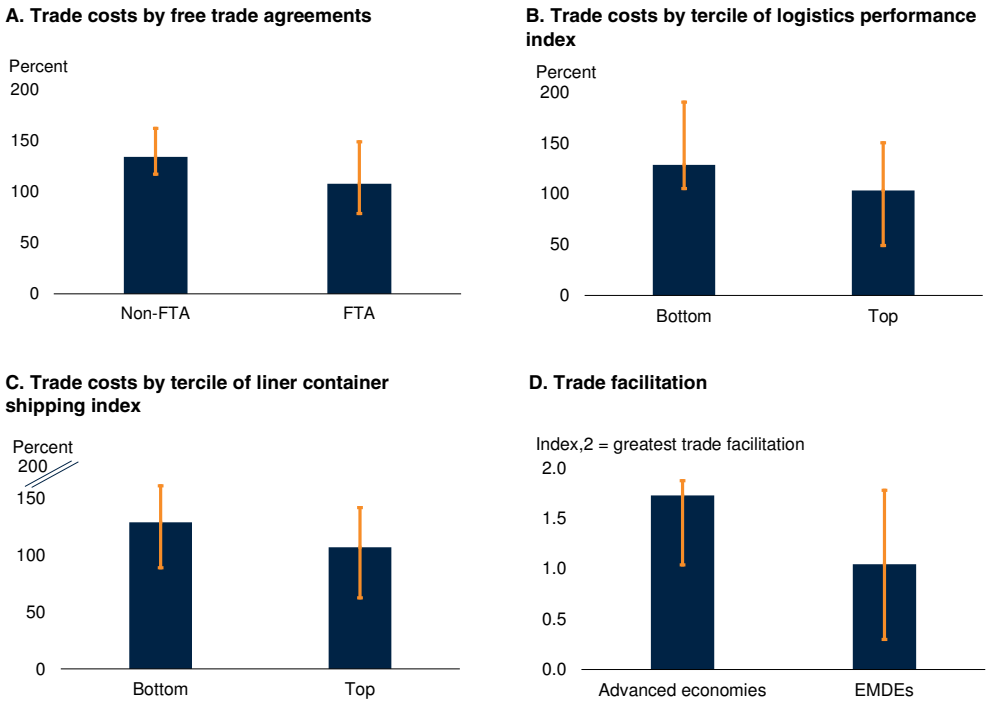
Trade uncertainty

Uncertainty about the costs associated with transport, customs and border processes, tariffs, and non-tariff trade policies can impose significant burdens on investment and output as well as trade. For example, uncertainty about trade policy may have lowered U.S. investment by more than 1 percent in 2018 (Caldara et al. 2020).

One dimension of trade uncertainty is the scope that countries have to raise tariffs without violating WTO rules—that is, the difference between applied tariffs and bound tariffs, the so-called "tariff water" (Osnago, Piermartini, and Rocha 2015). This dimension of trade uncertainty increased steadily in advanced economies in the two

FIGURE 6.7 International trade costs in EMDEs, by country characteristics

Trade costs are somewhat higher in EMDEs outside of regional free trade agreements, with the poorest logistics performance and the least maritime shipping connectivity. Trade facilitation is stronger in advanced economies than in EMDEs.



Sources: Comtrade (database); Gurevich and Herman (2018); OECD; UNESCAP-World Bank Trade Costs Database; World Bank; World Trade Organization.

Note: EMDEs = emerging market and developing economies; FTA = free trade agreements; LSCI = Liner Shipping Connectivity Index; LPI = Logistics Performance Index. Orange whiskers indicate minimum and maximum range. Sample includes 52 EMDEs.

A. Average trade costs (unweighted) of countries based on their membership in regional or global free trade agreements as defined in Gurevich and Herman (2018).

B. Average trade costs (unweighted) for countries ranked in the bottom and top quartiles of the Logistics Performance Index.

C. Bars show average trade costs (unweighted) for countries in the bottom and top quartiles of the liner shipping index.

D. Unweighted average for 36 advanced economies and 122 EMDEs. Trade facilitation index is an unweighted average of 11 subindexes, all scored on a scale of 0-2. A higher index indicates greater trade facilitation. The indexes score countries on information availability, trade consultations, advance rulings, appeals procedures for administrative decisions by border agencies, fees and charges on imports and exports, simplicity of trade document requirements, automation of border procedures and documentation, simplicity of border procedures, cooperation between domestic agencies, cooperation with neighboring agencies, and governance and impartiality. The data is collected from publicly available sources, country submissions, and private sector feedback. Orange whiskers indicate minimum and maximum range.

decades to 2013, but it has since declined significantly. In EMDEs, the gap between applied and bound tariffs has remained much wider than in advanced economies, with little sign of any sustained decline (figure 6.6).

Uncertainty about delivery times can also impose significant costs. In Africa, for example, a single-day transit delay for an exporter is estimated to be equivalent to a 2 percent tariff in importing partner countries (Freund and Rocha 2011).

Other factors

Policy-related nontariff barriers may include sanitary, phytosanitary, and other standards (often aimed at protecting consumer health and safety), pre-shipment inspections, licensing requirements, and quotas. These are important determinants of trade costs. Measuring non-tariff barriers is difficult. A common method is to construct a measure of the prevalence of non-tariff barriers, such as the percent of tariff lines covered by non-tariff barriers. One study estimated the average non-tariff barrier globally as equivalent to an 11.5 percent tariff, significantly higher than the average tariff rate of 4 percent (Kee and Nicita 2016). Non-tariff barriers have risen over time. In 2015, about 2,850 product lines were subject to at least one nontariff barrier, about double the 1,456 product lines in 1997 (Niu et al. 2018). Nontariff barriers affect a higher share of imports in advanced economies than in EMDEs (but a lower share of exports). Almost all agricultural imports face non-tariff barriers, compared with about 40 percent on average across all sectors (World Bank and UNCTAD 2018). Low-income countries are particularly affected by nontariff barriers because administrative requirements are particularly frequently applied to agricultural products and firms in low-income countries are less able to comply with such requirements.

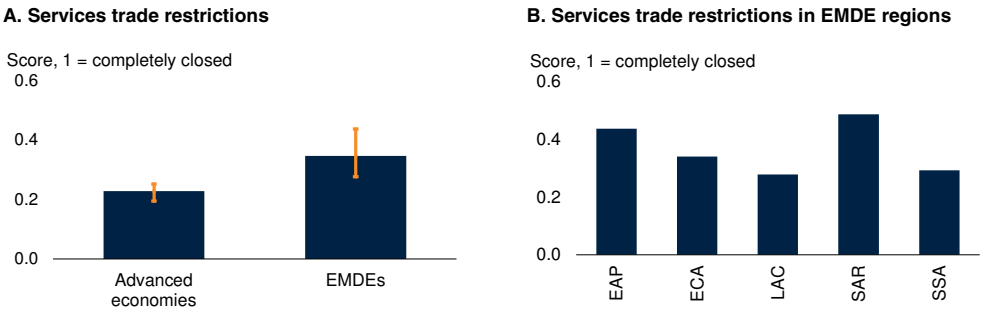
Noncompetitive market structures can drive-up trade costs. In some countries in SSA, for example, the cost of moving goods domestically is up to five times higher than in the United States (Atkin and Donaldson 2015; Donaldson, Jinhage, and Verhoogen 2017). This difference has in part been attributed to a lack of competition in the domestic transport sector. Elsewhere, excessive competition can drive down the quality of transport services, with high road mortality, deteriorated roads, and poor vehicle quality (Teravaninthorn and Raballand 2008).

Institutional quality and economic infrastructure affect trade costs. Better energy provisioning, more highly developed transport and communication infrastructure and services, financial development, and greater transparency of policy decisions have all been associated with lower trade costs (Cali and te Velde 2011; Hou, Wang, and Xue 2021). Analysis of data for a large sample of countries in the early 2000s indicates that more transparent and effective institutions—such as the availability of trade-related information, the simplification and harmonization of documents, the streamlining of procedures, and the use of automated processes—were associated with more than 10 percent lower trade costs (Moïsé and Sorescu 2013). Findings on the effects of corruption have been more ambiguous: it may raise trade costs when corrupt officials extort bribes or it may lower trade costs when corrupt officials allow tariff evasion (Dutt and Traca 2010). Consistent with concerns about institutional quality, trade finance of a type that reduces risk of non-payment or non-delivery (such as letters of credit) has been associated with more resilient trade flows during times of economic or financial stress (Crozet, Demir, and Javorcik 2021).

Regulatory restrictions on services trade can add to trade costs, even for goods trade. To a large extent, trade costs in the services sector reflect regulations that create entry barriers, such as licensing quotas. The OECD's Services Trade Restrictions Index

FIGURE 6.8 Services trade restriction policies

Services trade in EMDEs faces more restrictions than in advanced economies. Among EMDE regions, the most restrictive services trade policies are applied in South Asia and in East Asia and Pacific.



Sources: Organisation for Economic Co-operation and Development; World Bank.
Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
A. B. Services trade restrictions index (STRI) helps identify which policy measures restrict trade. The STRI takes values from 0 to 1, where 0 is completely open and 1 is completely closed. They are calculated on the basis of information in the STRI database which reports regulation currently in force. Bars show the unweighted average and orange whiskers indicate the minimum and maximum range. Sample includes 31 advanced economies and 17 EMDEs in 2020.

(STRI) measures de jure regulatory restrictions on services trade in 44 countries (figure 6.8). As with goods trade, services trade remains more restricted in EMDEs than in advanced economies, especially with respect to the entry of foreign firms. Across regions, the most restrictive policies are applied in SAR and EAP, whereas countries in LAC tend to be more open.

Estimation

Gravity equations are widely used to analyze the determinants of bilateral trade flows. Chen and Novy (2012) and Arvis et al. (2013) employ a gravity specification in the analysis of the determinants of bilateral trade costs in a cross-sectional dataset. The determinants of trade costs, as defined above, are estimated in a panel specification with time fixed effects, in line with the established literature (Moïsé, Orliac, and Minor 2011). The regression equation takes the following form:

$$TC_{ijt} = \beta_1 RTA_{ijt} + \beta_2 tariff_{ijt} + \beta_3 LSCI_{ijt} + \beta_4 LPI_{ijt} + \beta_5 Trade\ Policy\ Uncertainty_{ijt} + \beta_6 Gravity_{ij} + \eta_t + \varepsilon_{ijt}, \quad (1)$$

where, for any given country pair ij, bilateral trade costs TC observed at time t are regressed on a wide range of candidate drivers. These include membership in a regional trade agreement (RTA); sector-specific bilateral tariffs; shipping connectivity (UNCTAD's Liner Shipping Connectivity Index, or LSCI) and logistics (the World Bank's Logistics Performance Index, or LPI); a proxy for trade policy uncertainty; and standard gravity indicators (distance, a common language, and a common border). In line with Osnago, Piermartini, and Rocha (2018), trade policy uncertainty is defined as

the gap between binding tariff commitments and applied tariffs. To ascertain the role of policies aimed at facilitating trade, indexes of logistic performance and maritime connectivity are included.

The model is estimated for the economy as a whole and for manufacturing separately. The regression uses bilateral trade data for 2007-18 for up to 2 advanced economies and 72 EMDEs for which data on trade costs and its determinants are available. The choice of variables in the panel is informed by Arvis et al. (2013), but also by findings from the discussion of the drivers of trade costs presented in the previous sections. Full details on data and sources are presented in box 6.1.

In the estimation results, all coefficients have signs and magnitudes consistent with expectations from the literature (table B6.1.1). Geographic distance and bilateral tariff rates are positively associated with trade costs, while proximity, common language, and membership in a common RTA tend to reduce trade costs. Specifically, membership in a common RTA lowers bilateral trade costs statistically significantly, by just under one-fifth.[6] Greater trade policy uncertainty is also associated with higher trade costs, including in the manufacturing sector.

The regression results help shed light on the sources of the higher trade costs in EMDEs than in advanced economies and of the decline in trade costs over time. In 2018, trade costs for the average EMDE in the regression sample were almost one-quarter higher than for the average advanced economy in the sample. The panel estimation explains most of this gap and attributes about two-fifths of it to poorer logistics and shipping connectivity in EMDEs, a further two-fifths to trade policy (including trade policy uncertainty), and just under one-fifth to the greater remoteness (geographically and culturally) of EMDEs.

Between 2007 and 2018, trade costs fell by one-eighth, on average, in the countries in the sample, somewhat more than predicted by the regression. The regression attributes almost three-fourths of this decline to improved shipping connectivity and logistics and one-fourth to trade policy (tariff cuts, membership in RTAs, and uncertainty related to trade policy).[7]

Policies to lower trade costs

A menu of policy options is available to reduce trade costs at the border (OECD and WTO 2015). Some of the policies to reduce trade costs are under the control of

[6] This is somewhat smaller than the effect found by Bergstrand, Larch, and Yotov (2015), who estimate that an economic integration agreement lowered trade costs by 30 percent in a smaller and earlier sample (41 mostly advanced economies during 1996-2000). Qualitatively, the results are consistent with Brenton, Portugal-Perez, and Regolo (2014) who found that trade agreements helped to reduce the price differential between domestic and traded foods.

[7] Daudin, Héricourt, and Patureau (2022) decompose the decline in transport costs over 1974-2019 into "pure transport cost" and compositional effects (that is, changes in the composition of origin countries and goods baskets) and find that the decline in "pure transport cost" accounted for most of the decline in global transport costs.

individual country authorities (such as improving border and customs regulations and processes, and facilitating shipping and logistics) while others require international agreements (such as RTAs). While some policies can be implemented quickly, others, such as those aimed at increasing competition, can take years to establish.

- Measures that lower trade costs *at the border* include trade facilitation (through reform of customs and border procedures), tariff reductions, and trade agreements.
- Measures that lower trade costs *between borders* include improvements in transport, communications, and energy infrastructure and services networks.
- Measures that reduce trade costs *behind the border* include reforms of trade-related regulations and institutions; improvements in logistics and broader market governance; improvements in domestic transport infrastructure and in the market structure of domestic trucking and port operations; and the lowering of other nontariff barriers (for example, standards, accreditation procedures for standards, quotas).
- Beyond policies to facilitate trade, a wider set of institutional policies might also be needed to ensure that the benefits are sustainable and widely shared.

At-the-border measures

Possible sources of at-the-border trade costs include tariffs; an absence of or weak trade agreements; poor trade facilitation; and burdensome border processes. A package that reduces these at-the-border obstacles could significantly lower trade costs.

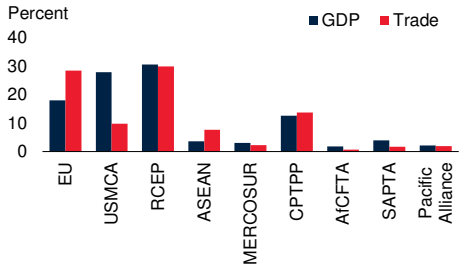
Reductions in tariffs, often embedded in broader trade agreements, have contributed to rapid trade growth in much of the period since World War II. However, tariffs have risen over the past five years as trade tensions have mounted, contributing to concerns about a protectionist turn among some major economies (World Bank 2021a). Reversing these increases and making further progress with tariff reduction would serve to lower trade costs. Reforms that lower import tariffs have generally been found to be associated faster economic growth, although effects have been heterogeneous (Irwin 2019). For example, the widespread removal of trade barriers and reduction of import tariffs in the mid-1980s to mid-1990s ushered in a period of rapid global trade integration (Irwin 2022). Removing uncertainty about trade policy by reducing the gap between actual applied tariffs and maximum (bound) tariffs, could further lower trade costs: the regression results suggest that a 10-percentage point reduction in this gap would be associated with about one-seventh lower trade costs.

The decline in trade costs over the past three decades has stemmed partly from new RTAs and RTA reforms. The number of RTAs more than quintupled between the early 1990s and the mid-2010s, and the focus of agreements has shifted from tariff cuts to lowering nontariff barriers (World Bank 2016). The largest RTA in terms of the number of member countries, the African Continental Free Trade Area (AfCTA), for example,

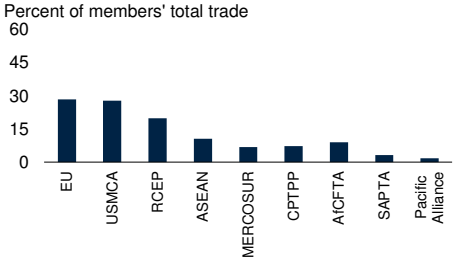
FIGURE 6.9 Regional trade agreements

Countries engaged in regional trade agreements (RTAs) account for a large part of global GDP. For some agreements, intra-RTA trade accounts for a large proportion of member country total trade.

A. Share of members of major RTAs in global GDP and trade



B. Share of intra-RTA trade in members' total trade



Sources: Comtrade (database); World Bank; World Trade Organization.
Note: RTAs are reciprocal trade agreements between two or more partners and include both free trade agreements and customs unions. Data for 2019.
A.B. AfCFTA = African Continental Free Trade Area; ASEAN = Association of South East Nations; CPTPP = Comprehensive and Progressive Agreement for Trans-Pacific Partnership; EU = European Union; MERCOSUR = Southern Common Market; RCEP = Regional Comprehensive Economic Partnership; SAPTA = South Asian Preferential Trading Arrangement; USMCA = United States-Mexico-Canada Agreement.

have raised real incomes among its members mostly by lowering nontariff barriers and through the implementing of trade facilitation measures (World Bank 2020c). The members of the major RTAs in North America (the USMCA) and Europe (the EU) account for more than 40 percent of global GDP (figure 6.9). RTAs have fostered domestic reforms in EMDEs and generated momentum for greater liberalization and expansion of trade opportunities (Baccini and Urpelainen 2014a, 2014b; Baldwin and Jaimovich 2010).

A multitude of costs are imposed on trade by administrative border and customs procedures. Documentation and other customs compliance requirements, lengthy administrative procedures, and other delays have been estimated to increase transaction costs by 2-24 percent of the value of traded goods. In some countries, government revenue losses from inefficient border procedures may exceed 5 percent of GDP (Moïsé and Le Bris 2013).

The WTO Agreement on Trade Facilitation (WTO TFA), adopted in 2014 and ratified by more than 90 percent of WTO members, provides a framework to streamline inefficient control and clearance procedures of border authorities, reduce unnecessary border formalities, and cut opaque administrative costs. 72 percent of the commitments made under the agreement have been implemented to date, but progress has been uneven, with less than 40 percent of commitments implemented in low-income countries. In West Africa, an initiative is underway to cut trade costs by electronically sharing customs transit data (World Bank 2021d). Guatemala and Honduras have reduced the time taken by traders to cross the border from 10 hours to 7 minutes by

integrating their trade procedures, replacing duplicative processes with a single online instrument (de Moran 2018).

Between-borders measures

The bulk of trade costs arises from the shipping and logistics involved in moving goods between borders. These costs depend in part on the quality of transport infrastructure and the government institutions involved in transport logistics, and on market structure in the transport sector. Countries have several avenues for lowering such costs.

High-quality and well-maintained transport infrastructure—at ports, airports, and on land—and efficient shipping services are associated with lower transport and logistics costs. Thus, policy measures to improve maritime connectivity and logistics performance should help lower trade costs. The regression results suggest that if a country were to move up from the bottom quartile on these two indicators' scores to the highest quartile—equivalent to a shift from conditions in Sierra Leone to conditions in Poland—trade costs would be lowered by between one-tenth and one-third (box 6.1).

Bribes and transport monopolies tend to drive up trade costs. In a pilot study of four African countries, more than two-thirds of survey respondents reported that bribery to accelerate transport services was common (Christie, Smith, and Conroy 2013). Efforts to reduce and eliminate such corruption and to increase competition in the transport sector should help lower transport costs.

Policies that strengthen regional integration can also be beneficial, particularly for small countries and countries that are geographically isolated from trade hubs. Coupled with regional institutions that help to reduce impediments to cross-border trade, improved regional infrastructure can help countries exploit the benefits of regional and global trade networks (Deichmann and Gill 2008). Transport-related trade costs can also be lowered through RTAs (Brenton, Portugal-Perez, and Regolo 2014).

Efforts to improve matching and liaison between trucking service providers and shippers can also cut trade costs by reducing wait times and empty backhauls. High transport costs may, in part, reflect unbalanced trade flows, since shipping at full capacity in both directions of a route is least costly (Ishikawa and Tarui 2018). At any one time, two-fifths of ships have been estimated to carry no cargo (Brancaccio, Kalouptsidi, and Papageorgiou 2020). Such asymmetries in demand for shipping services have been a major cause of shipping and supply bottlenecks in the wake of the COVID-19 pandemic. While shipping costs from China to the United States and Europe have risen to historically high levels, costs of shipping on ocean routes to China have remained low. Efforts to reduce wait times and empty backhauls may involve information and communications infrastructure and services to facilitate the timely provision of information about shipping capacity and schedules in order to allow exporters and shippers with available capacity to be matched more efficiently. Over the longer term, and in a favorable business environment more broadly, increased global value-chain

participation can expand the volume of bi-directional trade and thus help lower shipping costs.

Behind-the-border measures

Although not included in the empirical exercise described above because of lack of data, behind-the-border policies such as regulations, standards, inspection requirements, and labelling requirements, can impose considerable costs (Moïsé and Le Bris 2013). In Central America, sanitary and phytosanitary requirements, such as inspection requirements or labeling standards for meats and grains, have been estimated to raise import prices by about 30 percent on average (OECD and WTO 2015). Harmonization of standards can significantly reduce or eliminate such costs and increase trade, but smaller gains can also be achieved by mutual recognition of standards or conformity assessments (Chen and Mattoo 2008; World Bank 2016).

A shift from trade-based taxation to income-based or consumption-based taxation can further lower barriers to trade. In middle- and high-income EMDEs, such shifts have not been associated with lasting revenue losses, but revenue losses have occurred in low-income countries (Baunsgaard and Keen 2010).

Comprehensive reform packages

Some of the most successful trade reform programs have covered a wide range of policies. In Cambodia, a combination of customs and border improvements, regulatory reform, and streamlined import and export procedures helped the country leap 46 rankings in the Logistics Performance Index (LPI) between 2010 and 2014 (World Bank 2018). In Africa's Great Lakes region, improved trade and commercial infrastructure in the border areas and simplified border crossing procedures have been credited with improving accountability of officials, reducing rates of harassment at key borders (from 78 percent to 45 percent of survey respondents in south Lake Kivu), extending border opening hours, increasing trade flows, and doubling border crossings (World Bank 2021d).

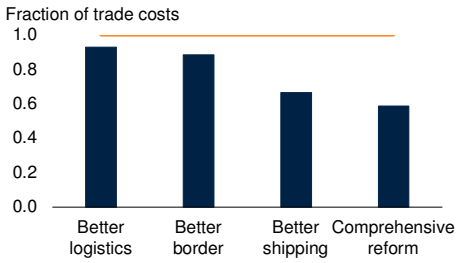
The regression results reported above can be applied to a hypothetical comprehensive reform scenario, focusing on pairs of countries that are in the bottom quartiles of the LPI and the Liner Shipping Connectivity Index (LSCI); three-quarters of these countries are in SSA. The coefficients estimated from the panel regression suggest that improvements in average logistics performance and shipping connectivity among these country pairs to the top quartile of the distribution of country pairs would halve their trade costs (figure 6.10).

Since manufacturers use services to produce and export goods, policies aimed at lowering trade costs in the services sector can help lower the costs of trading goods. Opening services markets to more competition, including in road and rail transport services and shipping, may be an effective way to reduce trade costs. Liberal bilateral air

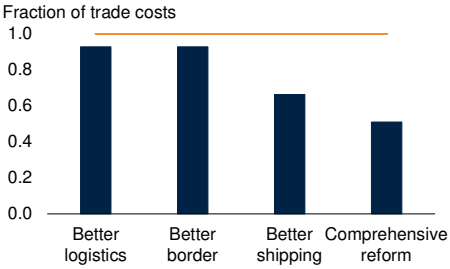
FIGURE 6.10 Impact of policy improvements on trade costs

Better logistics and shipping connectivity could help lower trade costs by more than one-half in the quartile of EMDEs that score worst on these indicators.

A. Reduction in overall trade costs associated with policy improvements



B. Reduction in manufacturing trade costs associated with policy improvements



Source: World Bank.
Note: EMDEs = emerging market and developing economies.
A.B. Bars show the fraction of trade costs that would remain after policy improvements. Policy improvements assume that the average EMDE in the quartile of EMDEs with the *poorest* scores in the Liner Shipping Connectivity Index (LSCI) and Logistics Performance Index (LPI) improves to match the score of the average EMDE in the quartile of EMDEs with the *best* score. The comprehensive package assumes that all three scores are improved simultaneously. Data refer to 2018. Orange line indicates 1 for unchanged trade costs in 2018 among the sample of EMDEs scoring in the poorest quartile on these indicators.

services agreements can also help lower trade costs for many goods that form part of global value chains or for high value-added agricultural products.

Given the perishable nature of agricultural products, measures that accelerate their movement across borders are particularly important (USAID 2019). The WTO TFA contains several provisions aimed at making agricultural trade faster and more predictable. This includes simplified and more efficient requirements for risk-based document verifications, physical inspections, and laboratory testing. A centralized "Single Window" authority for document processing and coordinating across all relevant agencies can reduce paperwork, too (UNESCAP 2011). Improved storage facilities can reduce spoilage and losses of perishable agricultural goods (UNESCAP 2017; Webber and Labaste 2010). Tracking and monitoring technologies can help accelerate paperwork and improve the monitoring of environmental conditions (Beghin and Schweizer 2020). Such measures to lower agricultural trade costs can also help prevent or reduce food insecurity.

A comprehensive package could also address the potential distributional consequences of trade. The failure of some firms participating in global value chains to pass cost reductions on to consumers and the declining share of labor income in countries integrated into global value chains have contributed to the perception of unequally shared gains from trade (World Bank 2020a). Conversely, growing services trade, global supply chains, and digitalization have offered new economic opportunities to women (World Bank and WTO 2020). Labor market policies that could promote a more

equitable sharing of gains from global value chain participation include policies to facilitate labor mobility, active labor market programs, and wage insurance schemes (World Bank 2020b).

Trade can play a critical role in the climate transition. Trade has the potential to shift resources to cleaner production techniques and to promote the production of goods and services necessary for transitioning to low-carbon economies. In addition, trade delivers goods and services that are key to help countries recover from extreme weather events. However, evidence indicates that in some countries, entry into global value chains in manufacturing has been accompanied by greater carbon dioxide emissions, and that global value chains have contributed to greater waste and increased shipping (World Bank 2020a). Shipping accounts for 7 percent of global carbon dioxide emissions and 15 percent of global emissions of sulfur dioxide and nitrogen oxides (World Bank 2020a). Being heavily concentrated in the electronics sector, global value chains have also contributed to e-waste (discarded electronic devices), which accounts for more than 70 percent of toxic waste in U.S. landfills (World Bank 2020a).

A number of policies can be implemented to reduce trade costs in a climate-friendly way, including policies that remove the current bias in many countries' tariff schedules favoring carbon-intensive goods, and that eliminate restrictions on access to environmentally friendly goods and services (Brenton and Chemutai 2021; World Bank 2020a). In addition, multilateral negotiations can focus not only on tariffs on environmental goods but also on nontariff measures and regulations affecting services—access to which is often vital for implementing the new technologies embodied in environmentally friendly goods.

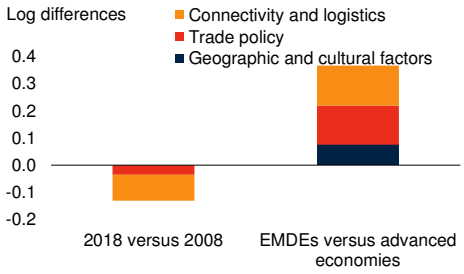
Digital technologies may eventually lower trade costs behind the border, at the border, and between borders, including by improving transparency and price discovery as well as information flows between exporters, shippers, and country authorities.[8] This may particularly support global supply chains. Robotics can help accelerate port procedures. Artificial intelligence can help lower logistics costs by optimizing route planning, storage, and inventory, as well as by improving tracking and monitoring; 3D printing can help shorten and localize supply chains, thus reducing the environmental footprint of trade; blockchain technology can help reduce time spent in customs, especially for time-sensitive goods, facilitate cross-border payments by increasing transparency and credibility, and enhance information sharing within supply chains (Fan, Weitz, and Lam 2019; WTO 2018). Such technologies may disproportionately benefit small and medium-sized enterprises that currently face higher trade costs than large enterprises (WTO 2019b). Shipping supply chains, in particular, could benefit from digitization to improve efficiency (Song 2021).

[8] Digitization can make the enforcement of value-added tax payments of ever smaller payment transactions profitable (World Bank 2021c).

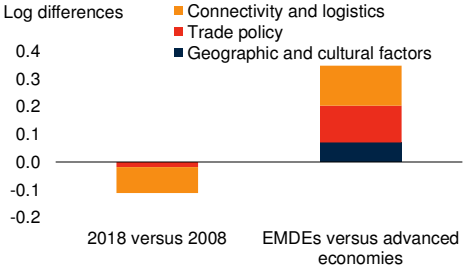
FIGURE 6.11 Estimated contributions to trade costs

The panel estimation described in the chapter accounts for much of the difference in average trade costs between EMDEs and advanced economies in 2018 and the change in trade costs between 2008 and 2018. About two-fifths of the predicted difference between average trade costs in EMDEs and advanced economies and three-fourths of the predicted difference between 2008 and 2018 are attributed to costs associated with shipping and logistics.

A. Model-based contributions to differences in overall trade costs



B. Model-based contributions to differences in manufacturing trade costs



Sources: Comtrade (database); World Bank.
Note: EMDEs = emerging market and developing economies.
A.B. Difference in predicted contributions to predicted logarithm of overall trade costs in 2008 and 2018 (A) or in advanced economies and EMDEs (B). Computed using coefficient estimates for each variable and the following realizations for each indicator included in the regression: trade-weighted averages for all countries in the sample in 2018 minus equivalent values for 2008; and trade-weighted averages for EMDEs minus equivalent values for advanced economies in 2018. Trade policy includes tariffs and membership in regional trade agreements; geographic and cultural factors include distance, common border, and common language; border regulation includes connectivity and logistics include liner shipping connectivity index and logistics performance index.

Conclusions

Despite a decline over the past three decades, international trade costs are high. In EMDEs, they amount to the equivalent of a tariff of more than 100 percent: thus they roughly double the price of an internationally traded good relative to a similar domestically traded good. Trade costs are on average about four-fifths higher for agricultural products than for manufactured goods and more than one-half higher for EMDEs than for advanced economies.

Trade costs have a number of components. Tariffs amount to only about one-twentieth of trade costs. The remainder are mostly costs of transport, logistics, and adherence to regulations, and, thus, reflect market conditions in the transport sector, administrative practices, and non-tariff policy barriers. About two-fifths of the difference in trade costs between EMDEs and advanced economies is accounted for by differences in the costs of logistics and shipping, and another two-fifths by differences in trade policies, including trade policy uncertainty (figure 6.11) .

Comprehensive packages of reforms have often been successful in reducing trade costs. Such packages can include trade facilitation measures; bilateral and multilateral agreements aimed at deeper trade integration; coordinated efforts to streamline trade procedures and processes at and behind the border; improved domestic infrastructure;

increased competition in shipping and logistics; reduced corruption; simplified trade-related procedures and regulations; and the harmonization or mutual recognition of standards. Many of these reforms, especially those relating to the business climate and governance, would stimulate private, trade-intensive investment and output growth more broadly (chapter 3).

Further research and analysis on trade costs is warranted, particularly regarding patterns and correlates of services trade costs. Measures of services trade costs remain scant, which makes it difficult to assess and quantify their determinants. In addition, since trade costs in services are largely associated with regulatory barriers, further analysis of the role of regulatory heterogeneity across sectors and regions seems warranted. Trade costs accumulate with multiple border crossings through the global value chain. Investigating what policy measures can be most effective in reducing trade costs when countries are involved in complex value chains is also key. Finally, further research could aim to better understand the distributional and climate-related effects of reducing trade costs.

TABLE 6.1 Data employed in the panel regression

Data	Definition	Source
Trade costs	Logarithm of the geometric average of country *i*'s and *j*'s bilateral trade costs	UNESCAP-World Bank Trade Costs Database
Tariff rates	Logarithm of the geometric average of country *i*'s and *j*'s bilateral tariff rates	UNESCAP-World Bank Trade Costs Database
Regional Trade Agreements (RTAs)	Dummy variable equal to unity if countries *i* and *j* share a common RTA	CEPII
Common border	Dummy variable equal to unity if countries *i* and *j* share a common land border (adjacency).	CEPII
Common language	Dummy variable equal to unity if countries *i* and *j* share a common language	CEPII
Distance	Logarithm of distance (in kilometers) between the largest cities in two countries	CEPII
Logistic Performance Index	Logarithm of the geometric average of country *i*'s and *j*'s scores	World Bank
Liner Shipping Connectivity Index	Logarithm of the geometric average of country *i*'s and *j*'s scores	World Bank
Trade policy uncertainty	Logarithm of the geometric average of the country *i*'s and *j*'s gap between bounded and applied tariff rates	World Development Indicators Database

Sources: CEPII; United Nations Conference on Trade and Development; World Bank.

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CHAPTER 7

Services-Led Growth: Better Prospects after the Pandemic?

The services sector accounted for two-thirds of economic growth in emerging market and developing economies (EMDEs) over the past three decades. In 2019, it accounted for more than half of GDP and employment in EMDEs. The sector consists of a wide range of activities, ranging from high-skilled offshorable services, such as information and communications technology (ICT) and professional services, to low-skilled "contact" services, such as retail and hospitality. The pandemic disrupted many low-skilled contact services that typically require face-to-face interactions between providers and consumers. High-skilled offshorable services were the least affected owing to the use of digital technology that enabled remote delivery. Increased digitalization has improved prospects for scale economies and innovation in the services sector that were previously constrained by the need for physical proximity and the lack of opportunities to augment labor with capital. Policies to support the diffusion of digital technologies could therefore further raise the growth potential of the services sector. Policies to improve market access for, and skills in, ICT and professional services could ease important constraints on growth opportunities in these high-skilled offshorable services that have best withstood the pandemic. The same holds true for policies, including regulatory reforms, that promote investment in low-skilled contact services, such as transportation, which have important linkages with the wider economy.

Introduction

The services sector is large and has been the main source of global economic growth over the past three decades. Between 1995 and 2019, services accounted for 66 percent of global output growth and 73 percent of global employment growth and for 63 percent of global output levels and 57 percent of global employment levels in 2019. While the services sector represented a somewhat smaller part of economic activity in emerging market and developing economies (EMDEs) than in advanced economies (AEs), the difference was small. Even in EMDEs, services made up for 60 percent of output and 52 percent of employment in 2019.

The services sector is diverse. First, it includes high-skilled offshorable services (information and communications technologies, finance, and professional services) that have been internationally traded much like goods since the ICT revolution in the 1990s. Second, it includes generally low-skilled contact services (transportation, hospitality, retail, personal services, arts, entertainment and recreation, and administrative and support) that have typically required physical proximity between providers and

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Note: This chapter was prepared by Gaurav Nayyar and Elwyn Davies.

consumers. Many services from both these categories provide important inputs for non-service sector activity. For example, transportation and logistics services form the infrastructure for international trade in agricultural commodities and manufactured goods, while ICT services are increasingly central to data-intensive production processes. Third, there is a group of social services (education and health) that are largely publicly provided and therefore not a focus of this chapter.

The pandemic has dealt uneven blows to services activity. Low-skilled contact services, such as transportation and hospitality, were hit particularly hard by social distancing regulations and precautions. But high-skilled offshorable services, such as ICT and professional services, were much less affected owing to their amenability to home-based work.

The increased digitalization that has been implemented by firms to cushion the impact of the pandemic's disruptions can be leveraged to boost growth in the services sector. Baumol (1967) and Hill (1977) argue that the potential for services-led growth is limited because services typically require a simultaneity of production and consumption that precludes economies of scale. In other words, the need for face-to-face interactions between service providers and consumers inhibits opportunities to serve demand beyond the local market. They also point out that services have less scope for capital-deepening and innovation than in manufacturing. Increased digitalization, however, enables greater scale and innovation in the services sector. The resulting productivity benefits, in turn, can boost overall economic growth owing to the important linkages between the services sector and other parts of the economy.

Against this backdrop, this chapter addresses the following questions:

- How has the services sector shaped global economic growth over the past three decades?
- How has the services sector been affected by the pandemic?
- How can digitalization enhance the services sector's growth as countries recover from the pandemic?
- Which policies can help harness the services sector's growth potential?

It presents several novel findings. First, although the services sector has led economic growth over the past three decades in both advanced economies and EMDEs, there are significant differences in the composition of services sector growth between the two groups. While the contribution of low-skilled contact services to GDP growth is similar between the two groups, that of high-skilled offshorable services increases with per capita income levels. Thus, high-skilled offshorable services account for around one-third of GDP growth in AEs compared with 15 percent in EMDEs, and for one-half of employment growth in AEs compared with 11 percent in EMDEs. This matters because

the growth of low-skilled contact services has been characterized by lower dependence on (a) export growth relative to domestic demand growth, and (b) total factor productivity growth relative to the growth of labor and capital inputs.

Second, the impact of the pandemic on the growth of the services sector has been uneven. Low-skilled contact services reliant on face-to-face interactions with consumers, such as accommodation, food, and transportation services, have been among the most adversely affected sectors, even though there are now signs of recovery. But high-skilled offshorable services, which tend to be amenable to remote work though digital delivery, such as ICT and professional services, were among the sectors least adversely affected, and some—especially ICT services—have even seen growth of output and investment.

Third, the increase in digitalization during the pandemic augurs well for growth prospects in the services sector. Among high-skilled offshorable services, there is a new momentum; the share of digitally deliverable ICT and professional services in total services exports of EMDEs increased to 50 percent in 2020 from 40 percent in 2019. Among low-skilled contact services, streaming platforms such as Netflix and YouTube have increasingly enabled providers of arts and entertainment services to export their creative content to international markets at low cost. Even where physical proximity remains important, intangible capital associated with digitalization has increased opportunities for scale economies. For example, e-commerce platforms have enabled retailers and restaurants to reach customers beyond their local neighborhoods. Additionally, ICT and management practices have facilitated the standardization of production across many establishments.

Fourth, appropriate policy interventions can better enable countries to leverage the potential of the services sector to drive economic growth. Policies to support the diffusion of digital technologies in EMDEs, for example, can bring particularly high returns because of the lack of digitalization in the services sector: the share of firms using email to communicate with clients was less than one-third in several EMDEs in as recently as 2018. Investing in ICT infrastructure, updating regulatory frameworks (including in relation to data), and strengthening management capabilities and worker skills can all boost the adoption of digital technologies. Countries can also promote the expansion of high-skilled offshorable services by reducing barriers to international trade and taking measure to improve skills. Last, but not least, countries can support investment and implement regulatory reforms that foster the revival of low-skilled contact services, such as transportation, that can be large employers and important enablers of growth in the wider economy.

This chapter makes several contributions to the literature. First, it presents stylized facts about the role of the services sector in overall economic growth over the past three decades. This draws on and complements a growing literature on structural change and productivity growth in EMDEs that highlights the changing contributions of the manufacturing and services sectors (Fan, Peters, and Zilibotti 2021; Kinfemichael and Mahbub Morshed 2019; McMillan and Rodrik 2011; Nayyar, Hallward-Driemeier, and

Davies 2021; Rodrik 2016). The main innovations here are the growth decompositions: services subsectors are explored; the demand-side contributions of domestic demand, exports, and government consumption are compared; and the supply side contributions of the growth of factor inputs and total factor productivity are examined.

Second, it analyzes how the pandemic has affected prospects for services-led growth by tracing patterns of recovery and assessing future growth opportunities linked to the acceleration of digitalization. By making a systematic assessment by services subsector, this builds on a spate of recent studies that examine the effects of the pandemic on growth and distribution (Apedo-Amah et al. 2020; Beraja and Wolf 2021; Chetty et al. 2020) as well as the literature on how the digital economy is expanding opportunities to boost productivity.

Third, it discusses policy options and priorities for leveraging the services sector's potential for boosting economic growth after the pandemic. This adds to the policy discussion in Nayyar, Hallward-Driemeier and Davies (2021) by focusing on developments since the pandemic. Policies considered include the reform of regulatory barriers and the promotion of skill development for both high-skilled offshorable and low-skilled contact services.

The remainder of the chapter is organized as follows. Section 2 quantifies how the services sector has shaped economic growth over the past three decades. Section 3 analyzes how the pandemic has affected the services sector's growth. Section 4 examines the potential of digitalization to increase growth in the services sector. Section 5 identifies policy priorities to leverage this potential to drive stronger overall economic growth. Section 6 presents conclusions.

How has the services sector shaped economic growth?

A general feature of economic development is structural change in national economies. The pioneering work of Fisher (1935), Clark (1940), Chenery (1960), and Kuznets (1971) observed a common pattern of change in the relative sizes of the agricultural, industrial (or manufacturing), and services sectors among the industrialized or advanced economies in the course of their development. In the early stages of development, the agriculture sector's share in both output and employment was dominant. Subsequently, as industrialization proceeded, the agriculture sector's share fell off, and the industrial (or manufacturing) sector's share rose. Once countries industrialized and reached an advanced stage of economic development, the industrial sector's share also declined, and the services sector's share increased. Interestingly, growth in EMDEs over the past three decades has not conformed to this pattern. In spite of the relatively early stages of development of most of these economies, the services sector has offset much of the decline in the share of the agricultural sector in both GDP and employment.

However, there are important differences across services subsectors. Three categories may be distinguished. First, ICT, finance, and business services comprise a group of

high-skilled offshorable services. Second, there is a group of low-skilled contact services that are not offshorable. However, some are traded internationally through either their linkages with goods (cargo transportation and wholesale trade) or tourism-related travel (accommodation and food). Education and health services (social services) comprise a third group. High-skilled offshorable and low-skilled contact services differ in two particularly important economic respects. First, growth in the output of low-skilled contact services has generally been characterized by lower dependence on export growth, as opposed to domestic demand growth, than high-skilled offshorable services. Second, growth in the output of low-skilled contact services has generally been based less on growth of total factor productivity, as opposed to growth of physical capital and labor inputs, than high-skilled offshorable services.[1] High-skilled offshorable services have expanded less in EMDEs than in AEs.

Services and structural transformation

Between 1991 and 2019, the services sector's share of total employment in EMDEs increased from 39 to 51 percent, offsetting almost the entire decline in agriculture's share, with little change in the share of industry (figure 7.1.A). Similarly, the services sector's share of GDP rose from 47 percent to 58 percent, offsetting a substantial decline in the share of agriculture together with a smaller decline in the share of industry (figure 7.1.B). These rising shares of the services sector in employment and GDP reflect its central role in driving economic growth in EMDEs over the past three decades. Thus, the services sector accounted for more than half of both employment growth (figure 7.1.C) and value-added growth (figure 7.1.D) and between 1991 and 2018 across EMDEs.

In the past, the increasing share of the services sector in employment and GDP in industrialized countries was attributed, at least in part, to rising relative prices of services that resulted from lower productivity growth than in industry (Baumol 1967). Labor productivity in the services sector could not be readily increased, either through innovation and capital accumulation, owing to the "intrinsic role of labor," or through economies of scale, because the intensity of face-to-face interactions constrained service providers from reaching consumers beyond the local market.

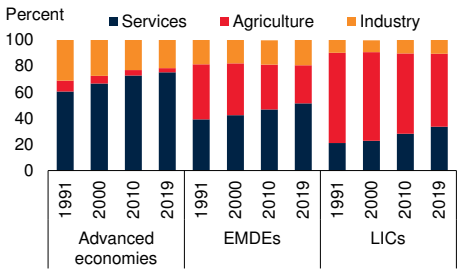
This past characterization of the services sector is less relevant for EMDEs today. Labor productivity growth in the services sector between 1995 and 2018 was similar to, or higher than, in the industrial sector in four of the six EMDE regions—Latin America and the Caribbean (LAC), the Middle East and North Africa (MNA), South Asia (SAR), and Sub-Saharan Africa (SSA; figure 7.1.E). Only in the East Asia and Pacific (EAP) and Eastern Europe and Central Asia (ECA) regions—where export-led manufacturing has been the cornerstone of economic growth—did the growth of labor productivity in industry exceed that in services, as was the case in the advanced economies.

[1] The relatively large contributions of export growth and total factor productivity growth to the growth in the output of high-skilled offshorable services have, nevertheless, been smaller than their contributions to the growth of manufacturing output.

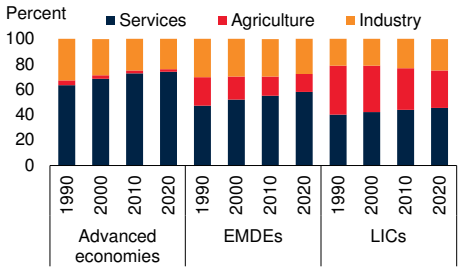
FIGURE 7.1 The services sector and structural transformation

In recent decades, the services sector's share in output and employment has increased and the sector has made larger contributions to both employment and output growth than agriculture or industry in both advanced economies and EMDEs. Labor productivity growth in services has been at least similar to that in industry in four out of the six EMDE regions. The contribution of the services sector to overall labor productivity growth has occurred both through productivity growth within the sector and through the shift of labor to services from the lower-productivity agricultural sector.

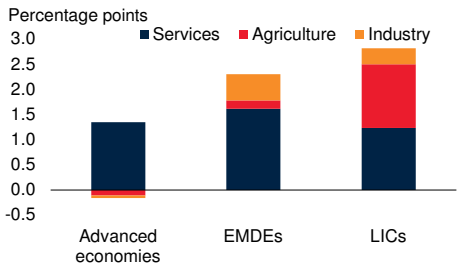
A. Share of individual sectors in employment



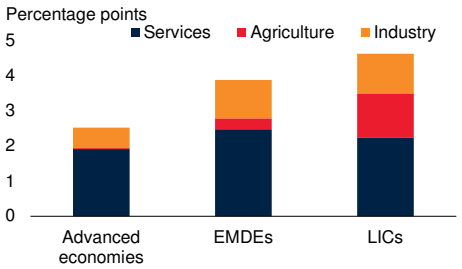
B. Share of individual sectors in value added



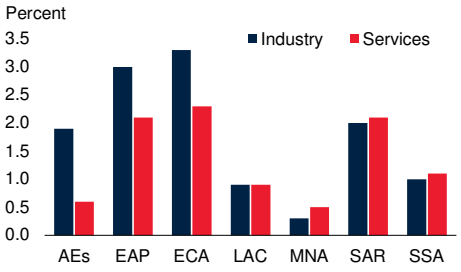
C. Contributions of individual sectors to employment growth, 1995-2019



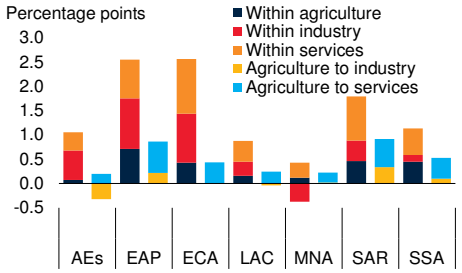
D. Contributions of individual sectors to value added growth, 1995-2019



E. Labor productivity growth in services compared to manufacturing, 1995-2018



F. Contributions of individual sectors to labor productivity growth, 1995-2018



Sources: Nayyar, Hallward-Driemeier, and Davies (2021); World Bank.
Note: EMDEs = emerging market and developing economies; LICs = low-income countries.
A. Sample includes 35 advanced economies, 143 EMDEs, and 26 LICs. Data until 2019.
B. Sample includes 31 advanced economies, 140 EMDEs, and 23 LICs. Data until 2020.
C.D. Sample includes 30 advanced economies, 116 EMDEs, and 21 LICs. Bars represent an individual sector's contribution to growth, averaged over 1995-2019.
E.F. AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
E. Average compounded annual growth rates in labor productivity (value added per worker) across each region between 1995-2018.
F. Bars represent labor productivity growth attributed to each sector as well as movement between sectors for the period 1995-2018.

Furthermore, between 1995 and 2018, labor productivity growth in services in all EMDE regions except MENA exceeded that in advanced economies, implying narrowing productivity gaps. This provides encouraging evidence that services growth has been contributing to EMDEs' catch-up with per capita incomes in advanced economies. It is also consistent with evidence of unconditional convergence of productivity across countries: countries starting from lower labor productivity in the services sector experienced faster productivity growth between 1975 and 2012 than those with higher initial labor productivity in that sector (Enache, Ghani, and O'Connell 2016; Kinfemichael and Mahbub Morshed 2019).

These trends in labor productivity growth, combined with the changing sectoral shares of employment, underlie the contribution of the services sector to overall labor productivity growth. This growth reflects both *within-sector* gains in productivity, as well as *between-sector* gains as the labor force shifts from low- to high-productivity sectors. Thus, productivity growth within the services sector contributed more than productivity growth within industry to aggregate productivity growth in all EMDE regions other than EAP in the past three decades. Furthermore, although the relative contribution of the between-sector component did not exceed one-third in any region, in each case the bulk of it came from the increasing share of services in total employment (figure 7.1.F).

Increased productivity-enhancing growth opportunities in the services sector include new opportunities for larger-scale production, innovation (including through mechanization), and spillovers through linkages with other sectors—characteristics typically associated with manufacturing-led growth. For example, digital electronic content has made ICT services more storable, codifiable, and transferable and therefore more scalable. Similarly, innovation through research and development (R&D) since the 1990s has been largely concentrated in ICT multinationals owing to software patents (Branstetter, Glennon, and Jensen 2018). ICT services have also increasingly benefited other sectors as data analytics have improved the quality and efficiency of production processes.

The heterogeneity of the services sector

The services sector comprises a wide range of economic activities.[2] They can be grouped on the levels of skills that they involve and their amenability to be offshored and internationally traded. Three groups may be distinguished: high-skilled offshorable services, low-skilled contact services, and social services.

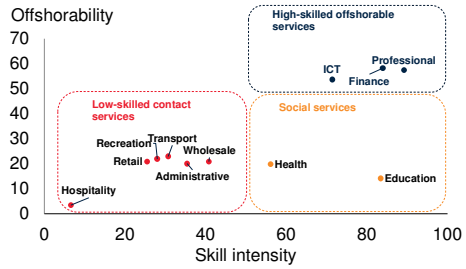
The first group, high-skilled offshorable services, comprises ICT, finance, and professional, scientific, and technical services that employ a smaller share of workers in

[2] Under the United Nations (UN) International Standard Industrial Classification of All Economic Activities (ISIC), the broad categories of services include, among others, wholesale and retail trade; accommodation and food; transportation and warehousing; information and communications technology (ICT) services; financial services; real estate; professional, scientific, and technical services; public administration and defense; education and research; health services; arts, entertainment, and recreational services; administrative and support services; and other social, community, and personal services (United Nations 2008). Mining; utilities such as electricity, gas, and water; and construction are typically classified within "industry," together with manufacturing.

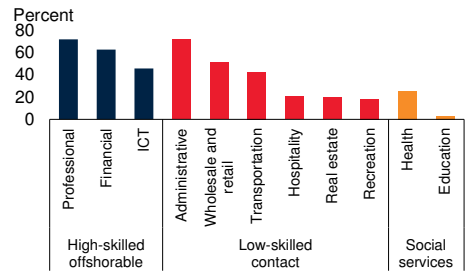
FIGURE 7.2 The heterogeneity of the services sector

Service sub-sectors differ in the amount of physical capital they use, their skill intensity, the degree they are connected to other sectors, the extent they are traded internationally, and how offshorable they are.

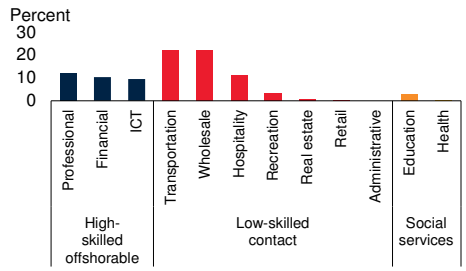
A. Offshorability and skill intensity in the United States



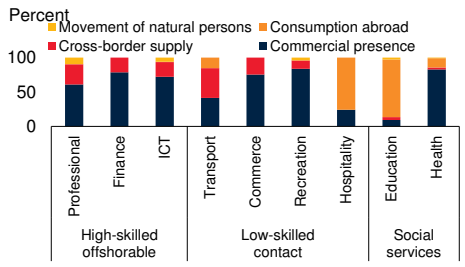
B. Inter-sectoral linkages in the European Union



C. Intensity of exports in the United States



D. Trade by mode of supply



Sources: Blinder and Krueger (2013); Organisation for Economic Co-operation and Development; U.S. Department of Labor; World Trade Organization.

Note: The services sub-sectors above are divided by skill intensity and whether the tasks can be done remotely or offshored. ICT = information and communications technology.

A. Offshorability is measured by the share of worker tasks in the United States that (a) do not involve face-to-face contact with people other than coworkers; (b) can be done without being physically present; and (c) will not experience a decline in quality if they can be delivered remotely. It reflects the possibility for tasks to be offshored from the United States to emerging and developing countries where labor costs are lower. Skill intensity is measured by the inverse of the share of workers in manual-task-intensive occupations among 23 major occupational groups in the U.S. Department of Labor's Occupational Information Network (O*NET) database in 2018. The use of data from the United States provides a lower bound; if a sector's jobs are predominantly filled by unskilled workers in the United States, they are almost certainly likely to be intensive in emerging and developing countries.

B. Share of sales to other domestic sectors in output in European Union countries in 2015. This shows the upside potential for linkages between sectors since advanced economies have more diversified production structures. Data from OECD Trade in Value Added database.

C. Share of value added exported in the United States in 2015. This show the upside potential for scale since advanced economies have more sophisticated services sectors that are more likely to be traded internationally. Data from OECD Trade in Value Added database.

D. Share of global trade in services by four modes of supply in 2017. Commercial presence refers to foreign direct investment. Data from the World Trade Organization's Trade in Services by Mode of Supply (TiSMoS) database.

manual task-intensive occupations and that involve tasks more amenable to offshoring (figure 7.2.A). These services are more offshorable because they rely less on face-to-face interactions with customers and suffer less from losses in quality when delivered remotely. They are also often used as intermediate inputs by other firms in the domestic economy, creating opportunities for domestic as well as international trade. For instance, three-fourths of the output of professional services constituted intermediate inputs in other sectors (figure 7.2.B).

The second group, low-skilled contact services, relies more on manual labor and are less amenable to offshoring. This group includes transportation; hospitality; wholesale trade; arts, entertainment, and recreation; retail trade; administrative and support services; and personal services. Some of these services—notably transportation, hospitality, and wholesale trade—are highly traded internationally (figure 7.2.C). Transportation services and wholesale trade are often intermediate inputs into internationally traded goods. In contrast, hospitality services—accommodation and food provision—are mostly traded through "consumption abroad" owing to tourism-related travel (figure 7.2.D).

The third group, social services, consists of education and health services that are both relatively skill-intensive and less amenable to offshoring. This group of services is outside the focus of this chapter since they are largely provided by the public sector.

Low-skilled contact services accounted for about one-third of GDP growth between 1990 and 2019 in each major country group—AEs, EMDEs, and low-income countries (LICs). The contribution of social services to overall GDP growth over the past three decades, at about 15 percent, was also similar in each of these groups. However, the contribution of high-skilled offshorable services to GDP growth increased with levels of per capita income, ranging from 10 percent in LICs to 15 percent in EMDEs and almost 30 percent in advanced economies (figure 7.3.A).

The contribution of high-skilled offshorable services to employment growth between 1990 and 2019 was also larger at higher levels of per capita income, ranging from 4 percent in LICs to 11 percent in EMDEs and more than 50 percent in AEs. In contrast, the contribution to employment growth of low-skilled services, at around 40 percent, was similar across LICs, EMDEs, and AEs (figure 7.3.B).

The nature of services-led growth

The contribution of demand-side factors

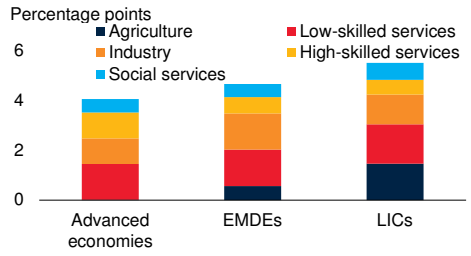
The output of a sector caters to either intermediate demand from other sectors in the domestic economy or to final demand that comprises domestic private consumption and investment, government expenditure, and exports. Among the components of final demand, domestic private demand plays the largest role in many low-skilled contact services, accounting for one-half of output in retail trade and three-fourths of output in hospitality services (figure 7.3.C). International trade in these services has typically been constrained by the need for physical proximity between service providers and consumers (Hill 1977). Among low-skilled contact services, exports play a larger role in transportation and wholesale trade, where they are linked to trade in goods.

The share of exports in final demand is also quite large for some high-skilled offshorable services, such as professional services and ICT, where digital electronic content has made them more storable, codifiable, and transferable. Because the constraint of physical proximity between consumers and providers has become less binding, professional services now have trade costs comparable to those in manufacturing industries (Gervais

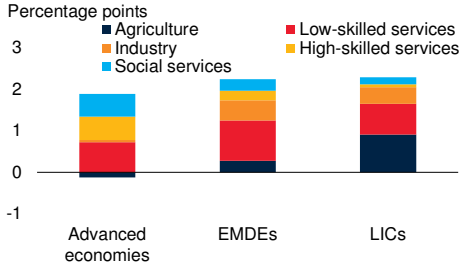
FIGURE 7.3 Employment, value added, and productivity in service sub-sectors

High-skilled offshorable services and low-skilled contact services have both made key contributions to the growth of value added and employment in advanced economies, while low-skilled services have played a larger role in EMDEs. High-skilled offshorable services tend to be more closely linked to other sectors through input sales, more export-oriented, and more productive. Their growth is also more closely linked to improvements in productivity.

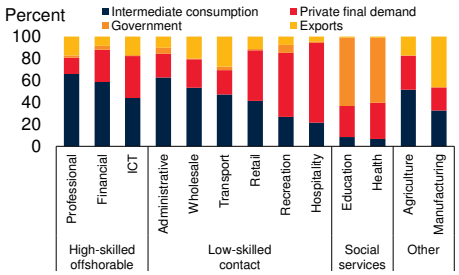
A. Sectoral contributions to value added growth



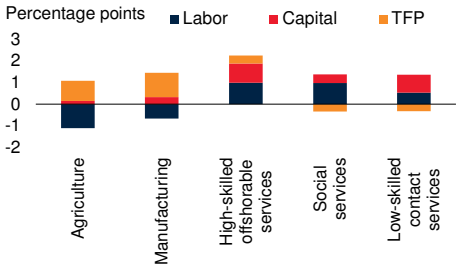
B. Sectoral contributions to employment growth



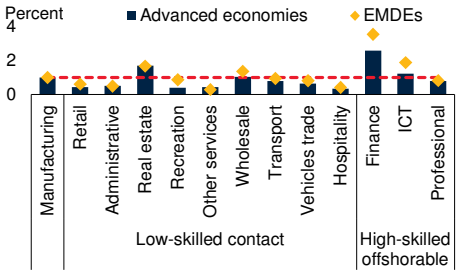
C. Shares of intermediate and final demand



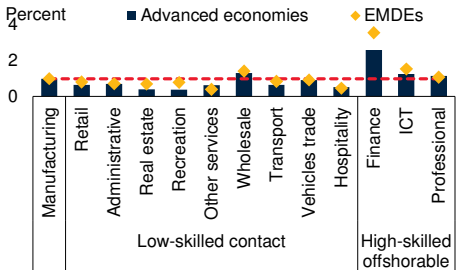
D. Contributions of growth of labor, capital, and TFP to output growth in advanced economies



E. Labor productivity compared to manufacturing



F. Total factor productivity compared to manufacturing



Sources: European Commission; Groningen Growth and Development Center (GGDC); Nayyar, Hallward-Driemeier, and Davies (2021); World Input-Output Database (WIOD).

Note: EMDEs = emerging market and developing economies; LICs = low-income countries; TFP = total factor productivity.

A. Bars represent the average contribution of individual sectors to value added growth between 1990-2018. Sample from GGDC's Economic Transformation Database includes 6 advanced economies, 39 EMDEs, and 6 LICs.

B. Bars represent the average contribution of individual sectors to employment growth between 1990-2018. Sample from GGDC's Economic Transformation Database includes 6 advanced economies, 39 EMDEs, and 6 LICs.

C. Intermediate consumption measures sales to other sectors, based on WIOD data from 42 countries in 2014.

D. Based on the European Union KLEMS database due to constraints on data availability in EMDEs.

E.F. Productivity in the manufacturing sector in the same country is normalized to 1 (red line). Data are from 56 countries, including 35 EMDEs, are for the latest available year between 2010-17.

and Jensen 2019). Yet, even for these services, the share of exports in final demand is considerably lower than for manufactured goods. This may be attributable to a range of policy impediments that have constrained services trade. Government consumption matters most in education and health services, which are often publicly provided.

Intermediate domestic demand—sales to producers in other sectors of the domestic economy—matters greatly for many services, accounting for more than half the output of both high-skilled offshorable services and some low-skilled contact services, such as transportation, wholesale, and administrative and support services (figure 7.3.C). These links with other goods-producing (tradable) sectors also mean that services might be exported indirectly.

Value added by services accounted for 43 percent of world exports in 2009, up from 31 percent in 1980. In fact, more than two-thirds of the growth in services value-added in exports between 1995 and 2011 was due to an increase in services embodied in other exports rather than services exported directly (Heuser and Mattoo 2017). This suggests that services such as transportation, telecommunications, finance, and business services have increasingly been used as intermediate inputs in the production and export of goods. In France, Germany, Italy, the United Kingdom, and the United States, services contribute more than half the total value-added embodied as inputs in exports. Even in China, often viewed as predominantly an exporter of manufactured goods, more than a third of the value-added in its exports comes from services (World Bank 2020). Furthermore, there is evidence that services embodied as inputs improve the productivity of downstream manufacturing (Arnold et al. 2015). These forward linkages highlight the important enabling role that many services play.

The contribution of supply-side factors

The growth of output can be decomposed into the contributions of the growth of factor inputs, such as capital and labor, and the contribution of the growth in the productivity of these factors, known as total factor productivity (TFP). Estimates based on data for 15 EU countries indicate that growth of factor inputs, particularly labor, accounts for most of the growth of output of most services subsectors between 1991 and 2018 (figure 7.3.D). The low, even negative, contribution of TFP growth may reflect, at least in part, Baumol's "cost disease" hypothesis. Baumol (1967) argued that the productivity of many services sector activities cannot be readily increased through innovation because of their inherently labor-intensive nature. With technological progress in other sectors, the prices of manufactured and agricultural products would tend to fall relative to the price of services, leading to an increasing share of services in total output.[3]

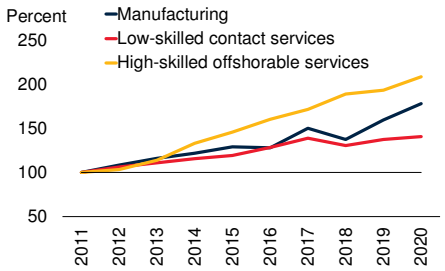
However, high-skilled offshorable services have contradicted Baumol's hypothesis with higher labor productivity than in manufacturing. Labor productivity in financial services is 3.5 times higher than in manufacturing in EMDEs (and about 2.5 times higher in

[3] The challenges of measuring outputs and inputs in the services sector also raise concerns about the mismeasurement of productivity (Nayyar, Hallward-Driemeier, and Davies 2021).

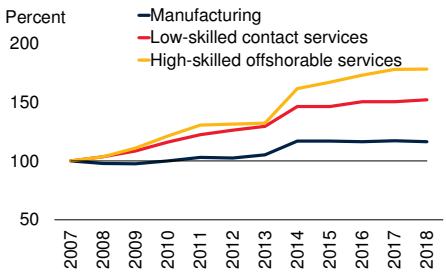
FIGURE 7.4 Outward foreign direct investment in the services sector from the United States

Foreign direct investment (FDI) is an important mode through which services are traded internationally ("mode 3" under the General Agreement on Trade in Services framework). U.S. outward FDI in the services sector has been increasing, and for high-skilled offshorable services it has been outpacing that in manufacturing. Employment in U.S. foreign affiliates has been increasing in both high-skilled offshorable services and low-skilled contact services, while it has been stagnant in manufacturing.

A. Outward FDI from the United States



B. Employment in foreign affiliates of U.S. multinational enterprises



Source: Organisation for Economic Co-operation and Development.
Note: FDI = foreign direct investment. FDI position reflects the value of the stock at the end of the reference year. The destination of the outward FDI from the United States is not available in the data but includes both advanced economies and emerging market and developing economies. Data from the OECD Affiliates of Multinational Enterprises database.

AEs), while labor productivity in ICT services is about 2 times higher in EMDEs (and 1.3 times in AEs) (figure 7.3.E). Labor productivity in professional services is below that of manufacturing, but TFP—which corrects for differences in physical capital—is slightly higher than in manufacturing (figure 7.3.F). Low-skilled contact services tend to have lower labor productivity and TFP than manufacturing.

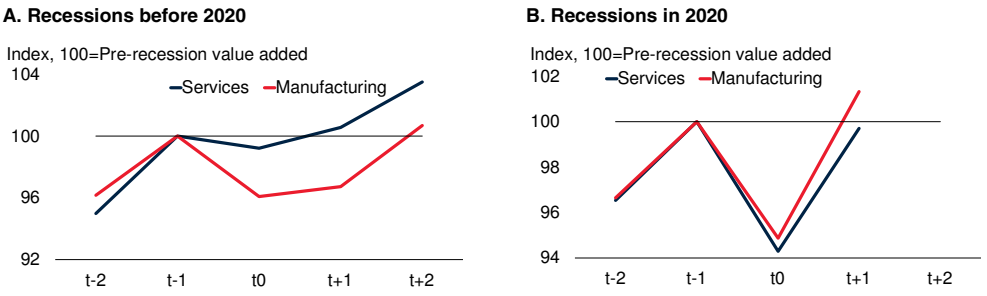
However, productivity gains still occur in low-skilled contact services. Fan, Peters, and Zilibotti (2021) show that the growth of such contact services—employing large numbers of low-skilled labor—in India over the past three decades has been characterized by productivity gains. Furthermore, firm-level data from Côte d'Ivoire, North Macedonia, Moldova, and Vietnam show that productivity growth in firms across several low-skilled contact services during their initial years often exceed productivity growth in manufacturing firms (Aterido et al. 2021).

The relatively large contribution of capital accumulation to output growth in the services sector reflects increasing investments, including through foreign domestic investment (FDI).[4] For example, outward FDI from the U.S. in high-skilled offshorable services outpaced that in manufacturing between 2011 and 2020 (figure 7.4.A). Furthermore, employment in U.S. foreign affiliates (outward FDI) has increased across all services

[4] Foreign direct investment is the most prevalent "mode" of trade in services ("mode 3" under the General Agreement on Trade in Services [GATS] framework).

FIGURE 7.5 Services and manufacturing activity through recessions

Recessions that occurred 2020 at the height of the COVID-19 pandemic were unusual in the disruptions they caused to services activity. In previous recessions, services activity was resilient despite sharply contracting manufacturing activity.



Source: World Bank.
Note: Recessions are defined as output contractions in which output growth is one standard deviation or more below the long-term average. This definition yields 185 recession events that ended before 2020 in 103 countries (with available data since 1960) and 76 recession events in 2020 in 76 countries. The average number of events is 1.7 per country. Charts show the unweighted average level of real value added in services (blue) and manufacturing (red) in the years around the recession year t0, indexed to 100 for the year preceding the recession.

groups, while employment growth in manufacturing remained more stagnant (figure 7.4.B), despite increasing investment.

How has the COVID-19 pandemic affected the services sector's growth?

In previous recessions, the services sector was resilient despite sharply contracting manufacturing activity (figure 7.5.A). However, this resilience was missing during the pandemic (figure 7.5.B). In fact, the economic contraction following the COVID-19 pandemic was particularly salient for the services sector (Apedo-Amah et al. 2020; Chetty et al. 2020; OECD 2021; World Bank 2022).

Unlike in previous downturns, the consumption of durable goods was resilient, but the consumption of many services declined owing to lockdown measures and increased caution by consumers (Tauber and Van Zandweghe 2021). This unusual shift in consumption patterns may carry implications for the ongoing recovery: whereas reduced spending on durables in earlier downturns might just have represented postponed spending, consumers are less likely to catch up on reduced services spending (Beraja and Wolf 2021).

However, the impact of the pandemic on the services sector has not been uniform across either subsectors or countries. The effects have been particularly severe on many services in the low-skilled contact services group, especially those most reliant on face-to-face interactions, such as accommodation, food, and transportation services. But the high-skilled offshorable services group, consisting of ICT, professional and financial services, has generally withstood the pandemic as well as, if not better than, manufacturing,

largely because digitalization has helped to make these services amenable to remote delivery and home-based work. Even among some low-skilled contact services, the pandemic has accelerated digitalization, including in countries where the use of digital technologies was low.

Patterns of impact and recovery

Differences across services subsectors

Overall, the impact of the pandemic on output was somewhat larger in the services sector than the manufacturing sector. In 2020, the growth rate of the services sector was lower than that of manufacturing in more than half (87) of the 157 countries with available sectoral value-added data (World Bank 2021). In 136 countries, value-added of the services sector fell in 2020, compared with 116 countries where there was a decline in manufacturing (figure 7.6.A).

However, the overall impact of the pandemic conceals considerable heterogeneity among the various services groups. In the low-skilled contact services group, hospitality (accommodation and food services) and transportation services were the most negatively affected. Gross value added in these sectors declined by 40 and 21 percent, respectively, in the year to April 2020 in a representative group of EMDEs with available national accounts data (figure 7.6.B). Estimates based on data from firm surveys similarly indicate that the largest negative impacts on sales in 2020 and 2021 occurred in accommodation, food services, and transportation (figure 7.6.C), together with "other" services (including personal services).[5] Negative impacts in these sectors continued through 2021 in EMDEs (figure 7.6.D), but some recovery became visible in advanced economies (figure 7.6.E). The concentrated impact of the pandemic contrasts with the more even effects of the global financial crisis and associated recession across services subsectors.[6]

Similar patterns can also be seen in FDI inflows into EMDEs (figure 7.6.F). For most services subsectors, announced greenfield FDI was lower in 2020 and 2021 than pre-pandemic levels, with the largest declines being in hospitality and "other" services (including personal services). High-skilled offshorable services performed slightly better, although both professional services and financial services saw significant declines. ICT services was the only group that saw an increase in greenfield FDI—of one-third between 2019 and 2021.

The intensity of face-to-face interactions and amenability to remote work

The importance of physical proximity in delivering services in different sub-sectors is correlated with the pandemic's adverse impact on sales. Such low-skilled contact services

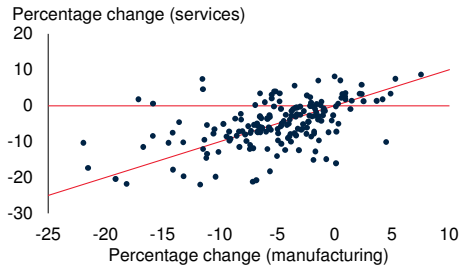
[5] In classifications of economic activities, personal services are often grouped under "other services" (under ISIC Rev 4, this corresponds to section S).

[6] For example, in the United States, in the first quarter of 2009, subsectoral impacts in the services sector ranged between -11 percent (for retail and wholesale) and -6 percent (for ICT). In the first quarter of 2020, U.S. services subsectoral impacts ranged from -47 percent (for hospitality) and +1 percent (for ICT).

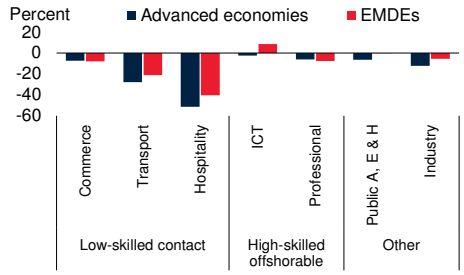
FIGURE 7.6 The impact of COVID-19 across sectors

National accounts data and firm-level surveys indicate that the effects of COVID-19 on output were negative in both services and manufacturing, and larger in services in about half of all countries. But they varied significantly among services sub-sectors. Hospitality and transportation were the most negatively affected in both EMDEs and advanced economies. Most services sub-sectors also saw reductions in FDI, with the exception of ICT, which saw growth in value added and investment, as well as FDI, during the pandemic.

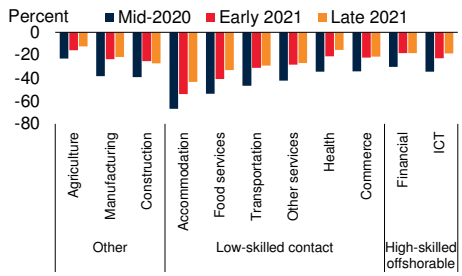
A. Value added growth in manufacturing versus services, 2019-20



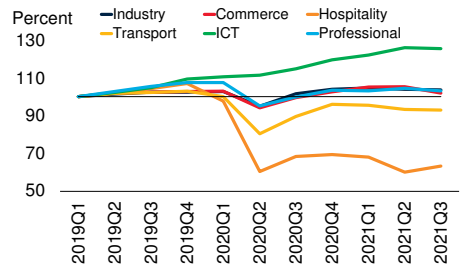
B. Change in value added by services subsector, April 2020 compared with April 2019



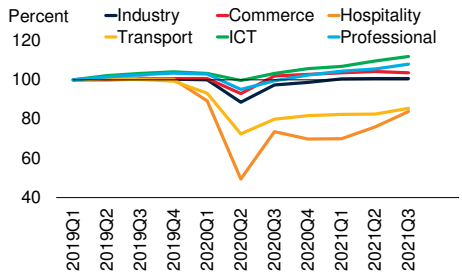
C. Change in sales as reported by firms



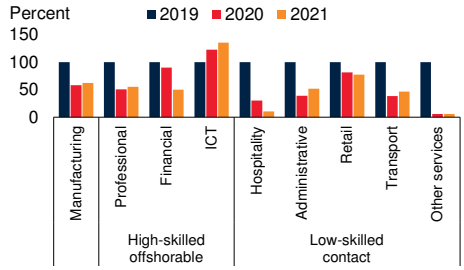
D. Value added by sector in EMDEs



E. Value added by sector in advanced economies



F. Greenfield FDI in EMDEs



Sources: Financial Times fDi Markets; Haver Analytics; UN World Tourism Organization; World Bank.

Note: ICT = information and communications technology.

A. Vertical axis reports percent change in services value added, whereas horizontal axis presents percent change in manufacturing value added for each individual country in the scatterplot.

B.D.E. Sample of advanced economies includes Australia, Canada, Norway, Sweden, and the United States.

Sample of EMDEs includes Brazil, Ghana, Indonesia, Kenya, Morocco, and Vietnam. Not all countries in the Haver Analytics database report granular sectoral disaggregation.

B. "Public A, E, & H" refers to public administration, education, and health.

C. The change in sales reported by firms are conditional values based on a regression of the change in sales on sector, size, month of interview, and age. Sample from the World Bank Business Pulse Survey and Enterprise Surveys includes 47 countries (countries with data for three waves). Weights have been applied such that every country carries an equal weight.

F. Greenfield FDI from the fDi Markets database represents the value of new announcements, relative to 2019.

as hospitality took the biggest hit, reflecting their high dependence on face-to-face interactions and the limited possibilities for remote or home-based work.[7] In many countries, hospitality is also highly dependent on tourism-related international travel, which declined significantly; the UN World Tourism Organization estimates a decline of 97 percent at the height of the pandemic (figure 7.7.A).

In contrast, the ICT sub-sector—part of the high-skilled offshorable services group—was the least adversely affected, being more amenable to home-based work. In EMDEs, output of ICT services grew by 20-25 percent in 2020, while other sub-sectors contracted or stagnated. Among EMDEs with available data, Ghana and Türkiye have seen the largest expansion of ICT services (figure 7.7.B). As mentioned earlier, ICT is also the only services sub-sector that has seen positive investment growth, with FDI in ICT in EMDEs growing by a third between 2020 and 2022.

In general, firms engaged in service activities dependent on face-to-face interactions between providers and consumers, such as hospitality, experienced the largest decline in sales (figure 7.7.C). Similarly, firms engaged in activities that are more amenable to home-based work typically experienced smaller declines in sales. This applies to ICT, financial services, and professional services—all high-skilled offshorable services (figure 7.7.D).

The transportation sector, which is moderately dependent on face-to-face interactions between providers and consumers and among the least amenable to home-based work, has been adversely impacted too. This holds not only for passenger transportation services, but also for freight transport, which has been affected not only by border closures but also by impacts upstream in the manufacturing sector, which led to reductions in the capacity of freight transportation. Given the important linkages between freight transportation and goods-producing sectors, this has contributed to prolonged supply chain disruptions.

Since 2020, hospitality and transportation services have experienced partial recoveries, attributable, at least in part, to the phasing out of government restrictions on in-person gatherings and travel. Yet continuing restrictions and social distancing precautions mean that full recovery has some distance to cover. For example, at end-2021, international tourist arrivals were still two-thirds lower than before the pandemic. Furthermore, recovery has been slower in EMDEs than in advanced economies. Thus, while hospitality services in the U.S. in the third quarter of 2021 were about 8 percent lower than in the same quarter of 2020, they were close to 40 percent lower in a group of EMDEs with available data.

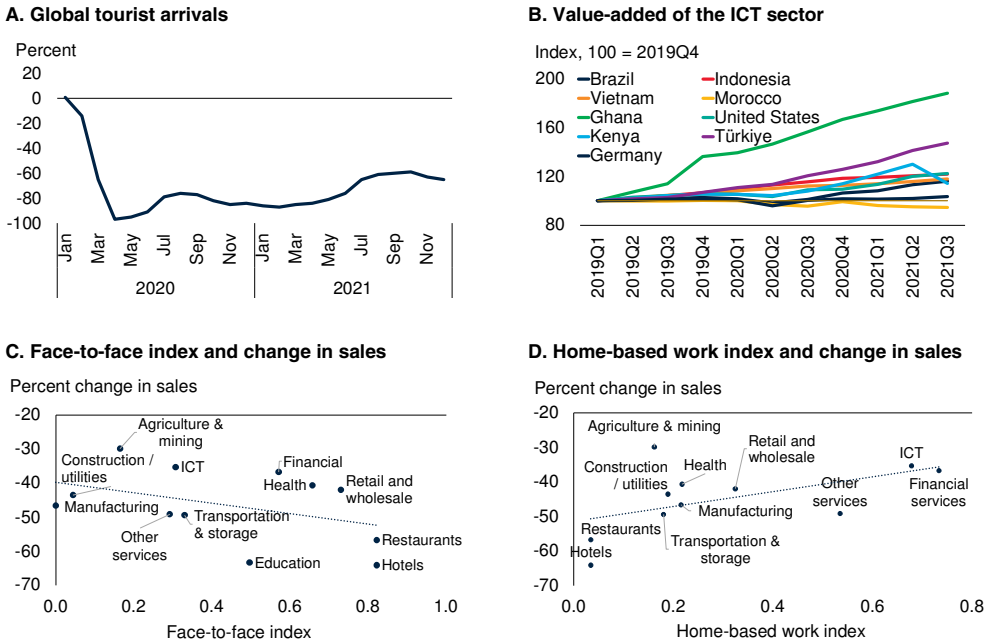
The advent and growth of digitalization

The adoption of digital technologies has increased during the pandemic. The World Bank COVID-19 Business Pulse and Enterprise Surveys show that nearly 44 percent of businesses globally started or increased their use of digital technologies and that 29

[7] Except for takeaway and home delivery services, physical proximity has remained central to their provision.

FIGURE 7.7 COVID-19 and the performance of services sub-sectors

There are large differences between sectors in how they fared through the pandemic. ICT services, for example, have grown in many EMDEs, while tourism-related sectors declined. The need for face-to-face interactions and the possibility for remote delivery explains part of these differences. Sectors relying on face-to-face interactions in the delivery of services fared worse during the pandemic, while those amenable to home-based work—even if traditionally relying on face-to-face interactions (for example, financial services)—fared better.



Sources: Avdiu and Nayyar (2020); Dingel and Neiman (2020); Haver Analytics; World Tourism Organization; World Bank.
A. Change in tourist arrivals compared to same month in 2019.
C.D. Year-on-year change in firms' sales between 2019 and 2020, drawn from the first wave of high-frequency data from World Bank Business Pulse and Enterprise Surveys in 47 countries conducted between March and September 2020. The face-to-face index and home-based work index are, respectively, based on Avdiu and Nayyar (2020) and Dingel and Neiman (2020).

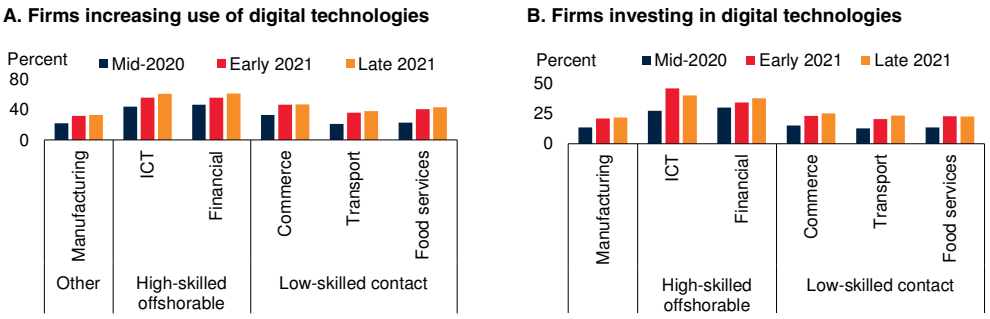
percent invested in digital technologies during the initial months of the pandemic (Apedo-Amah et al. 2020). Even as restrictions were relaxed and firms experienced fewer adverse impacts from the pandemic, increases in the use of digital technologies as reported by firms were sustained (figures 7.8.A and 7.8.B).

The adoption of digital technologies was higher in services than in manufacturing, agriculture, mining, construction, and utilities. In these non-service sectors, only roughly one-third of firms reported an increase in the use of these technologies. There are also differences across services subsectors. The high-skilled offshorable services reported the largest proportions of firms increasing the use of digital technologies, including financial services (61 percent in late 2021) and ICT services (60 percent in late 2021).[8]

[8] The patterns across sectors are similar when looking at firms' investment in digital technologies. The frequency of such investment ranged from around 40 percent of firms in ICT and financial services; 25 percent in wholesale and retail trade, food preparation, and accommodation services; and 20 percent in agriculture, mining, construction, manufacturing, and transportation.

FIGURE 7.8 Adoption of digital technologies in EMDEs

High-frequency surveys of firms in EMDEs during the pandemic highlight that services firms were more likely to start using or increase their use of digital technologies than manufacturing firms. Firms also increased their investment in digitalization.



Source: World Bank.

Note: ICT = information and communications technology. Balanced panel of 47 countries (comprising EMDEs as well as Poland) for which three waves were available. Each column corresponds to a survey wave. For most countries, wave 1 was conducted in Q2 or Q3 of 2020, wave 2 in early 2021, and wave 3 in late 2021. Data from World Bank Business Pulse and Enterprise Surveys.

There has also been an increased use of digital technologies in some low-skilled contact services. The share of firms starting or increasing the use of digital technologies in accommodation, food services, and retail trade—services that are among the most dependent on face-to-face interactions—was 35-45 percent in the most recent (late 2021) survey round. In fact, these services have seen the largest accelerations in digitalization during the pandemic. Thus, the change in the frequency of firms increasing the use of digital technologies between the first and second waves of the survey, at 14 percentage points, was highest in food preparation and accommodation services among all industries. Similar patterns can be seen in data for increases in investment in digital technologies. This digitalization reflects adjustments in business models. For example, digital platforms enabled restaurants to offer their food services outside their premises through home-delivery and takeaway meals.[9]

In sum, high-skilled offshorable services, where digital technologies allow remote delivery, have been less adversely affected by the pandemic than low-skilled contact services that are more reliant on face-to-face interactions with customers and have little scope for remote delivery. Among the former group, ICT services have actually experienced positive growth. However, even firms in low-skilled contact services increased their use of, and investment in, digital technologies at a faster pace than firms in manufacturing and agriculture. Furthermore, firms report that they continued to increase digitalization even after pandemic-related restrictions were relaxed.

[9] For example, in the U.S., food delivery apps reported that their revenues more than doubled in 2020 (Sumagaysay 2020).

How can digitalization transform opportunities for future services sector growth?

The acceleration of digitalization during the pandemic augurs well for growth prospects in the services sector. In particular, it has shown how digitalization can expand opportunities for scale economies and innovation that were previously hampered by dependence on face-to-face interactions between providers and consumers and by limits to combining labor with physical capital. Even before the pandemic, increased digitalization had expanded these opportunities, albeit mostly for high-skilled offshorable services and a limited number of countries. The recent acceleration raises the question of how much potential there may be for the benefits of digitalization to spread more widely in the services sector.

Digitalization and exporting opportunities in the services sector

High-skilled offshorable services

The ICT revolution has, since the 1990s, enabled the offshoring of ICT and professional services to lower-cost destinations. Much like global value chains for manufactured goods, the production of these services is fragmented across countries, such as when preliminary architectural designs and tax returns are put together in one country and finalized and delivered to customers in another (World Bank 2020).[10] This labor cost arbitrage is reflected in the inverse relationship between the share of cross-border delivery (mode 1 trade) in total exports of ICT and professional services and per capita GDP. Service providers in EMDEs with English-language skills, such as India, the Philippines, and Ghana have particularly benefited (figure 7.9A).

The rapid expansion of bandwidth with the fifth-generation technology standard (5G) for broadband cellular networks is expected to further increase the quality of data streaming. And new collaborative digital platforms such as Skype for Business, Slack, Trello, and Basecamp have enhanced the remote (digital) delivery of global innovator services. These digital platforms are associated with a new form of online outsourcing for office and other professional services, whereby low search costs enable clients to contract third-party individuals as freelancers. Developing economies have the edge in exporting these services through digital platforms (Baldwin and Dingel 2021).

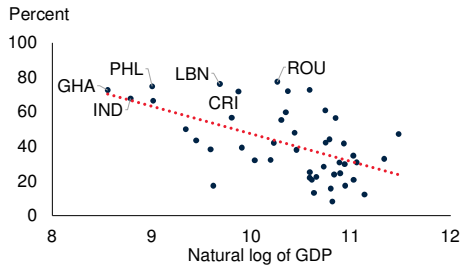
Based on data from five of the largest English-language online outsourcing platforms between June 2017 and October 2020, the Oxford Internet Institute's iLabour Project estimates that much of the global demand for online outsourcing came from high-income countries while two-thirds of all online freelancers were in EMDEs. Approximately one-quarter of freelancers are based in India and another quarter in Bangladesh and Pakistan. In per capita terms, the big suppliers are Bangladesh, Pakistan,

[10] Freund and Weinhold (2002) provided the earliest assessment of the relationship between digital technologies and trade in services, finding that the growth in U.S. service exports and imports increased by 1.1 percentage points as internet penetration in a partner country increased by 10 percent.

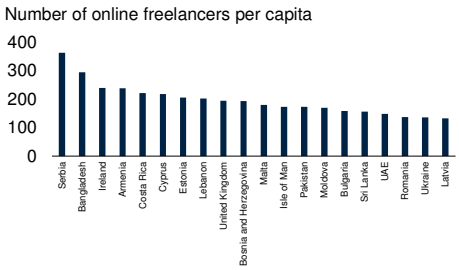
FIGURE 7.9 Digitalization and services exports

EMDEs have leveraged offshore ICT and professional services to diversify their export baskets. Many are also among the top 20 countries in terms of the number of online freelancers per capita, which reflects a new form of online outsourcing for computer programming and other professional services through digital platforms. The share of these digitally deliverable services expanded relative to other services during the pandemic. Even for travel-related services, where in-person delivery remains important, digital technologies have boosted tourist arrivals.

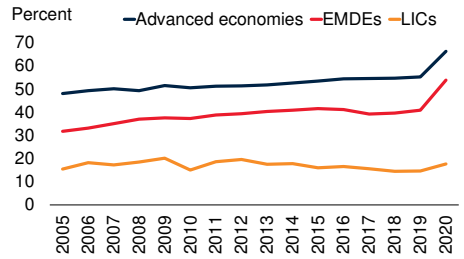
A. Share of cross-border delivery in exports of high-skilled offshorable services versus per capita income, 2017



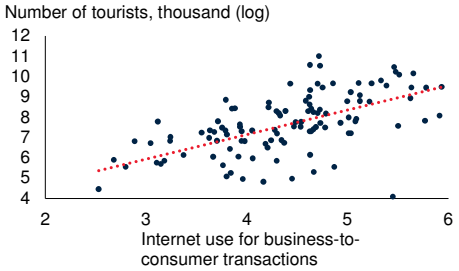
B. Largest number of online freelancers per capita, top economies, 2021



C. Share of digitally deliverable services in total services exports



D. Index of internet use for B2C transactions and international tourist arrivals, 2017



Sources: Lopez-Cordova (2020); United Nations Conference on Trade and Development (UNCTAD); University of Oxford, Oxford Internet Institute, and ILO (2020); World Trade Organization; World Bank.

A. Cross-border delivery refers to services trade through mode 4 of the General Agreement on Trade in Services. Data are from the WTO's Trade in Services by Mode of Supply (TisMoS) database.

B. Based on data from the five largest English-language online outsourcing platforms from the University of Oxford's iLabour project, representing at least 60 percent of the global market.

C. EMDEs = emerging market and developing economies; LICs = low-income countries. Digitally deliverable services are defined by UNCTAD as an aggregation of insurance and pension services, financial services, charges for the use of intellectual property, telecommunications, computer and information services, other business services, and audiovisual and related services.

D. B2C = business-to-consumer. Results show that digital tools may help less traditional destinations overcome information obstacles and reduce travel costs, and thereby attract more visitors. Indexes are based on Lopez-Cordova (2020). Each scatter point indicates a country. The number of tourists is expressed in natural logarithms.

Sri Lanka, and several countries in Eastern Europe (figure 7.9B). Suppliers in Eastern Europe likely benefit from their integration with the European Union market, while those in South Asia leverage their advantage of English being the preferred language for business transactions. This pool of online freelancers is likely to widen geographically as the importance of knowledge of the English language diminishes with the diffusion of AI-enabled machine translation (Baldwin 2019; Brynjolfsson, Hui, and Liu 2019).

The share of these digitally deliverable services in total services exports increased steadily between 2005 and 2019 in both EMDEs and advanced economies. Their robustness

during COVID-19 pandemic is indicated by the fact that this average share in EMDEs increased from 40 to more than 50 percent in 2020 alone (figure 7.9C).

Low-skilled contact services

Among low-skilled contact services, streaming platforms such as Netflix and YouTube have enabled providers of arts, entertainment, and recreation services from EMDEs to export their creative content to international markets at low cost. And COVID-19 has provided an impetus for performing artists to devise new ways of sharing their talents with audiences virtually. Even in low-skilled contact services where in-person delivery has remained important, digital tools have boosted export opportunities. Digital platforms that reduce the costs of searching for, matching, tracking, and verifying information (Goldfarb and Tucker 2019) are particularly relevant here. The digital platforms that are increasingly used by travelers and businesses to transact accommodation and transportation services are good examples. These digital tools may help less traditional destinations overcome information obstacles and reduce travel costs, and thereby attract more visitors. Indeed, countries with higher business-to-consumer (B2C) internet use have also had higher levels of international tourist arrivals (figure 7.9D). Analyzing population-wide internet use in origin countries and business-to-consumer (B2C) internet use in destination countries, Lopez-Cordova (2020) finds that digital platforms have boosted the demand for international tourism services in Africa.

Digitalization and innovation in the services sector

High-skilled offshorable services

In the case of high-skilled offshorable services, innovation has occurred largely through the accumulation of ICT capital—computer equipment, telecom equipment, computer software, and database assets. Since the 1990s, among OECD countries, the share of tangible ICT capital in total capital increased the most in financial and professional services (figure 7.10.A).

The diffusion of digital technologies has also been associated with accumulation of intangible capital—not only computer-related software and data, but intellectual property acquired through R&D and design, and company competencies such as branding, firm-specific training, and business process engineering. Here too, at least in the United States, the largest shares of intangible capital in firms' investment have been in ICT, finance, and professional services (figure 7.10.B). The accumulation of intangible capital in these high-skilled offshorable services is likely to increase further given that AI-driven machine learning (ML) algorithms have dramatically increased predictive power in many cognitive tasks such as problem solving, speech recognition, and image recognition (Nayyar, Hallward-Driemeier, and Davies 2021).

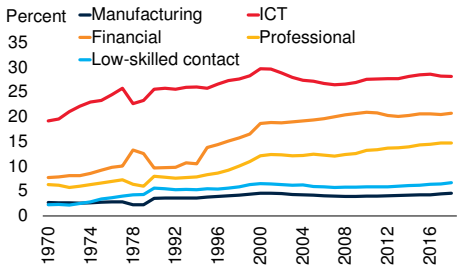
Low-skilled contact services

The share of intangible capital in investment is also higher than in manufacturing in several low-skilled contact services, such as commerce and hospitality. For example, in

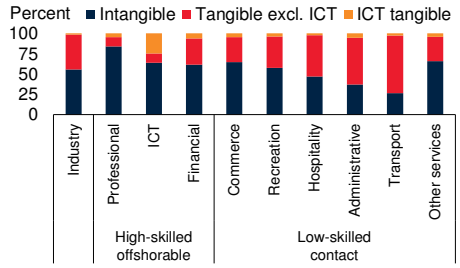
FIGURE 7.10 ICT and intangible capital

Service sector firms rely more than manufacturing firms on ICT and intangible capital, such as software, R&D, branding, and organizational practices, in their production processes. The shares of ICT capital in total capital and of intangible investment in total fixed investment have been largest among high-skilled offshorable services.

A. Shares of ICT capital in total capital across sectors, advanced economies



B. U.S. investment in tangible and intangible capital, 2015



Sources: INTAN Invest (database); Organisation for Economic Co-operation and Development.

A. Includes capital as measured in national accounts and excludes most forms of intangible capital.

B. Intangible capital includes software and databases, intellectual property, and economic competencies, following the methodology of Corrado et al. (2016). The sample is drawn only for the United States from the INTAN Invest database owing to data constraints, but the data may be viewed as indicating the upside potential of ICT-related capital in EMDEs.

OECD countries in 2018, the share of businesses with a website allowing online ordering was highest in hospitality and retail trade, and almost all services subsectors had higher rates than in manufacturing (figure 7.11.A). The increasing sophistication of ICT, such as through the advent of AI and ML, is likely to spawn complementary investments in intangible capital (Brynjolfsson, Rock, and Syverson 2021). While ICT services stand out as having the largest share of firms using ML algorithms, the diffusion of these technologies is as widespread across many low-skilled services as in manufacturing, if not more so (figure 7.11.B).

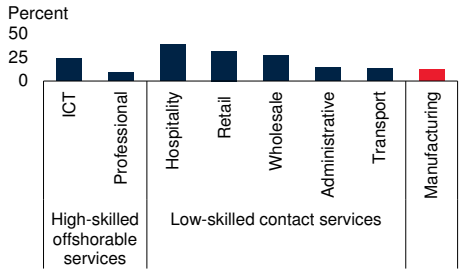
There are similar opportunities for organizational and marketing innovation among low -skilled services through new or improved company competencies that accompany digitalization. For example, the share of firms that introduced new methods for product placement (figure 7.11.C) or new methods for organizing external relations (figure 7.11.D) were higher in most services subsectors than in manufacturing, and not very different in low-skill services from high-skilled offshorable services.

Increased digitalization and related investments in intangible capital bring opportunities for innovation and productivity gains in low-skilled contact services in three main ways. First, they enable improvements in the efficiency of internal business processes, such as inventory management, accounting practices, marketing, and payments. For example, big data analytics can increase the efficiency of transportation services by making possible the tracking of shipments in real time, while improved and expanded navigation systems may help route trucks more efficiently on the basis of current road and traffic conditions (World Bank 2020). Second, ICT-related investments can substitute for missing and scarce skills. For example, ICT apps enable Uber drivers to function with

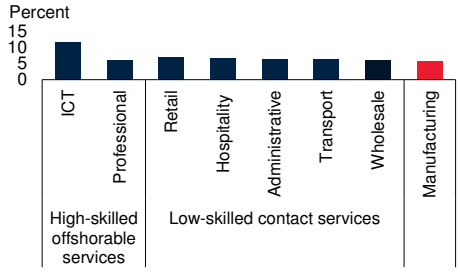
FIGURE 7.11 Digitalization and innovation in the services sector

The use of digital technologies brings greater opportunities for technological innovation in the services sector, including in low-skilled contact services, where the share of firms using basic ICT and advanced AI is higher compared with manufacturing. The same holds true for digitalization-related investments in intangible capital that enable marketing and organizational innovation.

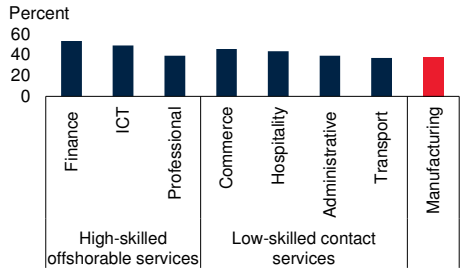
A. Share of businesses with a website allowing online ordering



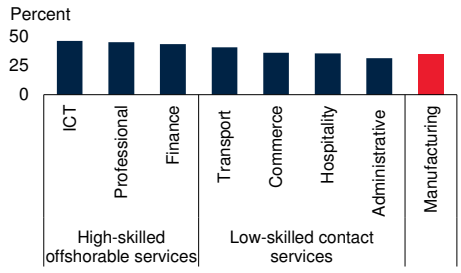
B. Share of businesses using artificial intelligence



C. Share of businesses introducing new product placement methods



D. Share of businesses introducing new ways of organizing external relations



Source: Organisation for Economic Co-operation and Development.
Note: The sample is drawn from advanced economies, owing to constraints on data availability.
A.B. Sample includes OECD countries in 2018.
C. New product placement methods help position a firm's product on the market, with the objective of increasing the firm's sales.
C.D. Sample, drawn from the EU Community Innovation Survey, includes EU countries and the U.K. in 2018.

limited geographical knowledge and numeracy skills. Third, the expansion of company competencies associated with digital technologies, such as marketing and branding, facilitates the scaling up of low-skilled contact services that are less amenable to remote delivery. For example, restaurant chains have invested in ICT and management practices that help determine optimal staffing, daily food purchases, and new menu items for each restaurant. This standardization of production over many establishments has enabled restaurants and retail stores to scale up by replicating the same production process in multiple locations near consumers (Hsieh and Rossi-Hansberg 2020).

The adoption of basic ICT in the services sector remains low across EMDEs

Despite the diffusion of digital technologies, the use of basic ICT such as computers and email, which is positively associated with countries' per capita incomes, is far from

widespread in EMDEs. In many EMDEs, less than one-third of firms used email to communicate with clients as recently as 2018 (figure 7.12.A). The share of firms using a website was even lower (figure 7.12.B).

The positive relationship between the share of firms using email and countries' per capita incomes is much stronger in low-skill contact services (where it is similar to that of the manufacturing sector) than in high-skilled offshorable services (figure 7.12.C). Firms in retail and hospitality services in EMDEs still rely mostly on manual processes for a range of business functions. For example, in Senegal, 60 percent of such firms use manual costing most frequently for pricing, 80 percent use manual selection most frequently for merchandising, and 62 percent use handwritten records for inventory management (Cirera et al. 2020a). In Senegal, the sophistication of the most widely used technologies across a range of business functions, including business administration, marketing, and inventory management, is similar for firms in retail trade and firms in apparel manufacturing (Cirera et al. 2020b). The share of firms having their own website is also positively related to countries' per capita incomes, with the relationship being more similar across sectors (figure 7.12.D).

What policies can best harness the services sector's growth potential after the pandemic?

To build on the momentum of digitalization in the services sector, and for the services sector's growth potential to be fully harnessed, policies can play a useful role. First, policies can be used to support the adoption of digital technologies across the services sector, including through promoting investment in ICT infrastructure, reforming regulatory frameworks, and strengthening firms' capabilities. The role that policies can play is especially important for EMDEs and smaller firms because the greater intensity of digitalization among advanced economies and larger firms during the pandemic has widened the digital divide between countries and firms (Cirera, Comin, and Cruz 2022).

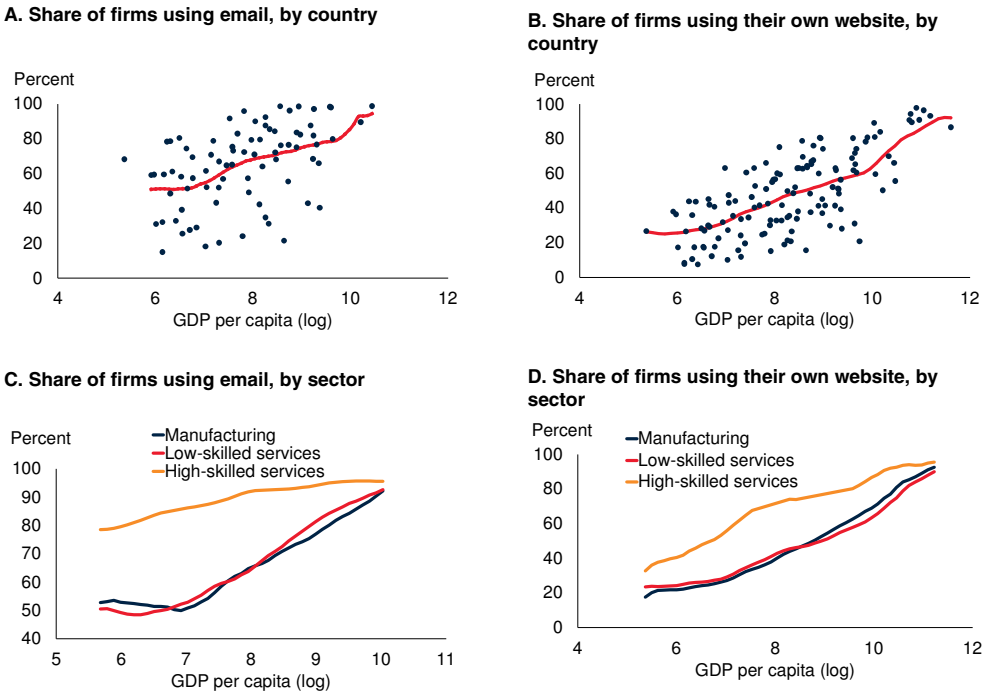
Second, policies can help promote the revival of some low-skilled contact services that have been hardest hit by the pandemic. The revival of travel-related transportation and hospitality is likely to benefit from the expansion of pandemic-related health services. Supporting infrastructure investments and regulatory reforms in transportation and related distribution services can further help recovery and lay the ground to minimize supply chain disruptions in the future. Third, policies can be designed to promote the further growth of high-skilled offshorable services that have shown greater resilience to the pandemic, by removing barriers to market access and improving the skills of the workforce.

Supporting the adoption of digital technologies

The use of digital technologies contributed to the resilience of firms in the pandemic. Firms with higher levels of technological sophistication pre-pandemic saw larger increases in sales and were also more likely to increase the use of digital technologies

FIGURE 7.12 Diffusion of ICT among services firms

Email and website usage among services firms is more widespread in countries with higher per capita incomes. In the case of email use, its relationship with per capita income is weaker for firms in high-skilled offshorable services than for firms in either low-skilled contact services or manufacturing.



Source: World Bank.
Note: Calculations based on World Bank Enterprise Survey data and World Development Indicators. GDP per capita is in natural logarithms.
A.B. The question on whether firms use email or their own website was not asked in most high-income countries included in the Enterprise Surveys. Data are for latest available year, ranging from 2006 to 2018. Each dot represents a country. The red line represents a trendline (a kernel-weighted local polynomial regression) of the data points shown.
C.D. The lines represent trendlines (a kernel-weighted local polynomial regression) of the share of firms in a country using email or websites for three sector groups. Individual country data points are omitted for visual reasons.

(Comin et al. 2022). While new technologies have recently been spreading to EMDEs and LICs faster than in the past, they are adopted by only a small share of firms at the technology frontier (Comin and Mestieri 2018).

Policies that support widespread adoption of the most-basic digital technologies in EMDEs can lay the foundation for firms to leverage software applications, digital platforms, and even more advanced ML algorithms. But policies supporting investment in broadband infrastructure, while necessary, are not sufficient for greater uptake of digital technologies. Also needed are the updating of regulatory frameworks to expand market access, and policies to strengthen worker and management skills (Cirera and Maloney 2017). Precise policy requirements will vary among countries and across different services subsectors. For example, management practices tend to be particularly weak (but with the most potential for improvement) among firms in low-skilled contact

services, while advanced digital skills matter most for high-skilled offshorable services. Updating regulatory frameworks governing digital markets is especially relevant for high-skilled offshorable services where tech giants have increasingly dominated markets.

Expanding access to digital infrastructure

Expanding access to the internet is crucial for the services sector. Hjort and Poulsen (2019) show that the arrival of internet cables in Africa predominantly benefited the services sector, spurring the formation of new firms and boosting productivity. Although many countries have been accelerating the rollout of internet access, reliable and affordable access to broadband internet is still not widely available in many EMDEs, and generally much less so than in AEs (figure 7.13.A). Fiber optic cables now reach most countries, but there are big gaps across countries in the provision of "last mile" connectivity. To achieve widespread internet access, public investment may be needed to overcome market failures inherent in the private provision of internet infrastructure (essentially a public good). These failures stem from externalities (including network externalities) and costs that decrease with scale (tending to lead to natural monopolies). Policy interventions can also catalyze complementary private investment by ensuring enough competition between providers, targeting subsidies carefully, and enforcing appropriate performance requirements to ensure coverage in more remote and lower-income locations (World Bank 2021).

Reforming regulatory frameworks for digital markets

The incentives and ability to use digital technologies are also affected by the regulation of digital markets. Restrictions on digital trade tend to be more stringent, on average, in EMDEs than in AEs (figure 7.13.B). Competition authorities face new challenges in the regulation of digital trade in the services sector, particularly in high-skilled offshorable services. In this sector, many tech companies own valuable intangible assets (such as software, advertising space, and branding), which derive value from strong network effects and access to data. Ownership of data and the portability of data, especially across international borders, raise issues of privacy and innovation. For example, content providers could restrict the provision of some services to countries where intellectual property rights are inadequately protected (Hallward-Driemeier and Nayyar 2017).

Digital trade in services also poses new challenges for taxation. Traditional tax treaties tend to focus on the question of whether a firm has physical presence in a country. As a result, firms that have "presence without mass" through digital business models can avoid significant taxation, denying governments a growing source of potential revenue. International negotiations are seeking to address this issue, including through possible formulas for minimum tax payments by multinationals that serve markets only virtually (World Bank 2021).

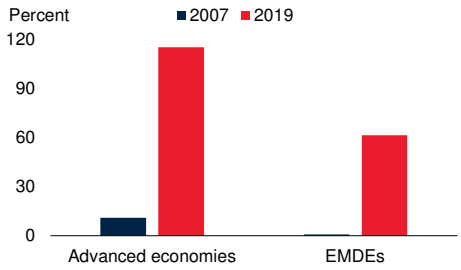
Upgrading management and worker skills

Low levels of use of digital technology stem partly from shortcomings in the capabilities of firms, at both management and staff levels. Sound management practices facilitate

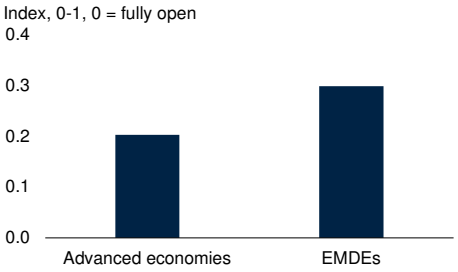
FIGURE 7.13 Digital technology enablers

Broadband connectivity in EMDEs has increased considerably over the past decade, but it still lags that in advanced economies (AEs). Beyond access, the use of digital technologies in EMDEs is hampered by relatively high restrictions on international trade in services and digital technology. The capabilities of firms and workers to adopt new technologies, reflected in management practices, tertiary education rates, and digital skills, are also weaker in EMDEs than in AEs.

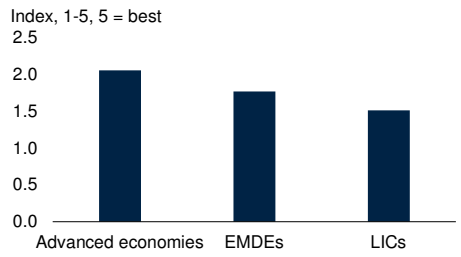
A. Mobile broadband connections per 100 inhabitants



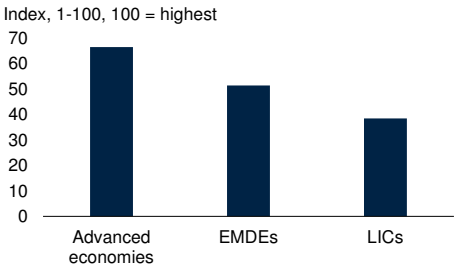
B. Digital trade restrictiveness index



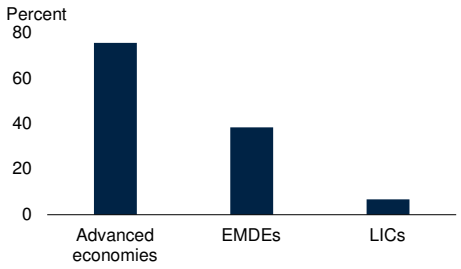
C. Management practices index



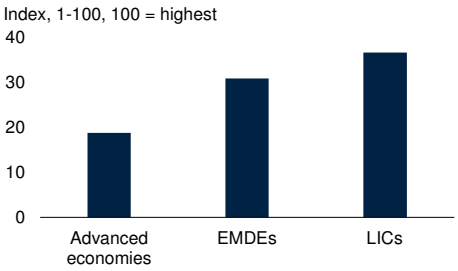
D. Digital skills index



E. Tertiary enrollment rates



F. Services trade restrictiveness index



Sources: European Center of International Political Economy (ECIPE); International Telecommunications Union (ITU); World Bank; Nayyar, Hallward-Driemeier and Davies (2021); World Economic Forum.

Note: EMDEs = emerging market and developing economies. LICs = low-income countries.

A. Sample from the ITU includes 37 advanced economies and 141 EMDEs in 2019.

B. The ECIPE's Digital Trade Restrictiveness Index provides information on transparency of applied digital trade restrictions across 36 advanced economies and 28 EMDEs in 2017-18.

C. Covers 18 key management practices, across 21 advanced economies, 17 EMDEs, and 3 LICs in 2018 or latest available year.

D. Sample from World Economic Forum includes 34 advanced economies, 71 EMDEs, and 6 LICs in 2019.

E. Sample includes 33 advanced economies, 70 EMDEs, and 7 LICs in 2019.

F. The World Bank's Services Trade Restrictiveness Index covers five sectors (telecommunications, finance, transportation, retail, and professional services) and key modes of delivery across 22 advanced economies, 67 EMDEs, and 6 LICs in 2008.

worthwhile change in production processes, including the adoption of new technologies, which can often be disruptive. Thus, management practices have played a role in the ways firms have, or have not, adapted to the pandemic. Firms with more structured management practices are more likely to adjust their product mix or to adopt online work arrangements, including in the services sector (Grover and Karplus 2021). Management practices in the services sector are weaker in EMDEs than in AEs (figure 7.13.C). Further, evidence for EMDEs and AEs shows that structured management practices are particularly uncommon among firms in low-skill services, such as retail trade and hospitality (Nayyar, Hallward-Driemeier, and Davies 2021). Governments can support technological innovation and the adoption of structured management practices by addressing information failures at the management level—either through the direct provision of training and other business advisory services or through vouchers and awards (Bloom et al. 2013). [11]

Also important for increasing the adoption of digital technology are the skills of a firm's labor force. Digital skills are weaker in EMDEs than AEs (figure 7.13.D). Many workers report that their lack of ICT skills is a constraint on employment and higher earnings. For example, about 40 percent of workers in Vietnam reported in 2013 that deficient ICT skills prevented them from finding a job or getting a better-paying job (Nayyar, Hallward-Driemeier, and Davies 2021). This is less of a priority in firms providing low-skilled contact services, where basic knowledge of how to use a computer and email is generally sufficient. A skills agenda that is broader than basic IT is needed for workers to embrace technological change, particularly in high-skilled offshorable services. Education, and particularly tertiary education—where enrollment rates are lower in EMDEs than in AEs (figure 7.13.E)—plays an essential role in equipping workers with the cognitive skills needed for complex problem solving, critical thinking, and adaptability. Tertiary education systems can meet these demands by incorporating more general education in technical degree programs and facilitating lifelong learning through adult education programs (World Bank 2019). Public investment in education and training can also be supplemented, at advanced levels, by tuition and training paid for by employers or by households if access to finance is not a barrier.

Promoting the revival of low-skilled contact services

Investing in widespread vaccination rollouts and related healthcare services is particularly important to enable travel-related services, such as accommodation and passenger transportation, to operate safely again at pre-pandemic scale. The uneven recoveries of these services from the pandemic thus far—with stronger recoveries in advanced economies than in EMDEs and LICs—is attributable, at least in part, to differences in the pace of vaccine rollouts (World Bank 2022).

While the low vaccination rates in LICs primarily reflect procurement challenges, efforts to rapidly scale up inoculations are also being hampered by logistical challenges in

[11] Not all firms are well-positioned to take advantage of management training. Efforts to provide management training to informal enterprises have shown that only a few have the capabilities to use such training (or tap external consulting services) to raise performance significantly. See, for example, Anderson and McKenzie 2022.

vaccine distribution, including insufficient cold chain capacity (Hall et al. 2021). These need to be addressed. Furthermore, vaccine rollouts will need to be supplemented by testing and access to treatment facilities, especially given the uncertainty about the possible emergence of more transmissible or more lethal variants of the virus that could escape protection from existing vaccines. All this highlights the importance of investing in better health service systems, including through public-private collaboration.

Evidence suggests that countries most dependent on tourism, such as small island economies, often have among the lowest Global Health Security Index scores (AIIB 2020). Increased digitalization, building on the momentum provided by COVID-19, could improve the performance of health services in such resource-constrained countries by supporting efforts to revamp health provider education; redesign platforms for care delivery; institute strategic purchasing and management strategies; and develop patient-level data systems (Nimako and Kruk 2021).

Apart from addressing vaccination and other health-related issues, investment in infrastructure (including through public-private partnerships) and measures to remove obstacles to competition and associated market distortions can minimize future disruptions in transportation and distribution services. Services trade faces significant regulatory barriers, which are generally higher in EMDEs than in advanced economies (figure 7.13.F). In low-skilled services, such as retail trade, there are both large EMDEs (such as Argentina, India, Indonesia, Malaysia, Thailand, and Vietnam) and advanced economies (such as Belgium, Finland, France, and Greece) among those with the highest trade restrictions, and many have made little progress in reducing them in the past decade (Nayyar, Hallward-Driemeier, and Davies 2021).

The pandemic has highlighted how disruptions in shipping, air transport, trucking, and distribution services at critical trade gateways and hubs can hinder activity in goods-producing sectors (Celasun et al. 2022). In fact, transportation and distribution services are among the sectors with the most intensive forward linkages to producers in other sectors—that is, with the largest shares of value-added forming inputs to economywide production (Nayyar, Hallward-Driemeier, and Davies 2021). Reducing regulatory restrictions in these upstream services can therefore bring cascading benefits to many downstream sectors. In India, for example, the productivity of downstream manufacturing firms increased following the liberalization of transportation services, including through greater foreign direct investment in the 1990s (Arnold et al. 2015).

Promoting the expansion of high-skilled offshorable services

High-skilled offshorable services are more amenable to remote delivery and, as a result, have better withstood the COVID-19 pandemic. These are also the services sectors with the highest total factor productivity, implying that reallocation of resources toward them can raise an economy's total output. In EMDEs, high-skilled offshorable services are 2.7 times more productive than low-skilled services, which account for two-thirds of total services employment. If the composition of the services sector in LICs matched that in advanced economies, overall services productivity would be 35 percent higher. Policy

interventions that alleviate constraints on the growth of high-skilled offshorable services may therefore be beneficial.

On the demand side, policy measures could support the growth of trade in ICT, finance, and professional services (see chapter 6). These include the easing of trade restrictions. Professional services are among the most protected industries in both EMDEs and AEs (Borchert, Gootiiz, and Mattoo 2014). EMDEs stand to gain from liberalizing import restrictions. By allowing more imports of services, with associated foreign know-how and investment, these economies could raise competitive pressures, productivity, and innovation (Fernandes, Rocha, and Ruta, 2021; World Bank 2020). Furthermore, trade agreements can provide opportunities for reciprocal reductions in barriers to services. Some progress has already been made through bilateral or regional trade agreements; more than 50 percent of all preferential trade agreements filed with the World Trade Organization (WTO) through 2017 covered the services sector (Hofmann, Osnago, and Ruta 2019). At the multilateral level, 67 WTO members recently concluded negotiations on a new set of rules aimed at slashing administrative costs and creating a more transparent operating environment for service providers in foreign markets.

On the supply side, shortages of technical skills are an important barrier to the growth of high-skilled offshorable services. Education, particularly tertiary education, and technical training are key to equipping workers with the necessary advanced skills. Expansion of public-private partnerships could make tertiary education and training programs more responsive to changing industry demands. The use of private providers and incentive contracts (where participant placement is a condition for payment) can help align incentives in improving the effectiveness of training programs. Having private sector actors involved in setting curricula can also help programs reflect the types of skills future employees will need. Links with industry are a feature of many tertiary education systems that are centers of innovation (World Bank 2019).

Conclusion

The development community's attention to the manufacturing export-led model of growth can detract from the fact that the services sector has been the main driver of economic growth in EMDEs over the past three decades. Today, half of all workers in EMDEs are employed in the services sector. However, except for in the high-skilled offshorable services—ICT, finance, and professional services—this services-led growth process has been fueled more by increases in domestic consumption than by exports, and by the growth of factor inputs rather than productivity growth. As a result, scale economies and innovation—which formed the basis for growth in the export-led manufacturing model—have been relatively limited in the services sector, especially in low-skilled contact services that employ a large share of low-skilled labor in EMDEs. This has led to pessimism about the longer-term prospects of services-led growth.

At the onset of the COVID-19 pandemic, social distancing regulations and precautions particularly affected low-skilled contact services—many of which are dependent on face-

to-face interactions between providers and consumers. However, service providers have responded by turning more to digital technologies, including for online sales in low-skill contact services where in-person delivery remains important. Meanwhile digitalization has enabled high-skilled offshorable services to withstand the adverse effects of the pandemic by facilitating remote delivery.

Increased digitalization during the pandemic has provided new momentum to services-led growth and its prospects. For one thing, it has improved opportunities for international trade in services, not only in high-skilled offshorable services, but also, for instance, through streaming platforms that enable the remote delivery of arts, entertainment, and recreation services. For another, it has made possible new and greater efficiency gains: digitalization can allow otherwise labor-intensive services to be combined with ICT and intangible forms of capital, reduce the importance of physical proximity in market transactions, improve business processes, and facilitate scaling up.

The use of even the most basic digital technologies in EMDEs, however, is far from widespread. To harness the potential of the services sector in shaping the recovery from the COVID-19 pandemic and strengthening future economic growth, policy makers in EMDEs need to prioritize the wider diffusion of digitalization. Policies to promote digitalization include supporting investment in digital infrastructure, updating regulatory frameworks, and fostering the development of firms' capabilities through education and training. The revival of low-skilled contact services, such as transportation and hospitality, will likely benefit from the expansion of vaccination rollouts and related medical services. Promoting infrastructure investment and regulatory reforms in such services as transportation, which shares important links with goods-producing sectors, is also likely to benefit the wider economy. Last, but not least, policies that improve market access and develop relevant skills can support the expansion of high-skilled offshorable services.

The prospect of long-term services-led growth will also depend on climate change considerations as countries aim to transition to net-zero emissions by 2050-60. The impetus for policy makers in EMDEs to enable structural transformation will be even stronger going forward; agriculture is more vulnerable to changes in climate than non-agricultural sectors (Casey 2020) and rising temperatures are associated with lower shares of workers outside agriculture (Liu, Shamdasani, and Taraz 2019).

The intensity of emissions varies by sector. In the United States, services produce less than 5 percent of total greenhouse gas (GHG) emissions directly and their direct GHG emission intensities per dollar of output are much less than those of physical products (Suh 2006). However, large environmental impacts can be traced to consumption by services workers. Together, they account for half of all wages globally, with the highest share of highly paid workers of any sector (Greenford et al. 2020). Simulation models based on shadow carbon prices show a limited impact of the net-zero transition on the shares of manufacturing and services in GDP (Chepeliev et al. 2022). There may also be important differences across services subsectors. On the one hand, travel-related services might contribute more to emissions because of their dependence on transportation. On

the other hand, high-skilled offshorable services might contribute more to emissions through consumption because the workers they employ tend to be more affluent.

The services sector can also play an important role in climate mitigation (reducing greenhouse gas emissions) and adaptation (building resilience to climate change). For instance, financial services can play a fundamental role in mobilizing the resources needed for necessary investments (Grippa, Schmittmann, and Suntheim 2019). Similarly, engineering and environmental consulting services will likely be central to enabling energy efficiency improvements (World Economic Forum 2022). The global environmental consulting services market size is expected to almost double from $56.4 billion in 2021 to $93.6 billion in 2026 (TBRC Business Research 2022).

Future research can explore how climate goals are impacted by structural change driven by the manufacturing and services sectors. Analyzing sectoral differences in vulnerabilities to climate change, intensity of emissions, and contributions to climate mitigation and adaptation could help clarify the contribution of the services sector to sustainable economic growth.

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A structural growth slowdown is underway across the world: at current trends, the global potential growth rate is expected to fall to a three-decade low over the remainder of the 2020s. Nearly all the forces that have powered growth and prosperity since the early 1990s have weakened, not only because of a series of shocks to the global economy over the past three years. A persistent and broad-based decline in long-term growth prospects imperils the ability of emerging market and developing economies to combat poverty, tackle climate change, and meet other key development objectives. These challenges call for an ambitious policy response at the national and global levels. This book presents the first detailed analysis of the growth slowdown and a rich menu of policy options to deliver better growth outcomes.

This book presents a sobering analysis of the secular growth slowdown based on the most comprehensive database of potential growth estimates available to date. With nearly all the forces that have driven growth and prosperity in recent decades now weakened, the book argues that a prolonged period of weakness is underway, with serious implications for emerging market and developing economies. The authors call for bold policy actions at both the national and global levels to lift growth prospects. The book is essential reading for policy makers, economists, and anyone concerned about the future of the global economy.

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Economic policy making is becoming increasingly complicated in the 2020s. In addition to tackling traditional tradeoffs in aggregate demand management and improving efficiency on the supply-side, policy makers need to address new priorities and challenges, from addressing climate change and its impacts to improving income distribution, all in the context of lower growth rates, waning productivity growth, and flattening of the globalization process that has brought unprecedented prosperity across the globe and lifted more than a billion people out of poverty. In Falling Long-Term Growth Prospects, the authors do a phenomenal job of assessing these trends at the global and regional levels, identifying and unpacking salient 21st century policy challenges, and providing thoughtful and evidenced-based policy prescriptions for leaders in advanced, emerging market, and developing economies. Importantly, the book underscores that these challenges tend to be global and, hence, global cooperation at all levels is necessary to achieve optimal results. Alas, we seem to be going in the opposite direction; this book offers a roadmap to put us back on the path to creating a more integrated, prosperous, and equitable global community.

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