Growth in potential output 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 gross domestic product (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 related, for example, to climate change materialize. 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 among women and older adults; to improve the efficiency of public spending; and to mitigate and adapt to climate change, including policies related to infrastructure investment to facilitate the green transition.

Introduction

Over the period 2011-21, global growth in potential output 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. 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 critically determines a wide range of macroeconomic and development outcomes, including sustained improvements in living standards and poverty reduction. 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 convergence of per capita incomes with those of advanced economies by more than a decade (figure 5.1). The possibility that the trend decline in potential growth will continue is a major concern in regard to prospects for growth and income convergence in EMDEs and presents a formidable challenge with respect to the international community’s ability to meet its broader development goals.

This chapter addresses the following questions:

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

To help answer these questions, this chapter employs 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, the 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 growth in potential output 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 estimates of potential growth 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, growth in the supply of labor, and growth in 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 change. It also examines the possible effects investment to alleviate the effects of

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\(^2\) Much of the previous literature has focused on examining past trends, but not prospects (ADB 2016; Dabla-Norris et al. 2015; IMF 2015b; OECD 2014a). For European countries and member countries of the Organisation for Economic Co-operation and Development (OECD), respectively, the European Commission (2021) and the OECD (2014b) have prepared long-term growth forecasts based on production function approaches. For individual EMDEs or EMDE regions, the World Bank (2018b, 2019b, 2020a, 2021b, 2021c, 2022) has estimated prospects for potential growth. Other studies have used a statistical approach to assess long-term growth prospects for a handful of countries (for example, Modis 2013).
climate change could have on potential growth. Several studies—reviewed in Shabnam (2014), Klomp and Valckx (2014), and Botzen, Deschenes, and Sanders (2019)—have found mixed evidence regarding 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. Broadly consistently 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 investment to mitigate or reduce the damage from climate change could have on potential growth, 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 growth in potential output. A large literature has considered
the impact of different policies and institutional settings on growth, including human capital improvements (World Bank 2018c), governance improvements (World Bank 2017c), trade and integration into global value chains (World Bank 2020b), new technologies (World Bank 2016, 2019a), and labor market changes (World Bank 2013). In contrast to these and other earlier studies, this chapter discusses growth-enhancing policy options in a way that 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 prospects for potential growth.** The baseline scenario projects the slowdown in potential growth in the past two decades, described in chapter 1, will extend into the remainder of this decade. Trends in the fundamental drivers of growth suggest that global growth in potential output 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 will be 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, as well as 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 strengthening productivity growth offsetting slowing population 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 growth in potential output.** 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

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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 of these studies, the sample has consisted mostly of advanced economies (Banerji et al. 2017; de Haan and Wiese 2022; IMF 2015b, 2016a).
investment to alleviate the effects of climate change could more than offset this damage. For example, the literature review in 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 10-year investment performance. Such additional investment over the remainder of this decade could raise global potential growth by 0.1 percentage point a year and EMDE potential growth by 0.3 percentage point.

• **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. Reforms associated with higher investment in physical capital, enhanced human capital, and faster growth in the supply of labor could raise potential growth by 0.7 percentage point a year in 2022-30, both globally and in EMDEs. This increase 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 in chapter 1, the next section examines prospects for potential growth and is followed by a section discussing risks to prospects for potential growth, including those from climate change. The chapter’s 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. This chapter estimates prospects for potential growth for a sample of 30 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 is expected to pick up slightly in advanced economies from its prepandemic 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

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4 Some studies dealing with individual advanced economies have suggested that the pandemic could have raised aggregate productivity through exit of unproductive firms (Kozeniauskas, Moreira, and Santos 2022; Van den bosch and Vanormelingen 2023).
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 assumptions of median fertility, normal mortality, and trend migration. Cohort effects are assumed to remain at their 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 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 that economy belongs.

Evolution of drivers of global potential growth

In the baseline projections, the contributions to growth in potential output of its broad, fundamental drivers—capital accumulation and growth in the supply of labor and TFP—weaken further, except for the contribution of capital accumulation in advanced economies (figure 5.2). In the Group of Seven (G7), the seven largest advanced economies (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States), capital accumulation is expected to tick up over the remainder of the decade as major government investment plans get under way. In other advanced economies, capital accumulation is expected to remain stable and somewhat higher than in G7 countries.

Globally, faster capital accumulation in advanced economies is expected to offset slower capital accumulation in EMDEs, especially in China. 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 among different cohorts of workers over their life cycles (Balleer, Gomez-Salvador, and Turunen 2014; Kudlyak 2013).
Subdued investment growth in China and reduced room for catch-up 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 lower by about 0.2 percentage point per year 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 among 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).

Global prospects for potential growth

Absent unexpectedly favorable or adverse developments—such as significant
productivity breakthroughs or natural disasters related to climate change—the baseline
projects global potential growth in 2022-30 to weaken by 0.4 percentage point a year
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FIGURE 5.4 Demographics

Aging populations combined with withdrawal from the labor market by 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 on growth in per capita GDP of 1 percentage-point increase in share of working-age population

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B. Working-age population

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C. Working-age population

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<th>MNA</th>
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D. Potential growth and demographic trends

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<th>Other factors</th>
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<tr>
<td>2022-30</td>
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Sources: UN (2022); World Bank.
Note: AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; GDP = gross domestic product; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.
B. C. Population-weighted averages. The working-age population is defined as people aged 15-64 years.

Relative to that in 2011-21, to 2.2 percent a year (figure 5.5). Potential growth is projected to slow in almost one-half of economies globally and more than one-third of advanced economies, accounting, respectively, 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 growth in the remainder of the current decade than they did in 2011-21. Potential growth is projected to increase in, among others, smaller metal and energy commodity exporters, which are expected to benefit from increased investment growth.
Growth in potential output in advanced economies is expected to slow by 0.2 percentage point to 1.2 percent a year in 2022-30. A slight pickup in the pace of capital accumulation is expected to partly offset further weakening of both TFP growth and, because of population aging, growth in the supply of labor. The same applies to the G7 countries, where potential growth is also expected to be 0.2 percentage point per year slower in 2022-30 than in 2011-21.

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 slowdowns could
generate adverse spillovers to other EMDEs that the production function approach does not explicitly account for.\(^6\)

**Regional prospects for potential growth**

Growth in potential output 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). Working-age shares of the population are expected to shrink in EAP, ECA, and LAC and to rise in MNA, SAR, and SSA, but with a shift toward older cohorts with weaker labor market attachment in the latter group.

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 in excess of 7 percent in 2000-21 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 more than 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 growth in potential output between 2011-21 and 2022-30.

In **SSA**, a modest pickup in TFP growth reflecting accelerated per capita income catch-up after the setbacks caused by multiple adverse shocks over the past decade, including the coronavirus disease 2019 (COVID-19) pandemic, is expected to partly offset slower growth of the labor supply and slower capital accumulation in 2022-30. The projected decline in potential growth in SSA is therefore milder than that in EAP and ECA. South Africa and, in particular, population aging and weak investment growth in that country mainly account for the decline: 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 change little, at the relatively weak rates of just above 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, with the boost 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 diminishing demographic dividends are expected to offset this boost. The contribution of capital accumulation to potential growth in LAC and MNA is expected

\(^{6}\)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 a slowdown in the seven largest EMDEs (Huidrom et al. 2020).

\(^{7}\)October 2022 consensus forecasts are for GDP growth of 4.1 percent per year in China on average over 2022-30. Rajah and Leng (2022) project growth will slow to the range of 2-3 percent by 2030; the World Economic Forum (2021) forecasts growth of about 5 percent on average over 2022-30.
FIGURE 5.6 Regional growth in potential output

Among EMDE regions, EAP and ECA are expected to experience the most pronounced slowdown in growth of potential output in 2022-30, 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 catch-up 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 with potential growth below the average for the previous decade in EMDE regions and the share of regional GDP they represent

D. Share of countries with potential growth below the average for the previous decade in EMDE regions and the share of regional GDP they represent

E. Contributions to regional potential growth

F. Contributions to regional potential growth

Sources: Penn World Table; World Bank.
Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; GDP = gross domestic product; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; and SSA = Sub-Saharan Africa; TFP = total factor productivity.
A.B.E.F. GDP-weighted arithmetic averages using estimates of potential growth based on production function approach.
C.D. Number of economies and their share of the region’s GDP. Sample includes 61 EMDEs. Data for 2022-30 are projections.
to be broadly unchanged, assuming no major intensification of geopolitical risks and uncertainty. In SAR, a pickup in TFP growth related to expected gains in educational attainment and agricultural productivity as well as still-robust growth of investment is expected largely to offset a slowdown in growth of the supply of labor.

Risks to prospects for potential growth: Downside scenario

Several adverse developments could deepen the slowdown in potential growth projected in the baseline scenario. The forecasts for investment growth 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. Finally, policy-induced improvements in such areas as education, health care, and female labor force participation could disappoint. This section examines the implications of each of these downside risks in turn.

If any 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 2018a).

Investment disappointments

The baseline scenario assumes that investment growth over 2022-30 will match the one-to nine-year-ahead consensus forecasts in October 2022. However, during 2010-22, consensus forecasts overestimated global investment growth over the subsequent 10 years, on average, by 2.4 percentage points per year (figure 5.7). For EMDEs, consensus forecasts in this period overestimated investment growth, on average, by 1.4 percentage points per year, with average forecast errors for ECA and LAC 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 with these two global recessions and their subsequent rebounds excluded, consensus forecasts in 2010-22 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 10-year period.

To take account of the possibility of forecast optimism in the baseline scenario for 2022-30, a risk scenario is constructed here in which investment growth in every year of the forecast period is reduced from the baseline, for each respective forecast horizon, by the average forecast bias in 2010-22. In this scenario, growth in potential output 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.

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*Working-age population growth forecasts have also been shown to be biased (Keilman 2001).*
FIGURE 5.7 Risks to prospects for potential growth

Consensus forecasts have systematically overpredicted investment growth since 2000. If current forecasts for 2022-30 again turn out to be overly 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. Errors in forecasts of investment growth for EMDE regions

C. Global potential growth, adjusted for risks

D. Deviation from baseline scenario for EMDE potential growth, adjusted 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: EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; GDP = gross domestic product; 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 are EMDEs (3 in EAP [Indonesia, Malaysia, Thailand], 3 in ECA [Hungary, Poland, Romania], 6 in LAC [Argentina, Brazil, Chile, Colombia, Mexico, Peru], 1 in SAR [India]), 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 1- to 9-year-ahead investment growth for 2022-30. Correction for forecast error risk assumes that investment growth will fall by the smallest increase on record over any 10-year period; correction for labor market reforms risk assumes that female labor force participation rate will repeat the smallest increase on record over any 10-year period.

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 annex table 1F.15.

E.F. Orange whiskers display one standard deviation of the impact of climate disasters (panel E) and recessions (panel F).
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, the number of climate disasters—droughts, floods, and storms—per year increased by more than two-thirds over that in the previous two decades (1980-99). Among EMDE regions, storms disrupted economic activity most severely in 2000-18 in EAP and LAC, which have 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) are used here to construct a scenario representing an 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 is estimated to have reduced TFP growth, on average, by 0.1 percentage point in the year of the disaster.

These disasters had widely varying impacts over the medium term, depending on the speed and magnitude of reconstruction efforts. For example, three years after a climate disaster, TFP growth in countries affected was anywhere between 0 and 10 percent lower than in countries and years without disasters (Dieppe, Kilic Celik, and Okou 2020). Some countries, however, especially small states, have suffered much larger damages than the average effect suggests. 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 have not occurred in a predictable pattern. Instead, it has not been uncommon for 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 depicted here assumes that the number of climate disasters in 2022-30 will increase over that 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 lower by almost 0.1 percentage point a year than in 2011-21.

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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. They tend to have a negligible net effect, as a whole, in the year in which they occur. 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.
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 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 also been associated with lasting reductions in growth in potential output. 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. 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 in this chapter assumes that education and health outcomes will continue to improve in 2022-30 in line with their country-specific long-term trends. However, improvements in such outcomes 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 10-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 rates 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 pick up only about half as much in the alternative scenario.

The alternative, less optimistic, assumptions for education and health outcomes make a significant difference in regard to projected growth in the labor supply and TFP over 2022-30. Smaller improvements in life expectancy and education outcomes would discourage labor market participation among 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 slower by 0.4 percentage point than in the baseline scenario.

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10 See chapter 1 for a review of the related literature.
Policies to lift potential growth: Upside scenarios

This section uses the production function framework to construct upside scenarios driven by the implementation of policies that improve prospects for potential growth. 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 in the chapter.

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, for a particular policy-related variable, a repetition of its best 10-year improvement 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 they may be lower bounds of reform impacts.

Investment growth in each economy is assumed to rise over the course of 2022-30 by the most that it increased in that economy in any 10-year period during 2000-21. Such an investment surge would not only boost potential growth but also help countries address needs for investment to adapt to, and mitigate, climate change.

Indicators of educational outcomes—secondary and tertiary enrollment and completion rates—are assumed to rise in each country by the largest improvement that country has experienced in any 10-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 that country in any 10-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 in that country over any 10-year period during 2000-21, but not to exceed the male labor force participation rate in the same age group. Separately, a reform to social benefits with labor market implications is modeled. 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, respectively. 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 growth in potential output 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. More efficient investment spending can also raise potential output.

Scaling up investment

UNCTAD (2014) has estimated that achieving the Sustainable Development Goals will require raising global investment needs by up to 3 percent of global GDP. All EMDEs and EMDE regions have sizable investment needs (chapters 3 and 4) that could be filled through either public or private investment or combinations of both, including public-private partnerships. Policies that increase public investment and promote private investment can be effective in supporting aggregate demand and activity in the short
term as well as in raising growth in potential output 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 2017a). In many EMDEs, government revenue ratios relative to GDP remain low, indicating that they could be raised, by expanding tax bases and improving the quality of tax administration, among other measures (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 that economy’s largest increase over any 10-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. 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. 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. Rozenberg and Fay (2019) estimate that to limit climate change to 2 degrees Celsius and stay on track to achieve infrastructure-related Sustainable Development Goals, EMDEs need 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. They would need most of this increase to improve renewable-energy supply

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11 Since the investment surge is assumed to cumulate gradually over the period 2022-30, annual average investment growth over 2022-30 (shown in figure 5.8) increases less than the cumulative increase over the whole period.

12 This impact lies within the range of other estimates. For example, Dinlersoz and Fu (2022) have estimated that China’s expansion of infrastructure investment by 16 percentage points of GDP between 2002 and 2016 (about three times the magnitude in the scenario discussed in this chapter) raised output growth by 0.8-2.3 percentage points per year. 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 an increase of 5 percentage points of GDP in infrastructure investment in almost 100 EMDEs during 1960-2017 was associated with output that was up to 6 percentage points higher after seven years, or 0.9 percentage point higher per year on average.
and energy efficiency, to adopt appropriate standards of coastal protection for cities, and to address increased risks from river floods.

Estimates of investment needs related to climate change have spanned a wide range, as discussed in chapter 3. The World Bank’s Country Climate and Development Reports for 13 countries (Argentina, China, Arab Republic of Egypt, Ghana, Iraq, Jordan, Kazakhstan, Morocco, Peru, the Philippines, South Africa, Türkiye, and Vietnam) have estimated these countries’ additional needs for investment in these areas. The average of these 13 estimates is 2.3 percent of GDP per year—an estimate that is also approximately the average found in the broader literature review shown in chapter 3. Region-specific climate needs are assumed to be distributed across the six EMDE 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 growth by 0.2 percentage point, and potential growth in advanced economies by 0.1 percentage point (figure 5.10).
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 efforts to improve infrastructure spending efficiency accompanied it.

A. EMDEs: Potential growth in climate-related investment scenarios

B. EMDEs 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

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; GDP = gross domestic product; 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 the values in the World Bank’s Country Climate and Development Reports for 13 countries (Argentina; China; Egypt, Arab Rep.; Ghana; Iraq; Jordan; Kazakhstan; Morocco; Peru; the 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 spending efficiency moves two quartiles among emerging market and developing economies (EMDEs).

Improving spending efficiency

Implicit in these scenarios, as well as the baseline scenario, is the premise that any 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 significantly higher unit costs when a project was undertaken during a major scaling up of public investment (Gurara et al. 2021). Another found longer delays in projects undertaken while public investment was being scaled up (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).
Without complementary policies, investment in climate-related infrastructure, in particular, may benefit potential output less than estimated earlier in this section. 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 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 new climate-related investment.

To get a sense of the potential gains from improved investment efficiency, a scenario is estimated here that 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). The scenario assumes that countries in the first quartile, with the lowest investment efficiency, raise investment efficiency to the level of those in third quartile; that countries in the second quartile raise investment efficiency to the level of those in fourth quartile; and that all other countries raise investment efficiency to the level exhibited by the country with the highest spending efficiency. The effect of increased investment on TFP is then scaled up by the increase in spending efficiency. The improvement in spending efficiency is applied only to the climate-related investment boost of 2.3 percentage points of GDP. If the assumed improvement in the efficiency of investment accompanied the climate investment boost, it is estimated that growth in potential output in EMDEs would be raised by an additional 0.1 percentage point per year on average during 2022-30. The impact would vary across countries, with a range from 0 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 also 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). Such technical disruptions may not have a clear-cut impact on output. 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).
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 2018c).

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 2018c). At the national level, such actions generally include policies to improve teacher training, increase teacher accountability, and enhance teachers’ performance incentives (Evans and Popova 2016). At the student level, policies include efforts to tailor teaching methods to the requirements of students (Kremer, Brannen, and Glennerster 2013), grants to encourage disadvantaged students to attend schools (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 presented here, 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 that country in any 10-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 the next decade, compared with the baseline scenario.

Rapid technological change and greater needs for interdisciplinary skills may also require new strategies for lifetime education and retraining that increase workers’ mobility and adaptability throughout their careers. For example, analysis of job postings suggests that a growing number of jobs across a range of industries require soft skills as well as those related to communications and artificial intelligence (Liu and Lyu 2021; Squicciarini and Nachtigall 2021). Hence, an ability to acquire new skill sets may be a critical competency for workers for meeting the demands of future labor markets (OECD 2018).

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15 The effects of other measures, such as reducing student-to-teacher ratios or additional years of schooling, have differed widely among countries (Evans and Popova 2016; Hanushek and Woessmann 2008).
Health care policies

Average life expectancy in EMDEs is still lower than that in advanced economies: in 2011-21, it averaged 75 and 81 years in the two groups, 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, high sanitation usage and widespread handwashing must accompany improvements in sanitation to yield health benefits such as lower malnutrition and disease burdens (Carter 2017).

Well-defined and regularly monitored performance indicators can spur improvements in health care provision (Bradley et al. 2010). In countries with higher per capita incomes, better health outcomes have followed comprehensive provision of health care services (Maeda et al. 2014). Programs carefully targeted toward local providers of health services or groups of patients have generated considerable improvements in health care services and outcomes. For example, in Rwanda, performance-based incentive payments helped significantly improve health indicators for children (Gertler and Vermeersch 2012). In India, enhanced training of primary health care providers led to better identification and treatment of ailments (Das et al. 2017).

In a stylized scenario of improved health outcomes discussed here, life expectancy is assumed to rise over the course of 2022-30 in each country by as much as its largest improvement in that country over any historical 10-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, such improvements could increase

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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 enrollment rates and growth. The small average effect disguises a wide range of impact estimates that also reflect different quality of schooling (Glewwe, Maiga, and Zheng 2014). The empirical literature on the link between life expectancy and labor supply is even more mixed, with results varying widely depending on country circumstances and the direction of causality debated (Acemoglu and Johnson 2007; He and Li 2020; Desbordes 2011).
potential growth by more than twice as much. In contrast, they would have a negligible impact on potential growth for advanced economies.

Raising growth in the supply of labor

Raising the active share of a country’s working-age population, through policies to “activate” discouraged workers or groups with historically low participation rates, such as women and younger or older workers, can increase the country’s labor supply in advanced economies and EMDEs, higher labor force participation rates have often followed active labor market policies and reforms to social benefits (Betcherman, Dar, and Olivas 2004; Card, Klvue, and Weber 2010). In contrast, less rigid employment protection regulation and lower minimum wages have had mixed effects on employment and labor force participation and, at times, unintended side effects such as lower labor force participation among 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 member countries in 1985-2013 were associated with higher output growth only when they were introduced during the periods of expansionary fiscal policy.

Data suggest significant scope for increasing labor force participation, particularly among 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- to 45-year-old workers, and labor force participation among those aged 19-29 years was only four-fifths that of 30-45 year olds.

Raising female labor force participation is a formidable task for policymakers because such participation depends on many factors, including economic structure and its transformation over time (especially shifts toward 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 among women and older adults. For example, in Nigeria, improved access to finance and training programs increased female labor force participation by encouraging firm start-ups (Brudevold-Newman et al. 2017). In Uruguay, extension of the school day was associated with higher adult labor force participation (Alfaro, Evans, and Holland 2015). In Colombia and Mexico, subsidized day care was associated with increased female labor force participation (World Bank 2013). In ECA, improvements in health care services for the elderly have helped extend productive life spans, and improved support services for women with families has encouraged female labor force 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 explored here regarding labor force participation among older workers assumes a reform to social benefits that gradually raises participation rates in each five-year age group from 55-59 years onward. The scenario assumes that 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 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. It assumes that these increases occur gradually over 20 years. Such increases 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 for which data are available) and 3 years for women.

In this scenario, global and advanced-economy growth in potential output would rise by 0.2 and 0.3 percentage point a year, respectively, on average, in 2022-30. It would have a smaller effect in EMDEs, at 0.1 percentage point a year. EAP and ECA, the two regions with the most rapidly aging populations, would undergo the largest boosts to growth.

Raising TFP growth

The scenario analysis thus far has considered enhancements to the growth of the factors of production, capital, and labor, and how policy action might bring these enhancements about. But in the framework of the production function, faster growth of TFP, which again can be promoted by policies, can also raise output growth. Policies that improve institutional quality, such as stronger application of the rule of law and better control of corruption; increase political stability; and improve business climates can all raise TFP, by encouraging a shift from informal to more productive formal activities, among other ways. Policies that promote spending on research and development can also raise TFP growth by fostering technological progress.

The literature shows broad consensus 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, in which productivity tends to be higher (World Bank 2018a, 2019c).
Poor business climates allow anticompetitive practices to flourish, perpetuate corruption, discourage innovation, and distort the efficient allocation of factors of production (Aghion and Schankerman 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 health care, education, and public infrastructure (Acemoglu and Johnson 2005; Dort, Méon, and Sekkat 2014; Gwartney, Holcombe, and Lawson 2006).

The fact that, in many EMDEs, institutions and governance remain weak underscores the potential benefits of reforms in these areas (World Bank 2018c). 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 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 (see Blanchard, Jaumotte, and Loungani 2013; Bruhn 2011; La Porta and Shleifer 2014; Loayza, Oviedo, and Servén 2005; and Loayza and Servén 2010). 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 intrusive domestic industrial policy accompanies them (Topalova and Khandelwal 2011). Weak business environments have also diminished complementarities among 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 a particular 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 has 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).

Governments have often had an uneven ability to maintain the pace of institutional reforms, 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; Müller, Storesletten, and Zilibotti 2019). Even during more tranquil times, meaningful reforms 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-projections approach is used here to estimate the impact of major, sustained institutional reform advances and setbacks on the growth of TFP and investment in EMDEs. The approach defines sustained institutional advances (or setbacks) as increases (or decreases) in the unweighted average of four indicators from the PRS Group’s International Country Risk Guide—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-projections model estimates the effect of a 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 have been associated with significant and, in some cases, lasting increases in the growth of TFP and investment, whereas setbacks have had highly heterogeneous impacts. TFP has been, on average, about 1.9 percent above the baseline two years after reform advances (figure 5.11). Over time, this impact becomes more heterogeneous and more difficult to estimate precisely. By contrast, the impact on investment strengthens over time: four years after reform advances, investment has been, on average, 16-17 percent above the baseline. A wide range of outcomes with respect to TFP have followed sustained reform setbacks. Investment has also evolved in too heterogeneous a manner for a well-defined estimate of the impact but has often fallen well below the baseline over several years.

Fiscal reforms can also yield important productivity dividends. Several studies have highlighted the long-term growth benefits of fiscal reforms, especially when fiscal reforms are combined with other structural reforms (IMF 2016b). In OECD member countries, the growth-enhancing effects of a budget-neutral shift in government spending toward health, education, and transport often become 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. The IMF (2016a) found that growth acceleration of more than 1 percentage point a year followed 60 percent of fiscal
reform episodes in 112 countries—such as switching from labor taxation to consumption taxation and shifting spending toward health, education, and infrastructure. Over the longer term, fiscal reforms such as the establishment of fiscal rules have also proven to be growth-enhancing in European Union countries (Afonso and Jalles 2012; Castro 2011; Miyazaki 2014).

**Implications of policies in regard to prospects for potential growth**

The stylized scenarios presented in the foregoing discussion 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 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 growth of the supply of labor alone are associated, together, with global potential growth that is higher by 0.7 percentage point a year, an increase that is 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 investment in physical capital, enhanced human capital, and faster growth of the supply of labor could raise potential growth by 0.7 percentage point a year in 2022-30, both globally and in EMDEs. This increase would offset the

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**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 |
|-----------------------------|-----------------------------|
| Median 0.51 | 0.49 | 0.47 | 0.45 |

| t = 0 indicates the year when a sustained reform advance or setback started. |

**Sources:** Penn World Table; World Bank.

**Note:** Sustained institutional advances or setbacks are defined as increases or decreases, respectively, in the unweighted average of values for four International Country Risk Guide (ICRG) indicators—bureaucracy quality, law and order, corruption, and investment profile—provided the increases or decreases are not unwound for at least three consecutive years. Annex 5B details the methodology.

**EMDEs = emerging market and developing economies; TFP = total factor productivity.**

**A. Average of value for four indicators: bureaucracy quality, law and order, corruption, and investment profile.**

**B. Cumulative change in EMDE investment and TFP two and four years after a sustained change in institutional quality.**

<table>
<thead>
<tr>
<th>t - 4</th>
<th>t - 3</th>
<th>t - 2</th>
<th>t - 1</th>
<th>t = 0</th>
<th>t + 1</th>
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<td>Setbacks</td>
<td>TFP</td>
<td>Advances</td>
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<th>Percent</th>
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<td>-30</td>
<td>-15</td>
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</table>

**Vertical lines show the 90 percent confidence intervals.**

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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 investment, especially if improved spending efficiency accompanies it (figure 5.10). A climate-related investment surge amounting to 2.3 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 improved spending efficiency in EMDEs accompanied the increase in investment, potential growth could rise by another 0.1 percentage point.

**Conclusion**

Global growth in potential output 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 education and health outcomes or increases in investment or in 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 a boost in investment (for climate-related as well as other purposes); reforms of labor markets, education, and health care; 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 member countries, labor and product market reforms, measures to promote foreign direct investment, and trade liberalization have yielded important synergies (OECD 2017). Also in OECD member countries, labor market reforms have enhanced growth more when combined with an expansionary fiscal stance (de Haan and Wiese 2022). Reforms that are coordinated internationally may also demonstrate cross-country synergies. 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 in this chapter, and they are also likely to depend on the timing of reforms. There is some evidence that well-timed reforms have had the largest growth dividends—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 2016a).

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, the following among them:

- **Benefits from reforms involving state-owned enterprises.** First, many EMDEs host large state-owned enterprises or poorly regulated private monopolies. Reforms to these entities could trigger increases in productivity as capital and labor are reallocated toward 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 on potential growth of improvements in various dimensions of governance and business climates, including effects that operate through firm productivity and household decisions on labor force participation and informal employment, would also be helpful.

- **Better understanding of longer-term impact of reforms.** Third, the exercises conducted for this chapter rested on as wide a cross-country sample of data as possible, in order to represent the heterogeneity of EMDEs. Data constraints prohibited analysis of developments before 1990. However, for a smaller set of countries, earlier data should be available, 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 investment in climate-related infrastructure.** Fourth, the climate change scenario explored in this chapter is based on regional estimates of infrastructure investment needs because for a large number of individual EMDEs, available data are limited. Given the wide heterogeneity in climate challenges, country-specific estimates that can provide more precision should ideally supplement or replace these regional estimates. For some countries, country-specific infrastructure investment goals are available, including, for European Union countries, in the National Recovery and Resilience Plans funded through NextGenerationEU investments. For other regions, however, such country-specific data are for now unavailable.
## TABLE 5.1 Sample and region coverage

<table>
<thead>
<tr>
<th>Advanced economies</th>
<th>Emerging market and developing economies</th>
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<tr>
<td>Austria</td>
<td>East Asia and Pacific</td>
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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. In both ways, human capital accumulation is a critical driver of growth in labor productivity, the key to sustained growth in standards (see de la Fuente 2011; Dieppe 2020; Flabbi and Gatti 2018; and World Bank 2018a). The literature is divided on the degree to which human capital accumulation can explain cross-country differences in per capita incomes. 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 growth or levels of income, especially when combined with a supporting environment.

Higher school enrollment or educational attainment—especially in regard to primary and secondary education—has been found to be associated with stronger growth (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; Temple 2001; and Topel 1999). Primary and secondary education appear to be more important for knowledge diffusion and postsecondary education for innovation and creation of new knowledge (Vandenbussche, Aghion, and Meghir 2006). Better-quality education has an even stronger growth-enhancing effect than more schooling, as captured in enrollment and attainment rates (see Barro 2001; Bosworth and Collins 2003; Coulombe and Tremblay 2006; Hanushek 2002; Hanushek and Woessmann 2008; and Woessmann

17 Acemoglu and Autor (2012) discuss the role of education in encouraging technological progress; Che and Zhang (2018), Danquah and Amankwah-Amoah (2017), and Huffman (2020) discuss its role in technology adoption; and Easterly (2005), Ehrlich and Pei (2020), and Klenow and Rodriguez-Clare (2005) discuss its role in knowledge spillovers.

18 Some studies find that human capital accumulation can explain only 10-50 percent of cross-country income variation (Caselli 2005; Caselli and Ciccone 2013; Klenow 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 accumulation (Hendricks and Schollman 2017; Jones 2014; Malmberg 2016; Sasso and Rirzen 2016).

19 For the impact of primary and secondary schooling, see Barro and Sala-i-Martin (1995).
2003a, 2003b). For example, measures of acquisition of specific skills or academic achievement, such as test scores, are statistically significantly associated with higher growth (see Hanushek and Kimko 2000 and Hanushek and Woessmann 2015a, 2015b, 2016). This is especially true for low-income countries (Hanushek, Ruhose, and Woessmann 2017a, 2017b).

Other factors can slow human capital accumulation or dampen its growth-enhancing effects. These factors include unsupportive household environments (Hanushek 2002; Woessmann 2003a), as well as weak institutional environments that can divert highly skilled labor into unproductive activities such as rent-seeking (see Easterly 2001; Murphy, Shleifer, and Vishny 1991; and Pritchett 2001). Similarly, a stagnating economy with limited job creation may struggle to employ productively a better-educated workforce and thus fail to reap fully the potential gains in terms of growth (World Bank 2018a). Some studies find evidence of self-reinforcing feedback loops from higher growth to higher investment in human capital (see Bils and Klenow 2000; Pritchett 2001, 2006; and Weil 2014).

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 (see Galasso et al. 2017; Luo et al. 2012; and Taras 2005). As with education, there appear to be positive feedback loops as higher incomes allow more investment into health care 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 (Agénor 2013; Demetriades and Mamuneas 2000). For example, better transportation networks can reduce the cost of, and time taken to complete, new construction and the installation of new equipment (Turnovsky 1996), while improved access to electricity and better sanitation can help raise educational attainment and public health standards (Agénor 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 (see Hulten 1994; OECD 2007; and Sanchez-Robles 1998).

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
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. However, studies using physical measures of infrastructure investment have found that it is associated with significantly higher output. Access to specific infrastructure services, such as electricity, better roads, or telephones, has also been found to be associated with higher growth or higher income.

**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 experience gaps in education or health care (Gonzales et al. 2015; World Bank 2012). To the extent that this holds them back from engaging in 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 among reforms in multiple areas tend to strengthen their growth dividends. Investment in infrastructure related to 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

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20 Surveys of the literature include Bom and Ligthart (2014), Pereira and Andraz (2013), and Romp and de Haan (2007). The 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).

21 In a meta-analysis of 68 studies over 1983-2008, Bom and Ligthart (2014) find that public capital has considerably lower output elasticities at the regional level than at the central government level, suggesting that cross-regional spillovers are not taken into account. The IMF (2015a) 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. The IMF (2018) also argues that better management of public sector assets 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.


23 Regarding access to electricity, see Khandker et al. (2012), Kumar and Rauniyar (2011), and Rud (2012). Regarding access to better roads, see Datta (2012), Hu and Liu (2010), and Queiroz and Gautam (1992). Regarding 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). Investment in infrastructure in the areas of 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; see also Hulten 1994; OECD 2007; and Sanchez-Robles 1998).

ANNEX 5B Methodology: Impact of institutional reform

The local-projections estimation of changes in potential TFP growth and investment after reform episodes draws on an event study of reform episodes (World Bank 2021a). The identification of institutional reform events is based on the duration of changes in indicators from the PRS Group’s International Country Risk Guide. 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: bureaucracy quality, rule of law, corruption, and investment profile. This definition yields 106 episodes of sustained reform advances and 85 episodes of sustained reform setbacks in 100 EMDEs during 2004-19.

A local-projections estimation as in Jordà (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-projections estimations include their simplicity of estimation, their robustness to model misspecifications, the ease with which inferences can be made from them, and their 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 $\text{shock}_{it}$) on cumulative growth in TFP or real investment over a horizon $h$:

$$y_{i,t+h} - y_{i,t} = \alpha^h + \beta^h \text{shock}_{i,t} + \sum_{j}^2 \theta_{1,j}^h \text{shock}_{i,t-j}$$

$$+ \sum_{j}^{h-1} \theta_{2,j}^h \text{shock}_{i,t+h-j} + \sum_{j}^2 \theta_{3,j}^h d_iy_{i,t-j}$$

$$+ \theta_{4,i}^h X_i + \mu_i^h + \tau_i^h + \epsilon_{i,t}$$

where $X_i$ is a vector of control variables.
in which \( y_{i,t} \) refers to the log level of TFP (or real investment) in county \( i \) in year \( t \), \( dy_{i,t} \) to its annual growth rate, and \( m_i^h \) and \( t_i^h \) to country and year fixed effects. Additional 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 \( t \). Since \( y_{i,t+h} - y_{i,t} \) is cumulative growth in either TFP or real investment over horizon \( h \), the coefficient \( \beta_h \) 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 nonoverlapping episodes. That said, as with any regression, it remains possible that the events selected here may coincide with other favorable or adverse developments that spurred or slowed growth and the methodology cannot disentangle these two forces.
References


