

CHAPTER 3

INVESTMENT GROWTH AFTER THE PANDEMIC

Investment growth in emerging market and developing economies (EMDEs) is expected to remain below its average rate of the past two decades through the medium term. This subdued outlook follows a decade-long, geographically widespread investment growth slowdown before the COVID-19 pandemic. An empirical analysis covering 2000–21 finds that periods of strong investment growth were associated with strong real output growth, robust real credit growth, terms of trade improvements, growth in capital inflows, and investment climate reform spurts. Each of these factors has been decreasingly supportive of investment growth since the 2007–09 global financial crisis. Weak investment growth is a concern because it dampens potential growth, is associated with weak trade, and makes achieving the development and climate-related goals more difficult. Policies to boost investment growth need to be tailored to country circumstances, but include comprehensive fiscal and structural reforms, including repurposing of expenditure on inefficient subsidies. Given EMDEs’ limited fiscal space, the international community will need to significantly increase international cooperation, official financing and grants, and leverage private sector financing for adequate investment to materialize.

Introduction

As the COVID-19 pandemic began, emerging market and developing economies (EMDEs) had experienced a slowdown in real investment growth for most of the previous decade, from nearly 11 percent in 2010 to 3.4 percent in 2019. In EMDEs excluding China, investment growth tumbled more sharply: from 9 percent in 2010 to a mere 0.9 percent in 2019. The slowdown during the 2010s occurred in all EMDE regions, in both commodity-importing and commodity-exporting country groups, and in a large share of individual economies. In advanced economies, by contrast, investment growth was more sluggish but also more stable, hovering around its long-term average of 2 percent per year.

The pandemic triggered a severe investment contraction in EMDEs excluding China in 2020—a far deeper decline than in the 2009 global recession caused by the global financial crisis. EMDEs including China did not avoid an investment contraction in 2020, as they had in 2009 (figure 3.1.A). In advanced economies, however, investment shrank by less in 2020 than in 2009, thanks to large fiscal support packages and steep monetary easing. After a sharp rebound in 2021, investment growth in EMDEs is projected to revert to a pace still below the average during the previous two decades. The medium-term investment growth outlook remains subdued and has been downgraded substantially, along

with the GDP growth outlook, due to the effects of the Russian Federation’s invasion of Ukraine on commodity markets and supply chains, and because of historically high debt-to-GDP ratios and the sharp tightening of financing conditions as monetary policy responds to rising inflation.

Slowing investment growth is a concern because investment is critical to sustaining long-term growth of potential output and per capita income. Capital accumulation raises labor productivity, the key driver of the long-term growth of real wages and household incomes through capital deepening—equipping workers with more capital—and by incorporating productivity-enhancing technological advances. Despite large unmet investment needs, investment growth has weakened in most EMDEs.

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

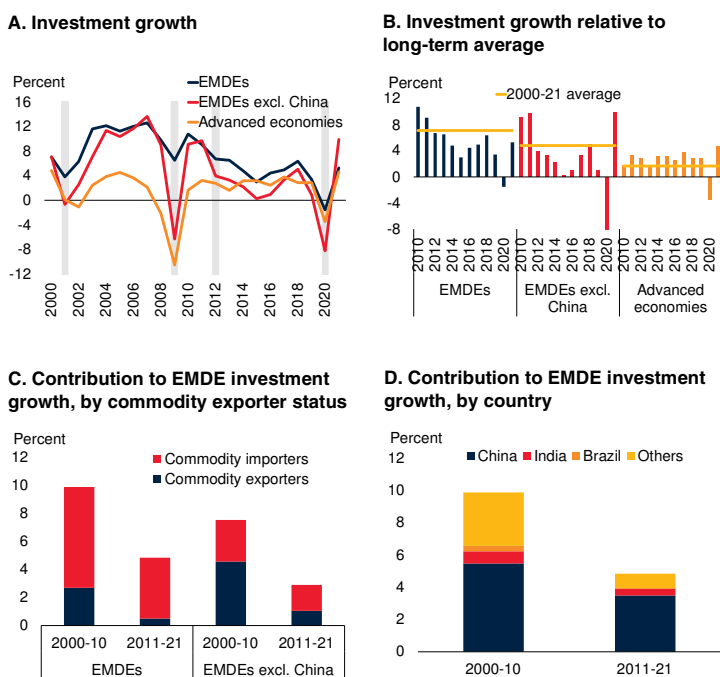
Against this backdrop, this chapter addresses four questions:

- How has investment growth evolved over the past decade?

Note: This chapter was prepared by Kersten Stamm and Dana Vorisek.

FIGURE 3.1 Investment growth

EMDEs experienced a broad-based slowdown in investment growth in the period between the 2007-09 global financial crisis and the COVID-19 pandemic. The pandemic-induced investment contraction in EMDEs excluding China in 2020 was historically large and much sharper than in advanced economies. The investment growth slowdown in EMDEs during the 2010s reflected underlying trends in both commodity-exporting and commodity-importing economies and in the three largest EMDEs, especially China.



Sources: Haver Analytics; World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights. Shaded areas indicate global recessions (in 2009 and 2020) and slowdowns (in 2001 and 2012).

A.B. Sample includes 69 EMDEs and 35 advanced economies.

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

- What are the key factors associated with investment growth?
- What are the implications of weak investment growth for development prospects?
- Which policies can help promote investment growth?

Contributions. The chapter makes several contributions to the literature on investment. First, this is the first study to examine investment growth since the pandemic in a large sample of EMDEs. Previous studies analyzing investment in EMDEs have tended to be based on pre-global

financial crisis data, confined to analysis of the global financial crisis, or focused on specific regions.¹ Second, the chapter examines the likely medium- and long-term consequences of the damage to investment in EMDEs from the pandemic and the war in Ukraine, focusing on the effects on productivity, potential output growth, trade, and the ability to achieve the SDGs and climate-related goals. Third, the chapter provides a broad set of policy recommendations to revive investment growth, including new priorities created by the pandemic and climate change.

Main findings. The chapter presents four main findings.

First, compared to the years following the global financial crisis, the investment recovery following the COVID-19 pandemic is proceeding more slowly. The slow recovery partly reflects the widespread impact of the pandemic on investment, which shrank in nearly three-quarters of EMDEs during the pandemic. The effects of the pandemic and the war in Ukraine are expected to extend the prolonged and broad-based slowdown in investment growth seen in the 2010s. Both private and public investment growth were more sluggish during the 2010s than in the previous decade.

Second, investment growth in EMDEs over the past two decades reflects in large part the path of output, changes in the capital flow-to-GDP ratio, and low private sector real credit growth. The empirical analysis in the chapter also finds that terms of trade improvements and investment climate reform spurts are associated with strengthening real investment growth.

Third, investment growth in EMDEs in 2022 remained about 5 percentage points below the 2000-21 average, and nearly 0.5 percentage points below in EMDEs excluding China. For all

¹ Macroeconomic studies of investment include Anand and Tulin (2014); Bahal, Raissi, and Tulin (2018); Caselli, Pagano, and Schivardi (2003); Cerra et al. (2016); and Qureshi, Diaz-Sanchez, and Varoudakis (2015); Firm-level studies include Li, Magud, and Valencia (2015) and Magud and Sosa (2015). Kose et al. (2017) and World Bank (2019) examine investment trends and correlates in a large sample of EMDEs.

EMDEs, projected investment growth through 2024 will be insufficient to return investment to the level suggested by the pre-pandemic (2010-19) trend. Investment weakness dampens long-term output growth and productivity, is associated with weak global trade growth, and makes meeting the development and climate goals more challenging.

Fourth, a sustained improvement in investment growth in EMDEs requires the use of policy tools and international financial support, with appropriate prescriptions dependent on country circumstances. Macroeconomic policy can support investment in EMDEs in a variety of ways, including through preserving macroeconomic stability. Even with constrained fiscal space, spending on public investment can be boosted by reallocating expenditures, freeing resources by moving away from distorting subsidies, improving the effectiveness of public investment, and strengthening revenue collection. Structural policies also play a key role in creating conditions conducive to attracting investment. Institutional reforms could address a range of impediments and inefficiencies, such as high business startup costs, weak property rights, inefficient labor and product market policies, weak corporate governance, costly trade regulation, and shallow financial sectors. Setting appropriate, predictable rules governing investment, including for public-private partnerships (PPPs), is also important.

Data and definitions. In this chapter, investment refers to real gross fixed capital accumulation, including both private and public investment. Gross fixed capital formation includes produced tangible (for example, buildings, machinery, and equipment) and intangible assets (for example, computer software, mineral exploration, entertainment, and original writing or art) used for more than one year in the production of goods and services. Investment growth is calculated with countries' real annual investment at average 2010-19 prices and constant 2019 U.S. dollars as weights for 69 EMDEs and 35 advanced economies (table 3.1). These economies have represented about 97 percent of global GDP since the mid-2000s. A decomposition of investment into type of use, such as buildings, transport equipment, and information and communications technology (ICT) equipment, is not possible due

to limited comparable data for EMDEs. Data availability also prevents an econometric exploration of private and public investment.

Evolution of investment growth

Several key features of investment growth in EMDEs during the pre-pandemic decade are evident. There was a pronounced slowdown between 2010 and 2015, followed by a moderate recovery until 2018 (figure 3.1.B). The slowdown over the course of the decade was unmistakable, however. Investment growth in EMDEs fell from nearly 11 percent in 2010 to 3.4 percent in 2019. In EMDEs excluding China, investment growth tumbled more sharply: from 9 percent in 2010 to a mere 0.9 percent in 2019.

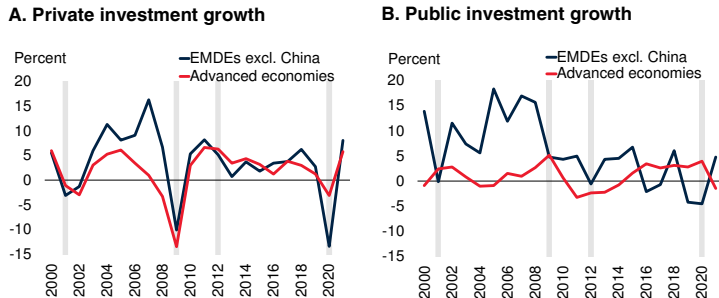
The slowdown in EMDEs in the 2010s occurred alongside broadly stable, albeit more sluggish, investment growth in advanced economies. Although investment growth in EMDEs remained above that in advanced economies, the difference in investment growth rates between EMDEs and advanced economies, especially in the second half of the decade, was far smaller than in the 2000s.

Weak investment growth during the 2010s was widespread across EMDEs. In each year between 2012 and 2020, investment growth was well below the pre-global financial crisis (2000-08) average in well over half of EMDEs. The slowdown during the 2010s occurred in both commodity-exporting and commodity-importing EMDEs, and in all EMDE regions (Vashakmadze et al. 2018; figure 3.1.C). Slowing investment growth in China made a large contribution to the aggregate EMDE slowdown (figure 3.1.D). In low-income countries (LICs), investment growth slowed sharply after a decade of solid investment growth that contributed to modest per capita income gains in the early 2000s. The slowdown was also observed in private and public investment growth, which grew at a slower pace in the 2010s than in the previous decade (figures 3.2.A, 3.2.B).

As business operations were disrupted and uncertainty spiked in 2020 due to the COVID-19 pandemic, aggregate investment in EMDEs

FIGURE 3.2 Private and public investment growth

Private and public investment growth in EMDEs excluding China were both weaker in the decade before the COVID-19 pandemic than during the years prior to the global financial crisis.

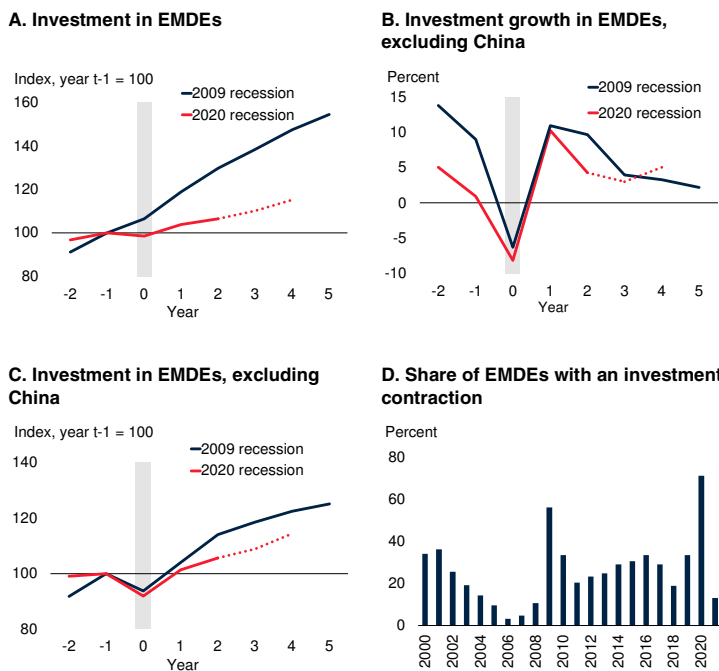


Sources: Haver Analytics; World Bank; World Development Indicators database.
 A.B. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights. Shaded areas indicate global recessions (in 2009 and 2020) and slowdowns (in 2001 and 2012). Sample includes 32 EMDEs excluding China and 11 advanced economies.

shrank, after avoiding a contraction in 2009, when the global financial crisis triggered a global recession (figure 3.3.A). EMDEs excluding China suffered an especially sharp investment contraction of more than 8 percent, a deeper decline than in 2009 (figures 3.3B, 3.3.C). A key difference between 2009 and 2020 is the number of affected EMDEs. About 70 percent of EMDEs experienced an investment contraction in 2020, well above the 55 percent of EMDEs in 2009 (figure 3.3.D). Regionally, the investment contraction in 2020 was sharpest in Latin America and the Caribbean and South Asia, the regions where output also declined the most.

FIGURE 3.3 Investment around global recessions

Investment in EMDEs excluding China shrank by more than 8 percent during the global recession in the first year of the COVID-19 pandemic in 2020, about 2 percentage points more than the drop during the global financial crisis. Due to the large number of EMDEs impacted by the 2020 global recession, the investment recovery is proceeding more slowly than the recovery after the 2009 global recession.



Sources: Haver Analytics; World Bank; World Development Indicators database.
 Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights.
 A.-C. On the x-axis, year zero refers to the year of global recessions in 2009 and 2020. Dotted portions of lines are forecasts.
 A.-D. Sample includes 69 EMDEs.

Macroeconomic backdrop

Slowing investment growth in EMDEs in the decade or so before the pandemic occurred in the context of a worsening global macroeconomic environment. Compared to 2002-07, the global economy was characterized in 2010-19 by slower output growth, lower commodity prices, lower and more volatile capital inflows to EMDEs, higher economic and geopolitical uncertainty, and a substantial buildup of public and private debt (Kose and Ohnsorge 2020).

Weak activity. Investment tends to respond, and respond more than proportionately, to economic activity, a phenomenon dubbed the accelerator effect (Shapiro, Blanchard, and Lovell 1986). EMDE per capita output growth slowed sharply in the decade following the global financial crisis, from 7.5 percent in 2010 to a trough of 3.9 percent in 2019. There was a roughly parallel growth slowdown in EMDEs excluding China—from 5 percent in 2010 to 1.6 percent in 2019. To the extent that the slowing of output growth in EMDEs was structural rather than cyclical or otherwise transitory, the slowing of investment growth may also be expected to persist (Didier et al. 2015; World Bank 2022a). The sources of the slowdown in output growth varied across EMDEs, but they included lower commodity prices, spillovers from weak growth in major economies, weakening productivity growth, tightening financial conditions, and a maturing of supply chains that slowed global trade growth. A 1 percentage point decline in U.S. or euro area

output growth has been found to reduce aggregate EMDE investment growth by more than 2 percentage points (World Bank 2017).

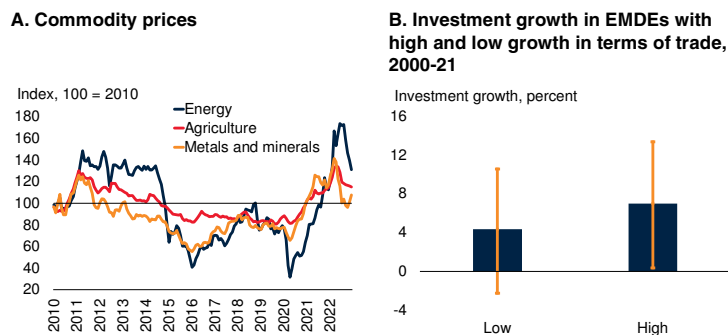
In China, growth rates slowed gradually as the economy was rebalanced from investment- and export-driven growth in manufacturing to consumption-driven growth in services. This transition reduced commodity demand and prices, with adverse spillovers to commodity-exporting EMDEs (Huidrom et al. 2020; World Bank 2016a). A 1 percentage point decline in China's output growth has been estimated to slow output growth in commodity-exporting EMDEs by about 1 percentage point after one year, with associated effects on investment growth (World Bank 2017).

Adverse terms of trade shocks. Almost two-thirds of EMDEs are reliant on exports of energy, metals, or agricultural commodities. Most commodity prices (in U.S. dollar terms) fell sharply from early-2011 peaks, with metals and energy prices plunging by more than 40 percent to troughs in 2016, followed by moderate recoveries in the following three years (figure 3.4.A). Surging U.S. oil production and a shift in OPEC policy in mid-2014 triggered an oil price plunge during 2014-16 that caused large disruptions in oil-exporting economies. At end-2019, energy prices were 21 percent below 2010 levels, and industrial metal and agricultural prices 19 percent and 13 percent below, respectively. As a result, the terms of trade of commodity exporters deteriorated by 6.5 percent between 2011 and 2019, and those of oil exporters by 27 percent. EMDEs with lower terms of trade growth experienced lower investment growth over 2000-21 (figure 3.4.B).

Rapid private sector credit growth and debt overhang. After rising continuously between 2001 and 2007, from close to zero to a peak above 30 percent, annual growth of real credit to the private sector (from domestic and foreign financial institutions) in EMDEs retreated during the 2008-09 global financial crisis. It subsequently slowed further, from 11.5 percent in 2011 to a trough of 4.8 percent in 2016, before stabilizing at about 6 percent in 2019-21 (figure 3.5.A). Average credit growth in 2011-19 was highly uneven across EMDEs, with some countries

FIGURE 3.4 Terms of trade and investment growth

The terms of trade of commodity exporters deteriorated between 2010 and 2019, reflecting steady declines in global energy, metals, and agricultural commodity prices between 2011 and 2016. EMDEs with higher terms of trade growth experienced higher investment growth over 2000-21.



Source: Haver Analytics; World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies.

A. Energy index includes crude oil (85 percent weight), coal, and natural gas. Agriculture index includes 21 agricultural commodities. Metals and minerals index includes the six metals traded on the London Metal Exchange (aluminum, copper, lead, nickel, tin, zinc) plus iron ore. Prices indexes are calculated using commodity prices in nominal U.S. dollars. Last observation is December 2022.

B. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate annual terms of trade growth in the top and bottom third of the distribution, respectively. Difference in medians between "low" and "high" subsamples is significant at the 1 percent level. Sample includes 69 EMDEs.

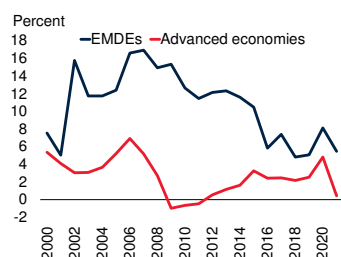
experiencing credit surges despite an overall downward trend. In contrast to the three decades before the global financial crisis, when around 40 percent of credit booms were accompanied or followed by investment surges within one or two years, credit booms since 2010 have been unusually "investment-less." Virtually none of the credit booms in EMDEs since the global financial crisis have been accompanied or followed by investment surges (World Bank 2017). In several countries, rapid credit growth instead fueled above-average consumption growth.

Despite declining credit growth since the global financial crisis, the ratio of outstanding credit to GDP in EMDEs has risen to record highs (figure 3.5.B). In the median EMDE, private credit as a share of GDP rose by 20 percentage points of GDP from 2000 to 2021, and by 27 percentage points in commodity-importing EMDEs. About four in ten EMDEs had private credit-to-GDP ratios exceeding 60 percent in 2021, up from one in ten in 2000. High leverage can lead to financial stress, restrict future access to credit, and divert resources from productive investment (Banerjee and Duflo 2005; World Bank 2022b). EMDEs

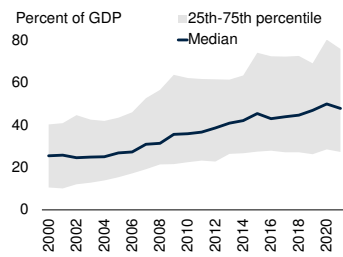
FIGURE 3.5 Credit growth, debt, and investment growth

Since 2011, weakening investment growth in EMDEs has been accompanied by slowing real credit growth to the private sector. EMDEs with higher credit growth experienced higher investment growth during 2000-21. Private sector debt has risen steadily, relative to GDP, in EMDEs over the past two decades. EMDEs with larger private debt-to-GDP ratios experienced slower investment growth during 2000-21.

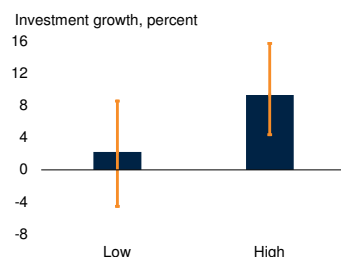
A. Private credit growth in EMDEs



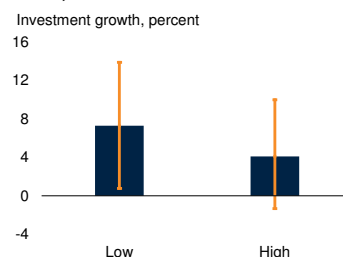
B. Private debt in EMDEs



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



D. Investment growth in EMDEs with high and low private debt-to-GDP ratios, 2000-21



Sources: Bank for International Settlements; Haver Analytics; IMF International Financial Statistics database; World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies. Private debt refers to domestic credit to the private sector as a percent of GDP.

A. Private credit refers to real annual credit growth to the private sector. Lines show weighted averages with countries' real annual investment in constant U.S. dollars as weights. Sample includes 69 EMDEs and 35 advanced economies. Last observation is 2021.

B. Sample includes 71 EMDEs. Last observation is 2021.

C. D. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate years when annual credit growth (C) and private debt-to-GDP ratios (D) were in the bottom and top third of the distribution, respectively, during 2000-21. Difference in medians between "low" and "high" and subsamples is significant at the 1 percent level.

C. Sample includes 69 EMDEs.

D. Sample includes 68 EMDEs.

with lower credit growth and higher private debt-to-GDP ratios experienced slower investment growth during 2000-21 (figures 3.5.C, 3.5.D).

Subdued and volatile capital inflows. Foreign direct investment (FDI) inflows to EMDEs more than tripled during 2000-19, accounting for about 40 percent of global capital inflows in 2015 and 62 percent in 2019. Since 2010, however, growth in FDI inflows to EMDEs has slowed,

partly due to weak activity in advanced economies. Growth of non-FDI inflows has shown more resilience and volatility, reflecting investors' search for higher yields amid low interest rates in advanced economies, a shift from bank to nonbank flows, and increased interest from institutional investors. (Cole et al. 2020; McQuade and Schmitz 2016). While the cost of capital is higher in EMDEs, the global financial crisis has led to a significant decrease in the average interest cost of outstanding government debt in advanced economies. In contrast, the average interest cost of outstanding government debt in EMDEs has barely decreased due to persistently high risk premia and increased reliance on international borrowing, particularly in foreign currency and on nonconcessional terms (United Nations 2022). Nevertheless, compared to the period leading up to the global financial crisis, 2000-07, there were twice as many sudden stop events in EMDEs in the years prior to the COVID-19 pandemic, 2011-19. During sudden stops, non-FDI inflows tend to decline much more sharply and for longer than FDI flows (Eichengreen, Gupta, and Masetti 2018).²

Heightened uncertainty. Policy uncertainty increased in many EMDEs after the global financial crisis, owing to geopolitical tensions in Eastern Europe, security challenges and conflicts in the Middle East, and acute domestic political tensions in several EMDEs. While the effects of uncertainty on investment and output growth are clearly negative, their scale depends on the context; they have been found to be more pronounced in countries that have a lower tolerance for uncertainty or where uncertainty interacts with other constraints such as access to credit (Carrière-Swallow and Céspedes 2013; Hofstede 2001; Inklaar and Yang 2012).

²The literature has produced mixed findings on the link between FDI and investment. Although there is evidence that FDI has a positive relationship with economic growth and investment, mainly in countries with well-developed financial markets, the literature has not found a consistent and significantly positive effect (Alfaro et al. 2004; OECD 2015). One possible explanation for the mixed evidence is that FDI crowds out domestic investment (Farla, de Crombrughe, and Verspagen 2016).

Empirical analysis of investment growth

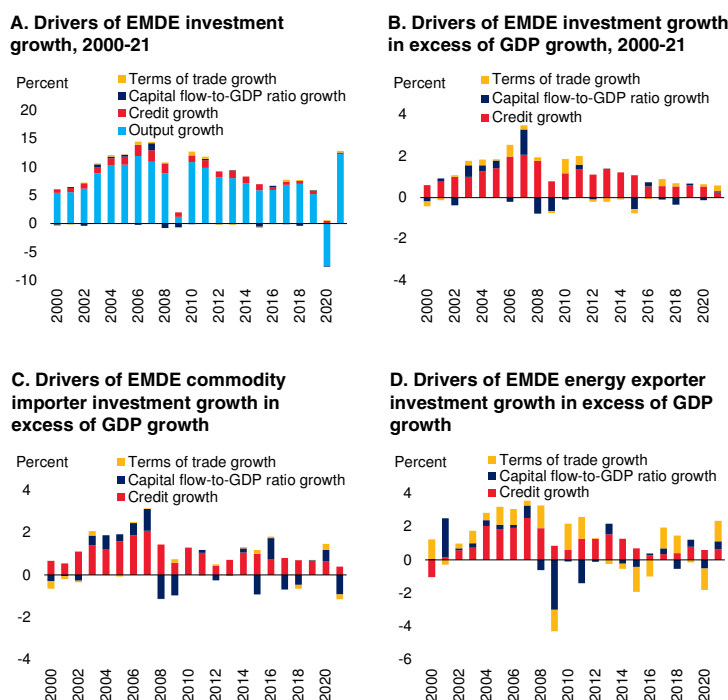
A panel regression analysis formalizes the role of macroeconomic factors in driving the investment weakness. Investment growth is estimated for 57 EMDEs covering 2000-21 as the dependent variable in a system generalized method of moments (GMM) panel regression, similar to Nabar and Joyce (2009). Drivers of investment growth, such as the marginal return to capital and risk-adjusted cost of capital, are proxied by real output growth, terms of trade growth, real private credit growth, the capital flow-to-GDP ratio, and a dummy variable for large improvements in the investment climate.

Real annual investment growth in EMDEs is found to be positively associated with real output growth, real credit growth, terms of trade improvements, increasing capital flow-to-GDP ratios, and investment climate reform spurts (annex 3.1; annex tables 3.1.1 and 3.1.2). These results are consistent with other studies finding multiple drivers of investment growth (G20 2016; IMF 2015; Libman, Montecito, and Razmi 2019). The importance of corporate borrowing as a driver of investment growth has also been found in other studies (Garcia-Escribano and Han 2015). The finding of a positive link between institutional quality, financial development, and investment growth is also in line with previous work (Lim 2014). While the coefficient of reform spurts is large and statistically significant, these events do not explain much of the variation in EMDE investment growth during 2000-21. On average, there were 0.8 investment profile reform spurts per year in the sample.

Using the results of the main regression to predict the contribution of the explanatory variables to investment growth shows that between 2000 and 2021, investment growth was primarily correlated with real output growth, followed by real credit growth (figure 3.6.A). Declining capital flow-to-GDP ratios contributed negatively to investment growth in commodity importers in multiple years since 2011, while energy exporting EMDEs experienced particularly low credit growth after 2015 (figures 3.6.B, 3.6.C, and 3.6.D).

FIGURE 3.6 Estimated contribution of explanatory variables to predicted investment growth

The investment growth slowdown in EMDEs in 2011-19 reflected, on average, declining output growth and real credit growth. In commodity importers, worsening real credit growth and several years of falling capital flow-to-GDP ratios weighed on investment growth. In energy exporting EMDEs, terms of trade growth has been highly correlated with investment growth, for example during the fall in commodity prices in 2015-16 and 2020 and the subsequent recoveries in 2017-18 and 2021.



Source: World Bank.

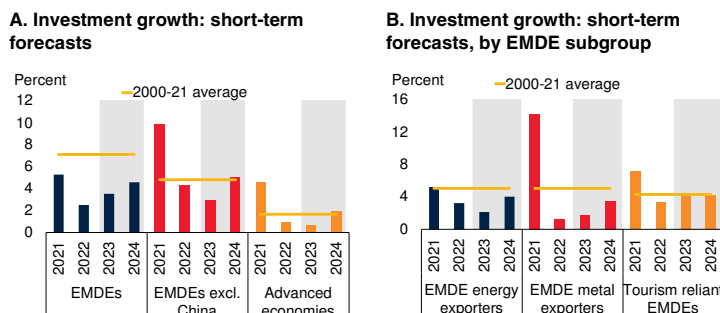
Note: EMDEs = emerging market and developing economies.

A.-D. Estimated impact of explanatory variables on investment growth in 57 EMDEs during 2000-21, based on the system generalized method of moments (GMM) estimation presented in the chapter. Bars show the contribution of each explanatory variable to predicted investment growth (defined, for each variable, as the coefficient shown in the regression results in column 1 of annex table 3.1.1 multiplied by the actual value of the variable). For presentational clarity, the charts show only the four explanatory variables with the largest contributions to predicted investment growth. Panels B, C, and D highlight the smaller but still significant contribution to investment growth after accounting for output growth.

The contribution of terms of trade was more volatile and comoved strongly with investment growth in energy exporting EMDEs, particularly during periods of falling or rising oil prices in 2015-16, 2020, 2017-18, and 2021 (Stocker et al. 2018). The negative shock to the terms of trade of energy-commodity exporters may be viewed as having lowered investment growth by reducing the expected return to capital in the exporting sector (Bleaney and Greenaway 2001). In contrast, improving terms of trade did not significantly offset the factors that slowed investment growth in

FIGURE 3.7 Investment growth outlook

Investment growth in EMDEs is projected to be below its 2000-21 average rate in 2023 and 2024. The war in Ukraine adds to downside risks relating to the pandemic and could further hold back investment growth.



Sources: Haver Analytics; United Nations World Tourism Organization; World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation.

A.B. Investment growth is calculated with countries' real annual investment in constant U.S. dollars as weights. Sample includes 69 EMDEs and 35 advanced economies.

B. Sample includes 15 EMDE energy exporters, 9 EMDE metals exporters, and 14 tourism-reliant EMDEs.

commodity importers, in part because the improvement was less pronounced than the deterioration experienced by commodity exporters.

In 2020-21, the output growth collapse and rebound generated even larger swings in investment growth. In energy exporters, these were amplified by terms of trade swings in the same direction. Low real credit growth did not compensate for the collapse in output in 2020 and then held back the recovery in 2021 in both commodity exporters and importers alike.

Investment prospects

After a robust rebound in 2021, investment growth is projected to average 3.5 percent per year in EMDEs and 4.1 percent in EMDEs excluding China in 2022-24, below the long-term (2000-21) average rates for both country groups (figure 3.7.A). Commodity-exporting EMDEs are projected to have lower investment growth rates than tourism-reliant EMDEs (figure 3.7.B). Investment growth is projected to be below the individual country trend of the past 20 years for about three-fifths of EMDEs for 2023 and 2024. For all EMDEs, projected investment growth through 2024 will be insufficient to return investment to the level suggested by the pre-

pandemic trend from 2010-19 (the period between the highly disruptive 2009 and 2020 global recessions), in part due to slowing investment growth in China (figure 3.8.B). Investment in EMDEs excluding China, however, is projected to return to pre-pandemic trend by 2024, with the recovery after the global recession in 2020 taking a year longer than after the global financial crisis (figure 3.8.A).

The weak outlook for investment reflects several factors, and may deteriorate further if the global economy tips into recession (Guénette, Kose, and Sugawara 2022). Uncertainties about the post-pandemic economic landscape, the war in Ukraine, and high inflation may discourage investment for some time. Tighter financial conditions are limiting the fiscal support governments can provide to stimulate public investment (World Bank 2022c). At the same time, the legacy of high corporate debt may constrain investment growth after the pandemic (Caballero and Simsek 2020; Stiglitz 2020). In China, investment growth is projected to remain well below the average of the past two decades: regulatory curbs on the property and financial sectors and continuing mobility restrictions related to the pandemic will both be restraining factors, in an environment of slower economic growth.

Implications of weak investment growth

Weakening investment growth has lasting implications for global trade as well as for long-term output growth and EMDEs' ability to reach key development and climate-related goals. The slowing of capital accumulation in EMDEs, and consequently of technological progress embedded in investment, implies slowing productivity growth and potential output, with adverse implications for their ability to catch up with advanced economy per capita incomes.

Slower trade growth. In part because investment is more import intensive than other components of demand, weakening investment growth contributed to the slowdown in trade growth prior to the pandemic (figures 3.9.A and 3.9.B; Bobasu et al. 2020; IMF 2016; World Bank 2021b). The

investment weakness was further accompanied by a pullback in cross-border investment by multinational companies, which account for one-third of global trade (Lakatos and Ohnsorge 2017).

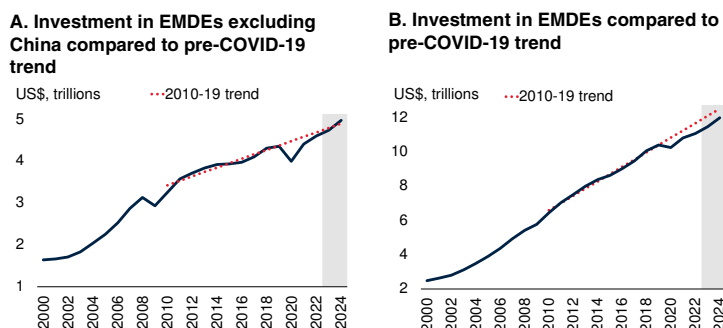
Global trade also propagates a pickup or slowdown in investment growth across countries (Freund 2016). Trade can facilitate more efficient allocation of capital goods, in turn improving overall productivity and rates of return on capital, thus encouraging investment (Mutreja, Ravikumar, and Sposi 2014). Countries engaged in deepening trade integration saw the price of investment goods fall relative to the prices of consumption goods, especially between 2005 and 2011, thus boosting investment rates (Lian et al. 2019). Indeed, trade openness has been found to be positively correlated with capital accumulation (Alvarez 2017; Irwin 2019; Sposi 2019; Wacziarg and Welch 2008).

Slower potential output growth. The prospect that investment growth will remain weak in the medium term raises fundamental concerns about the economic health of EMDEs, and about meeting the infrastructure needs of expanding and urbanizing populations in many EMDEs. Before the COVID-19 pandemic, potential output growth—the rate of growth achievable at full capacity utilization and full employment—had already slowed in EMDEs (Kilic Celik, Kose, and Ohnsorge 2020; World Bank 2018). Low investment growth in the medium term will further weaken potential output growth and result in capital accumulation contributing on average 0.6 percentage points per year less to EMDE potential growth in 2022-30 than in 2011-19. (figure 3.10.A; World Bank 2021a).

In addition to lowering capital accumulation, weak investment growth leads to weaker potential output growth partly by lowering total factor productivity (TFP) growth. Weaker investment and TFP growth can also be a symptom of market distortions that subsidize investment by less productive firms (Restuccia and Rogerson 2008). In contrast, increased investment often involves the adoption of productivity-enhancing technologies, including in the investment goods sector itself (Colecchia and Schreyer 2002; Hsieh and Klenow 2007; OECD 2016a).

FIGURE 3.8 Investment compared to trend

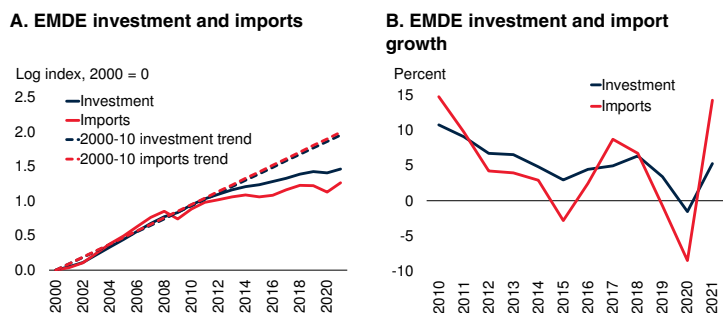
After the COVID-19 pandemic, China is expected to be a source of weakness for EMDE investment. In EMDEs excluding China, investment is projected to return to the level of investment suggested by the pre-pandemic trend by 2024. Including China, EMDE investment will not return to trend.



Sources: Haver Analytics; World Bank; World Development Indicators database.
 Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation. Investment levels after 2022 are forecast. Trendlines are calculated using linear regression on investment levels during 2010-19. Gray shading indicates forecasts. Sample includes 69 EMDEs.

FIGURE 3.9 Slowdown in growth of investment and trade

The investment growth slowdown in EMDEs after the global financial crisis was accompanied by a downturn in the growth of imports. Both imports and investment fell below their 2000-10 trend, and were further lowered by the COVID-19 pandemic.



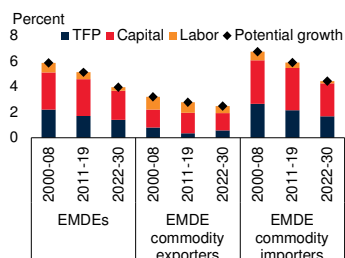
Sources: Haver Analytics; World Bank; World Development Indicators database.
 Note: EMDEs = emerging market and developing economies. Investment refers to gross fixed capital formation.
 A. Levels of real gross fixed capital formation and imports.
 B. Aggregate investment growth is calculated using real annual investment in constant U.S. dollars as weights.

Alongside slowing investment growth, TFP growth in EMDEs slowed in the decade prior to the pandemic, to 1.2 percent per year in 2010-19, on average, from 2.3 percent per year in 2000-08 (figures 3.10.B, 3.10.C). EMDEs with low investment growth tend to also have low TFP growth (figure 3.10.D). TFP growth weakened

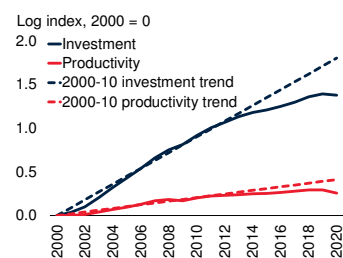
FIGURE 3.10 Growth of investment, productivity, and potential output

EMDEs with low investment growth also tend to have low total factor productivity (TFP) growth. Fluctuations in investment growth in EMDEs between 2000 and 2020 are mirrored in fluctuations in TFP growth. Slowing investment and TFP growth have lowered potential growth in EMDEs, especially in commodity-importing EMDEs, among which China has an outsize weight.

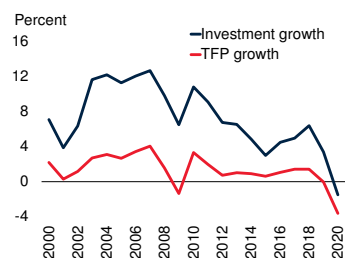
A. Potential output growth



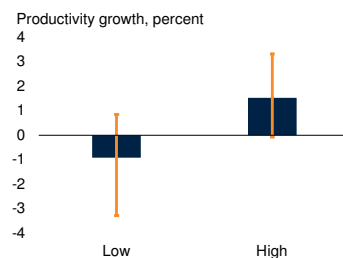
B. EMDE investment and total factor productivity



C. EMDE investment and total factor productivity growth



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



Sources: Dieppe (2021); Haver Analytics; International Labor Organization; Penn World Tables; UN World Population Prospects; World Bank; World Development Indicators database.

Note: EMDEs = emerging market and developing economies.

A. Potential output growth based on production function estimates. Sample includes 53 EMDEs.

B. C. Total factor productivity is derived from labor productivity (output per worker) by adjusting for human capital and capital deepening; see Dieppe (2021). Investment refers to gross fixed capital formation. Investment growth and TFP growth are calculated with countries' real annual investment in constant U.S. dollars as weights. Sample includes 69 EMDEs.

D. Bars show group medians; vertical lines show interquartile ranges. "Low" and "high" indicate years when annual investment growth was in the bottom and top third of the distribution, respectively, during 2000-20. Difference in medians between "high" and "low" subsamples is significant at the 1 percent level. Sample includes 69 EMDEs.

despite evidence of somewhat faster cross-country technology absorption from countries at the productivity frontier (Comin and Ferrer 2013; Moelders 2016). Weaker TFP growth would also be reflected in slower labor productivity growth—the key long-term driver of growth in real incomes (Blanchard and Katz 1999; Feldstein 2008).

Slower progress toward the SDGs and climate goals. Achieving the SDGs and climate-related goals requires increasing investment in EMDEs. Raising infrastructure investment is especially

important, following several years of subdued public infrastructure investment growth before the pandemic (Foster, Rana, and Gorgulu 2022; Vorisek and Yu 2020). Meeting greenhouse gas emissions reduction commitments, advancing the clean energy transition, and capping the rise in temperature is expected to require infrastructure investment and other adaptations of several trillion U.S. dollars per year (Black et al. 2022; IEA 2021; IPCC 2022; Songwe, Stern, and Bhattacharya 2022). For a partial set of EMDEs, building resilience to climate change and putting countries on track to reduce emissions by 70 percent compared to current levels by 2050 will require investment of 1 to 10 percent of GDP annually between 2022-30, with higher investment needed in LICs (World Bank 2022d). Similarly, the increase in spending needed to achieve the SDGs (relative to GDP) will be much larger for LICs than for the average EMDE (Gaspar et al. 2019). Substantial additional financing from the global community and the private sector will be needed to close investment gaps.

To achieve the SDGs related to infrastructure (electricity, transport, water supply and sanitation) and infrastructure-related climate change preparation (flood protection, irrigation) in low- and middle-income countries, an estimated investment of \$1.5-\$2.7 trillion per year is required on average during 2015-30, mostly for transport and electricity (Rozenberg and Fay 2019). This is equivalent to 4.5-8.2 percent of these countries' combined annual GDP, depending on policy choices and the quality and infrastructure service quality (figures 3.11.A, 3.11.B). The 4.5 percent of GDP estimate anticipates investment in renewable energy; transport and land-use planning that result in denser cities and more affordable, reliable public transport; as well as deployment of decentralized technologies such as minigrids and water purifications systems in rural areas.

Gaps in investment relative to the levels needed to reach the health-related SDGs also remain substantial (Stenberg et al. 2017; UNCTAD 2014). Likewise, investment in education is vital to achieving schooling-related SDGs, closing education achievement gaps created by the pandemic, and supporting long-term income growth (Barro 2013; Psacharopoulos et al. 2021).

Investment in infrastructure has multiple potential benefits. For one, it appears to be inversely correlated with income inequality in EMDEs. The channels through which infrastructure investment lowers income inequality and poverty can be direct, for example by employing low-income households or providing services at lower cost and better quality, or indirect, for example by lowering trade costs in stimulating economic growth.³ Investment in climate-related resilience, adaptation, and mitigation is central to eliminating extreme poverty and achieving the SDGs. Such investment is perhaps most crucial in low-income and high-poverty countries, which are particularly vulnerable to the impacts of climate change and increasingly frequent adverse weather events on agriculture, energy generation and usage, water availability (World Bank 2022d). Green infrastructure and the adoption of environmentally sustainable technologies can support faster growth in the long term, while mitigating climate change (OECD 2020; Strand and Toman 2010). Improving and expanding access to infrastructure can enhance productivity (Bizimana et al. 2021; Calderón, Moral-Benito, and Servén 2015; Perez Sebastian and Steinbuks 2017). Public investment in infrastructure has also been found to create jobs, especially in LICs (Moszoro 2021).

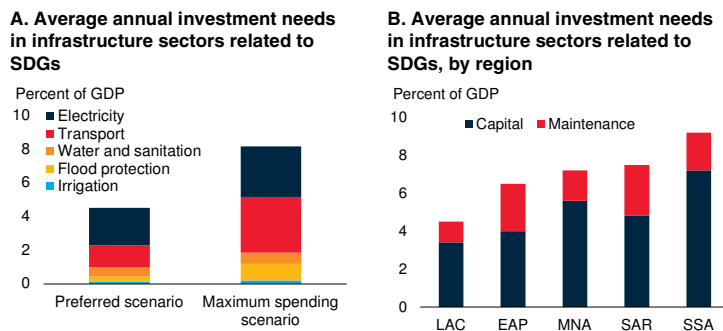
Policies to promote investment growth

EMDEs' investment needs—to bolster resilience to climate change, improve social conditions, smooth the transition away from growth driven by natural resources, and support long-term growth of output and per capita incomes—are substantial. At the same time, investment growth prospects are weak, fiscal space is constrained, and macroeconomic conditions are uncertain. The urgent need to ramp up investment in EMDEs is clear. However, mobilization of sufficient financing to

³ Calderón and Servén (2014) reviews multiple channels through which infrastructure investment affects the poor; Ferreira (1995) and Getachew (2010) discuss the role of public infrastructure investment and Madeiros, Ribeiro, and do Amaral (2021) the role of infrastructure investment; and Maliszewska and van der Mensbrugge (2019) examine the role of infrastructure investment in lowering trade cost and generating opportunities for the poor.

FIGURE 3.11 Infrastructure spending needs related to the Sustainable Development Goals (SDGs)

Substantial gaps in infrastructure investment remain across EMDEs. Continued weak investment growth will make filling these large gaps more challenging.



Sources: Rozenberg and Fay (2019); World Bank.

Note: EAP = East Asia and Pacific, LAC = Latin America and the Caribbean, MNA = Middle East and North Africa, SAR = South Asia, SSA = Sub-Saharan Africa, SDGs = Sustainable Development Goals.

A. Bars show average annual spending needs on capital (not including maintenance) during 2015-30. "Preferred scenario" is constructed using ambitious goals and high spending efficiency, and "maximum spending scenario" using ambitious goals and low spending efficiency. Country sample includes low- and middle-income countries, as defined in the technical appendix of Rozenberg and Fay (2019).

B. Bars show average annual spending needs during 2015-30.

close development-related investment gaps—from domestic resources, international assistance, borrowing from multilateral development banks, and foreign private sector investment—will be challenging (Bhattacharya and Stern 2021; United Nations 2019).

It is critical to design policy that can stimulate investment with lasting benefits while discouraging opportunistic behavior such as rent seeking, and to focus on high-quality investment projects (G20 2019). The challenges demand a multipronged strategy featuring a variety of fiscal and structural measures to boost public and private investment, with specific priorities driven by country circumstances.

Two areas with strong growth potential are investment in digital capabilities and the clean energy transition. The pandemic created new opportunities for the adoption of digital infrastructure in commerce and governance, while energy market volatility due to Russia's invasion of Ukraine and an increasingly urgent need to meet climate goals have made the development of clean, renewable, and affordable energy sources a priority. The pandemic also underscored the

potential for digital approaches to education in EMDEs, not to only to make up for the effect of lost schooling on future earnings, but also to help reduce inequality in education, provided that the necessary infrastructure and other appropriate underlying conditions are in place (Bashir et al. 2021; Muñoz-Najar et al. 2021; Wilichowski et al. 2021). In the long term, investment in education is needed to spur research and development, and ultimately, innovation.

Fiscal policy

Public investment in infrastructure, education, and health systems can be paid for in three main ways. First, funding can be raised through government borrowing, including through counter-cyclical fiscal stimulus programs during economic downturns. The extended low interest rate environment in the decade or more before 2022 offered an opportunity for many governments to borrow for investment projects, with limited risks to long-term fiscal sustainability (OECD 2016b). With debt burdens now at historically high levels and financing costs rising with global interest rates, however, EMDEs have limited capacity for expansionary fiscal policy financed by increased borrowing. Countries that are in or near debt distress can focus on fiscal sustainability in the short term to free fiscal resources for investment (ESMAP 2020).

Second, increased public investment can be financed by increasing revenues or cutting other expenditures. Revenues could be increased by strengthening tax administrations, broadening tax bases, or raising tax rates. Revenue-to-GDP ratios are particularly low in South Asia and Sub-Saharan African (World Bank 2015, 2016b). Even without tax rate increases, efforts to remove exemptions, tighten tax administration, and broaden tax bases could yield revenue gains that increase resources to finance public investment projects. Measures that have proven successful include the adoption of digital payments, taxpayer and property registration, and monitoring compliance (Okunogbe and Santoro 2021). Expenditures could also be reallocated toward welfare-improving investment. For example, eliminating distortive agriculture and fossil fuel subsidies would free sizable funds for investment in renewable energy, health, education,

and targeted social safety net programs, even in fiscally constrained EMDEs (World Bank 2022e). For commodity-exporting economies, well-implemented fiscal rules and stabilization funds allow governments to use windfall gains earned when commodity prices are high to smooth public investment and expenditures during economic downturns or when commodity prices are low. Pro-cyclical fiscal policy in commodity-exporting countries has been found to worsen the depth of economic downturns (World Bank 2022a).

Third, within an existing envelope of public investment spending, it may be possible to improve spending efficiency and increase the benefits to growth (Buffie et al. 2012). For example, medium-term budget frameworks can improve spending predictability while greater transparency of expenditures and independent spending evaluations can generate incentives to improve efficiency. Better coordination between different levels of government can reduce duplication and inconsistencies (Mandl, Dierx, and Ilzkovitz 2008; St. Aubyn et al. 2009). Limiting contractual and institutional risks related to public-private partnerships in infrastructure can reduce contingent liabilities, while careful monitoring of state-owned enterprises can limit the need to inject fiscal resources in these companies (Dappe, Melecky, and Turkoglu 2022; Dappe et al. 2022). In some countries, there is also capacity to improve budget execution of planned public investment (World Bank 2022f).

For EMDEs, boosting public investment can have large benefits in terms of output because multipliers tend to be large (Izquierdo et al. 2019). Few studies estimate the fiscal multipliers of infrastructure investment in EMDEs, but the existing literature suggests that investment in green and digital infrastructure may have high multipliers (Vagliasindi and Gorgulu 2021). And in the right conditions, public investment can boost private investment. A positive effect on private investment from public investment is more likely in the presence of falling trade barriers and privatization efforts especially if the stock of infrastructure is low and if access to credit is not constrained (Bahal, Raissi, and Tulin 2018; Erden and Holcombe 2005).

Fiscal policy can also support private investment indirectly. Prospects for growth of demand and output play a major role in private investment decisions. To the extent that a growth slowdown in EMDEs is cyclical, counter-cyclical fiscal stimulus can help raise private investment during and after a downturn, where there is policy space (Cerra, Hakamada, and Lama 2021; Huidrom, Kose, and Ohnsorge 2016). Yet expansionary fiscal policy can also crowd out private investment and thus hinder economic growth. If increased government borrowing, through the pressure it puts on credit markets or through reactions of the central bank, leads to increases in interest rates and domestic currency appreciation, the cost of financing will increase and reduce the country's international competitiveness. For example, high levels of public investment in China after the global financial crisis boosted economic growth but also saddled cities with large amounts of public government debt (Huang, Pagano, and Panizza 2020). Increases in local public debt in China tightened financial conditions and lowered private investment by local manufacturing firms. Conversely, reducing fiscal deficits can, in some circumstances, boost private investment (Essl et al. 2019).

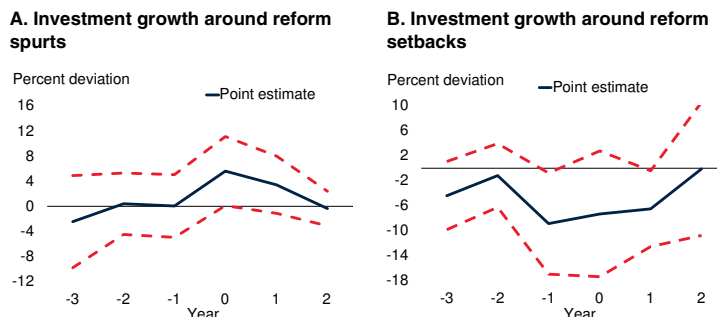
Monetary policy also has a role in supporting the growth of private investment, primarily by ensuring low and stable inflation over the medium term. Monetary policy can also play a countercyclical role through management of interest rates and credit growth, thereby supporting investment growth when activity is weak and inflation is low and helping to contain investment when the economy is overheating.

Structural policy

Structural reforms, including regulatory and governance reforms that improve the investment climate, can boost investment growth. Compared to advanced economies, banks extend less credit to the private sector as a share of GDP in EMDEs. This access gap to credit is largest for loans with long maturities (United Nations 2022). The empirical results in this chapter suggest that investment climate reform spurts and higher real credit growth have been associated with stronger

FIGURE 3.12 Investment growth around reform spurts and setbacks in EMDEs

In EMDEs, investment growth increased around reform spurts before returning to trend growth. Reform setbacks were associated with a significant decrease in investment growth.



Sources: International Country Risk Guide; World Bank.

Note: EMDEs = emerging market and developing economies. Sample includes 60 EMDEs from 1984-2022. Reform spurts and setbacks are defined in annex 3.2.

A,B. Solid lines show the increase in investment growth around a reform spurt (panel A) or setback (panel B) at $t=0$ relative to the countries not experiencing a reform spurt or setback. Dashed lines show the 95 percent confidence interval.

investment growth (annex 3.1). This positive impact is also apparent in a panel regression of investment growth on large spurts and setbacks in investment climate reforms among 60 EMDEs during 1984-2022 (figure 3.12.A). Reform spurts are associated with significantly higher investment growth—by about 6 percentage points, on average (annex 3.2). The impact of reform setbacks is more mixed (figure 3.12.B).

Reforms that improve the business climate can stimulate private investment directly and amplify the positive effects of investment, such as less informality and more job creation.⁴ Informal firms are both less productive and capital intensive than formal firms (IMF 2019; Ohnsorge and Yu 2021). Structural reforms that encourage entry of informal firms into the formal sector can therefore raise investment and potential output growth, particularly in countries where informal firms are prevalent. Reducing business startup costs has been linked to higher profitability of incumbent

⁴For the linkages between reform measures and investment growth, see Andrews, Criscuolo, and Gal (2015); Calcagnini, Ferrando, and Giombini (2015); Corcoran and Gillanders (2015); Field (2005); Munemo (2014); Reinikka and Svensson (2002); Schivardi and Viviano (2011); and Wacziarg and Welch (2008).

firms and greater investment in information ICT. Stronger property rights can encourage business and real estate investment. Labor and product market reforms that increase firm profitability can also encourage investment. In countries where access to finance is constrained, measures to promote financial deepening could boost investment, although risk indicators must be monitored to avoid financial instability (Kiyotaki and Moore 2005; Sahay et al. 2015).

Developing digital and technological infrastructure can be an important driver of investment growth. Policies to stimulate private and public investment include closing the rural access gap to broadband networks, aligning regulations with international standards, implementing regulation that encourages competition, ensuring price affordability for consumers, and educating the workforce in ICT-relevant skills (OECD and IDB 2016). Between 2003 and 2018, new high-speed undersea internet connections to Africa, in the presence of a reliable electricity supply, increased FDI flows into the technology and financial sectors and expanded the size of investment projects (Mensah and Traore 2022). In Nigeria, the expansion of mobile broadband internet led to an increase of consumption by covered households, lower poverty rates, and higher labor market participation (Bahia et al. 2020).

Addressing climate change and building reliable energy infrastructure requires structural reforms that encourage private investment participation and lower barriers to access for the private sector. In many EMDEs, governance and institutional reforms are necessary to improve and unify the often fragmented regulatory and institutional environment, including regional cooperation in, for example, electricity trade. Unpredictable regulatory and policy risk is one of the reasons that the cost of capital for solar energy producers is two to three times higher in EMDEs (excluding China) than in advanced economies (IEA 2022).

EMDEs have made progress in establishing policy frameworks for renewable energy and energy efficiency since 2010, but the gap with regulatory frameworks of advanced economies is still large, especially for LICs (ESMAP 2020). Medium-term

policy targets and development plans can lower policy uncertainty holding back private investment (World Bank 2022b). For energy-importing EMDEs, Russia's invasion of Ukraine has underscored the energy security benefits of relying on a diversified mix of energy inputs, transitioning to clean energy sources, and improving the energy efficiency of buildings and production processes (World Bank 2022g).

Setting appropriate, predictable rules relating to investment decisions can boost investment but also help avoid potential pitfalls. Using firm-level data, Gutierrez and Philippon (2017) find that when firms invest less than would be expected based on their market performance, two-thirds of this shortfall is explained by corporate governance and industry concentration. Improvements in the planning and allocation of investment and in the implementation of public investment management systems, including reforms that resolve problems of asymmetric information and moral hazard, can enhance the benefits of infrastructure investment—for instance, through the establishment of a sound legal and institutional setting, robust appraisal systems, and effective procurement and monitoring systems (Gardner and Henry 2021; Kim, Fallov, and Groom 2020). For EMDEs where PPPs for infrastructure investment are common, a robust PPP governance structure can limit fiscal risks and avoid opportunistic renegotiations (Dappe, Melecky, and Turkoglu 2022; Engel, Fischer, and Galetovic 2020). A robust PPP regulatory framework is especially critical in LICs, where related reforms are lagging (World Bank 2020a).

Trade-related reforms, such as simplifying border procedures, eliminating unnecessary duties and improving trade-related transport infrastructure, could help increase trade flows, with associated benefits for investment (Brenton, Farrantino, and Maliszewska 2022). Lowering uncertainty related to at-the-border trade costs and committing to current or reduced tariff levels as well as other non-tariff barriers will decrease trade costs and encourage investment. These reforms should be accompanied by high-quality and well-maintained infrastructure, such as ports and airports (World Bank 2021b). In some EMDEs, lower barriers to

cross-border trade finance are needed to help close the trade finance gap and further support trade growth (IFC and WTO 2022).

Membership in trade and integration agreements, such as the most recent African Continental Free Trade Area, solidifies reforms, which should benefit a country's investment climate, particularly if such agreements boost integration into global value chains and help lower the cost of tradable investment goods (machinery and equipment), for which EMDEs still face significantly higher costs than advanced economies (Lian et al. 2019). These reforms should include standardization of inspection and labeling requirements, which add significant costs to trade even if tariffs are low (Moïse and Le Bris 2013). Lower trade barriers can integrate participating economies in regional and global value chains, while investment, intellectual property rights, and competition protocols aim to increase cross-border investment (Echandi, Maliszewska, and Steenbergen 2022; World Bank 2020b).

In the long term, many commodity-exporting EMDEs need to diversify so that terms of trade shocks are less likely to impact investment decisions. This can be done by, for instance, moving production up the value chain or building infrastructure that promotes activity outside the natural resource sector. EMDEs will also increasingly need to develop policies to offset the investment-dampening effects of population aging (Aksoy et al. 2019; Zhang, Zhang, and Lee 2003).

Conclusion

Investment growth slowed during the decade prior to the pandemic. On an aggregate level, the investment collapse in EMDEs in 2020 (including or excluding China) was larger than in the global recession in 2009 and the return to the pre-recession trend is expected to take longer.

The empirical analysis in this chapter finds that strong real output growth, robust real credit growth, terms of trade improvements, growth in capital inflows as a share of GDP, and investment climate reform spurts are associated with strengthening real investment growth.

At a time when investment growth is projected to be sluggish in most EMDEs, fiscal space for expansion of public investment is limited, and borrowing conditions are much tighter than during the long period of easy credit in the decade prior to the pandemic. Policy makers will need to identify innovative ways to fill unmet investment needs. Meeting climate goals and SDG targets, and supporting long-term growth, requires sound fiscal policies, including debt sustainability, as well as targeted investment and reforms.

These reforms should be carefully sequenced and implemented and should reflect country-specific circumstances. For example, in countries in acute fiscal stress, the priority may be to improve spending efficiency in public investment; in countries with anemic private investment, the priority may be business climate reforms, including robust competition policy, to foster private investment; in countries with large foreign direct investment, the priority may be to improve human capital to ensure that such foreign direct investment is growth enhancing.

Fiscal policies include increasing spending efficiency; implementing counter-cyclical fiscal rules; and strengthening tax administration and revenue collection. Counter-cyclical fiscal rules and improved tax administration and revenue collection are equally important. Fiscal policy to boost investment will need to be complemented by additional financing from the international community and the private sector. Structural reforms are needed to crowd in private investment, such as lowering tariffs and nontariff barriers to trade, improving the business climate, and putting in place predictable rules such as governance structures that enable PPPs. Public and private investment can both play important roles in supporting long-term growth prospects by supporting productive sectors or expanding infrastructure (including digital, transportation, and electricity infrastructure), improving health sector outcomes, and improving and expanding education.

TABLE 3.1 Investment sample

Emerging market and developing economies (EMDEs)			Advanced economies
East Asia and Pacific	Latin America and the Caribbean	South Asia	Australia
Cambodia *	Argentina	India *	Austria
China *	Belize	Nepal *	Belgium
Indonesia	Bolivia	Sri Lanka *	Canada
Malaysia *	Brazil		Croatia
Mongolia	Chile	Sub-Saharan Africa	Cyprus
Philippines *	Colombia	Benin	Czech Republic
Thailand *	Costa Rica	Botswana	Denmark
Vietnam *	Dominican Republic *	Burkina Faso	Estonia
	Ecuador	Côte d'Ivoire	Finland
Europe and Central Asia	El Salvador *	Equatorial Guinea	France
Albania *	Guatemala	Ghana	Germany
Armenia	Honduras	Kenya	Greece
Belarus *	Jamaica *	Mali	Hong Kong SAR, China
Bulgaria *	Mexico *	Mauritius *	Iceland
Hungary *	Nicaragua	Mozambique	Ireland
North Macedonia *	Panama *	Namibia	Israel
Poland *	Paraguay	Niger	Italy
Romania *	Peru	Nigeria	Japan
Russian Federation	Uruguay	Rwanda	Korea, Rep.
Türkiye *		Senegal	Latvia
Ukraine	Middle East and North Africa	South Africa	Lithuania
	Algeria	Tanzania	Malta
	Bahrain	Togo	Netherlands
	Iran, Islamic Rep.	Uganda	New Zealand
	Kuwait		Norway
	Lebanon *		Portugal
	Morocco *		Singapore
	Oman		Slovak Republic
	Saudi Arabia		Slovenia
	United Arab Emirates		Spain
			Sweden
			Switzerland
			United Kingdom
			United States

Source: World Bank.

Note: * = EMDE commodity importers. Each EMDE is classified as a commodity importer or commodity exporter. An economy is defined as commodity exporter when, on average in 2017-19, either (1) total commodity exports accounted for 30 percent or more of total exports or (2) exports of any single commodity accounted for 20 percent or more of total exports. Economies for which these thresholds were met due to reexports were excluded. When data were not available, judgment was used. This taxonomy results in the classification of some well-diversified economies as importers, even if they are exporters of certain commodities (for example, Mexico). Pakistan and Bangladesh are not included in the sample because these countries report annual investment data for their fiscal year which does not align with the calendar year.

ANNEX 3.1 Determinants of investment growth: Empirical framework

Framework. Investment decisions are based on the expected marginal return of capital and the risk-adjusted cost of financing the investment. While public investment decisions may also involve other considerations, private investment accounts for the majority of investment in EMDEs, about three-quarters of total gross fixed capital formation.

Therefore, investment is modelled as the level of investment I chosen such that the marginal return on capital (MPK) equals the cost of capital, which is the sum of the risk-adjusted real interest rate r and the rate of depreciation of capital (δ), absent binding constraints:

$$MPK = r + \delta$$

As a result, investment I also depends on the determinants of the marginal product of capital—especially total factor productivity TFP and the existing stock of capital K . Since investment decisions are about the expected future returns to capital, the cost of capital also includes a risk premium π :

$$I = I(TFP, K, r, \pi, \delta)$$

A higher cost of capital—whether due to higher risk premia or higher risk-free real interest rates—would reduce investment, whereas higher productivity, lower depreciation, or a low capital stock would raise it.

To proxy these factors, the regression includes real output growth, terms of trade growth, real credit growth, change in capital flows as a percent of GDP, and a dummy for investment reform spurts. As exports are included in GDP, output growth also captures trade growth beyond the impact through terms of trade.

Data sources. Real investment growth is calculated from real gross fixed capital formation taken primarily from Haver Analytics and, for countries or years not available in Haver Analytics, from the World Bank's World Development Indicators

(WDI) or *Global Economic Prospects* (GEP) for 2021. Real output growth is taken from the World Bank's GEP. Real credit growth to the private sector and the credit-to-GDP ratio in the robustness section are taken from the Bank for International Settlements and supplemented with data from the International Financial Statistics (IFS) published by the International Monetary Fund (IMF). Credit growth proxies both depth of the financial sector as well as the cost of financing investment, since data on comparable financing cost for a sufficiently large number of countries over the past two decades is not available. Terms of trade are from WDI and, for 2021, from the GEP. Capital flows are calculated using data on the sum of FDI, portfolio flows, and changes in external bank liabilities from the IMF's IFS. Missing data for all three flow variables are imputed by taking the average of adjacent years. This imputation is limited to at most two consecutive missing observations per economy. Reform spurts are calculated using the Investment Profile Index taken from the PRS Group's International Country Risk Guide (ICRG). Reform spurts are defined as a two-year increase in the index above two times the standard deviation of the country-specific index. The data set includes a panel of 57 EMDEs and 31 advanced economies and covers the period from 1999 to 2021. The regression starts in 2000 and allows for lagged variables.

Methodology. The analysis estimates the correlates of investment growth in 57 EMDEs for the period 2000-21 in a system generalized method of moments (GMM) framework, with the third to sixth lag used to instrument the differenced equation and second lags for the level equation. These GMM-type instruments are used for output growth, real credit growth, growth in capital flows, and terms of trade growth. The econometric framework is similar to that of Nabar and Joyce (2009). However, the focus in this chapter is on investment growth—a critical component of overall output growth (ultimately, the source of rising living standards)—rather than changes in the investment-to-GDP ratio, which would only capture changes in investment growth relative to output growth. Use of investment growth is in line with recent studies on advanced economies

and individual EMDEs.⁵ The results are shown in annex table 3.1.1. The sample is unweighted to avoid a small number of EMDEs dominating the results (China and India, for example, account for a large share of total EMDE investment). Lastly, the terms of trade, real credit growth, and capital flow variables exclude the top and bottom 1 percent of observations in the entire sample to deal with outliers. Standard errors are clustered at the country level.

Robustness. Annex table 3.1.2 details a range of robustness checks. The regressions are robust to using OLS with fixed effects instead of system GMM (to account for the initial level of capital, for example). Further, when dividing capital flows into its components, the change of FDI flows is not significant, but the changes in portfolio and bank flows are. The credit-to-GDP ratio is not significant once China is excluded from the sample, and credit growth does not exhibit non-linear behavior. The regression is also robust to adding advanced economies to the sample (excluding Ireland, Malta, and Singapore, as these countries are large outliers for capital flows). Further robustness checks in the system GMM specification include controlling for various institutional quality variables from ICRG, time fixed effects, as well as the relative price of capital from Penn World Table 10. These additional variables were not significant while the main results are generally robust. Only the coefficient on terms of trade becomes insignificant when global trend variables are included. The subsamples of commodity-importing EMDEs and commodity-exporting EMDEs are too small to generate significant results.

TABLE A3.1.1 Correlates of investment growth

Dependent variable: real investment growth (percent)	(1) EMDEs
Real GDP growth (percent)	1.807*** (13.66)
Real credit growth (percent)	0.132*** (3.22)
Terms of trade growth (percent)	0.095* (1.95)
Investment climate reform spurt	6.970* (1.78)
Change in capital flows (percent of GDP)	0.218** (2.15)
Constant	-2.854*** (-5.30)
Observations	1024
Number of economies	57

Source: World Bank.

Note: Results of a panel system GMM regression for 57 EMDEs during 2000-21. Column (1) denotes the baseline regression for EMDEs. Real GDP growth, real credit growth, terms of trade growth, as well as change in capital flows are treated as endogenous. Standard errors are clustered at the country level. *t*-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

⁵ Banerjee, Kearns, and Lombardi (2015); Barkbu et al. (2015); Bussière, Ferrara, and Milovich (2016); and Kothari, Lewellen, and Warner (2015) cover advanced economies. Anand and Tulin (2014) covers India.

TABLE A3.1.2 Correlates of investment growth robustness

Dependent variable: real investment growth (percent)	(1) EMDE excl. China	(2) Split capital flows	(3) Credit to GDP ratio excl. China	(4) Real credit growth squared	(5) Nominal credit growth	(6) Global
Real GDP growth (percent)	1.839*** (14.04)	1.840*** (12.73)	1.979*** (17.58)	1.855*** (14.06)	1.854*** (13.85)	1.743*** (19.29)
Real credit growth (percent)	0.132*** (3.28)	0.148*** (3.32)		0.102 (1.60)		0.102*** (3.16)
Terms of trade growth (percent)	0.084* (1.75)	0.092* (1.78)	0.116** (2.25)	0.084* (1.87)	0.086* (1.75)	0.091* (1.85)
Investment climate reform spurt	7.834* (1.87)	3.165* (1.83)	8.173** (2.01)	6.384* (1.82)	7.701* (1.99)	4.375* (1.80)
Change in capital flows (percent of GDP)	0.219** (2.16)		0.195** (2.05)	0.226** (2.14)	0.203** (2.17)	0.132*** (3.55)
Change in FDI flows (percent of GDP)		0.102 (0.91)				
Change in portfolio flows (percent of GDP)		0.343** (2.60)				
Change in net liabilities of financial corporations (percent of GDP)		0.076*** (2.90)				
Change in credit-to-GDP ratio (percent of GDP)			0.123 (1.38)			
Real credit growth squared				-0.000 (-0.20)		
Nominal credit growth					0.089** (2.32)	
Constant	-2.861*** (-5.34)	-3.049*** (-5.79)	-2.509*** (-4.72)	-2.719*** (-5.46)	-3.221*** (-5.23)	-2.056*** (-6.15)
Observations	1002	948	1022	1024	1037	1649
Number of economies	56	57	56	57	57	88

Source: World Bank.

Note: Results of a panel regression for 56-57 EMDEs and 31 advanced economies during 2000-21. Number of economies varies based on data availability. Columns (1) to (5) are variations of the system GMM regression in column (1) of table 3.1.1. Column (1) excludes China from the sample. Column (2) separates capital flows into the three components. Column (3) replaces real credit growth with the change in the credit to GDP ratio, excluding China. Column (4) tests for nonlinearity of real credit growth. Column (5) replaces real credit growth with nominal credit growth. Column (6) estimates the baseline for a global sample of 57 EMDEs and 31 advanced economies (the sample excludes Ireland, Malta, and Singapore, as these economies are large outliers for capital flows). All additional control variables in columns (1) to (5) are assumed to be endogenous. Standard errors are clustered at the country level. *t*-statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

ANNEX 3.2 Investment growth and reforms

Values in figure 3.12 are based on a panel data regression in which the dependent variable is real investment growth. A spurt (setback) is defined as a two-year increase (decrease) above (below) two times the country-specific standard deviation of the investment profile index, a component of the International Country Risk Guide (ICRG) published by the PRS Group. The sample spans 60 EMDEs over 1984-2022. Overall, there are 44 reform spurt events and 10 reform setback events.

In the regression, t denotes the end of a two-year spurt, and s the end of a two-year setback. The coefficients are dummy variables for spurts and setbacks over the $[t-3, t+2]$ or $[s-3, s+2]$ window around these episodes (annex table 3.2.1). In figure 3.12, “reform” at time t refers to the two-year change from $t-2$ to t . All coefficients show the investment growth differential of economies during an episode compared to those that experienced neither improvements nor setbacks. All estimates include time fixed effects to control for global common shocks and country fixed effects to control for time-invariant heterogeneity at the country level.

TABLE A3.2.1 Investment growth around investment climate reform spurts and setbacks

Dependent variable: real investment growth (percent)	(1) EMDEs
t-3	-2.460 (3.752)
t-2	0.385 (2.501)
t-1	0.014 (2.550)
Period <i>t</i> of reform spurt	5.577** (2.815)
t+1	3.417 (2.320)
t+2	-0.393 (1.403)
s-3	-4.395 (2.772)
s-2	-1.163 (2.592)
s-1	-8.891** (4.129)
Period <i>s</i> of reform setback	-7.323 (5.137)
s+1	-6.490** (3.108)
s+2	-0.098 (5.438)
Observations	1,854

Source: World Bank.

Note: The regression includes time and country fixed effects. *t* indicates the period of the significant reform spurt, and *s* the period of the significant reform setback. Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

References

Aksoy, Y., H. S. Basso, R. P. Smith, and T. Grasl. 2019. "Demographic Structure and Macroeconomic Trends." *American Economic Journal: Macroeconomics* 11 (1): 193-222.

Alfaro, L., A. Chanda, S. Kalemli-Ozcan, and S. Sayek. 2004. "FDI and Economic Growth: The Role of Local Financial Markets." *Journal of International Economics* 64 (1): 89-112

Alvarez, F. 2017. "Capital Accumulation and International Trade." *Journal of Monetary Economics* 91 (C): 1-18.

Anand, R., and V. Tulin. 2014. "Disentangling India's Investment Slowdown." IMF Working Paper 14/47, International Monetary Fund, Washington, DC.

Andrews, D., C. Criscuolo, and P. N. Gal. 2015. "Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries." Productivity Working Paper 2015-02, Organisation for Economic Co-operation and Development, Paris.

Bahal, G., M. Raissi, and V. Tulin. 2018. "Crowding-Out or Crowding-In? Public and Private Investment in India." *World Development* 109 (September): 323-333.

Bahia, K., P. Castells, G. Cruz, T. Masaki, X. Pedrós, T. Pfitze, C. Rodríguez-Castelán, and H. Winkler. 2020. "The Welfare Effects of Mobile Broadband. Evidence from Nigeria." Policy Research Working Paper 9230, World Bank, Washington, DC.

Banerjee, A. V., and E. Duflo. 2005. "Growth Theory through the Lens of Development Economics." In *Handbook of Economic Growth, Volume 1A*, edited by P. Aghion and S. Durlauf, 473-552. Amsterdam: Elsevier.

Banerjee, R., J. Kearns, and M. Lombardi. 2015. "(Why) Is Investment Weak?" BIS Quarterly Review, March. Bank for International Settlements, Geneva.

Barkbu, B., S. P. Berkmen, P. Lukyantsau, S. Saksonovs, and H. Schoelermann. 2015. "Investment in the Euro Area: Why Has It Been Weak?" IMF Working Paper 15/32, International Monetary Fund, Washington, DC.

Bashir, S., C. J. Dahlman, N. Kanehira, and K. Tilmes. 2021. *The Converging Technology Revolution and Human Capital: Potential and Implications for South Asia*. Washington, DC: World Bank.

Bhattacharya, A., and N. Stern. 2021. "Beyond the \$100 Billion: Financing a Sustainable and Resilient Future." Policy Note, Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, London.

Bizimana, O., L. Jaramillo, S. Thomas, and J. Yoo. 2021. "Scaling Up Quality Infrastructure Investment." IMF Working Paper 21/117, International Monetary Fund, Washington, DC.

Black, S., J. Chateau, F. Jaumotte, I. W. H. Parry, G. Schwerhoff, S. D. Thube, and K. Zhunussova. 2021. "Getting on Track to Net Zero: Accelerating a Global Just Transition in This Decade." Staff Climate Note

- 2022/010, International Monetary Fund, Washington, DC.
- Blanchard, O. J., and L. Katz. 1999. "Wage Dynamics: Reconciling Theory and Evidence." NBER Working Paper 6924, National Bureau of Economic Research, Cambridge, MA.
- Bleaney, M., and D. Greenaway. 2001. "The Impact of Terms of Trade and Real Exchange Rate Volatility on Investment and Growth in Sub-Saharan Africa." *Journal of Development Economics* 65: 491-500.
- Bobasu, A., A. Geis, L. Quaglietti, and M. Ricci. 2020. "Tracking Global Economic Uncertainty: Implications for Global Investment and Trade." ECB Economic Bulletin 1/2020, European Central Bank, Frankfurt.
- Brenton, P., M. J. Ferrantino, and M. Maliszewska. 2022. *Reshaping Global Value Chains in Light of COVID-19*. Washington, DC: World Bank.
- Buffie, E. F., A. Berg, C. Pattillo, R. Portillo, and L.-F. Zanna. 2012. "Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces." IMF Working Paper 12/144, International Monetary Fund, Washington, DC.
- Bussière, M., L. Ferrara, and J. Milovich. 2016. "Explaining the Recent Slump in Investment: The Role of Expected Demand and Uncertainty." *IMF Research Bulletin* 17 (1): 1-3.
- Caballero, R. J., and A. Simsek. 2020. "Asset Prices and Aggregate Demand in a 'Covid-19' Shock: A Model of Endogenous Risk Intolerance and LSAPs." NBER Working Paper 27044, National Bureau of Economic Research, Cambridge, MA.
- Calcagnini, G., A. Ferrando, and G. Giombini. 2015. "Multiple Market Imperfections, Firm Profitability and Investment." *European Journal of Law and Economics* 40 (1): 95-120.
- Calderón, C., E. Moral-Benito, and L. Servén. 2015. "Is Infrastructure Capital Productive? A Dynamic Heterogeneous Approach." *Journal of Applied Econometrics* 30 (20): 177-198.
- Calderón, C., and L. Servén. 2014. "Infrastructure, Growth, and Inequality: An Overview." Policy Research Working Paper 7034, World Bank, Washington, DC.
- Carrière-Swallow, Y., and L. F. Céspedes. 2013. "The Impact of Uncertainty Shocks in Emerging Economies." *Journal of International Economics* 90 (2): 316-325.
- Caselli, F., P. Pagano, and F. Schivardi. 2003. "Uncertainty and the Slowdown in Capital Accumulation in Europe." *Applied Economics* 35 (1): 79-89.
- Cerra, V., A. Cuevas, C. Goes, I. Karpowicz, T. Matheson, I. Samake, and S. Vtyurina. 2016. "Highways to Heaven: Infrastructure Determinants and Trends in Latin America and the Caribbean." IMF Working Paper 16/185, International Monetary Fund, Washington, DC.
- Cerra, V., M. Hakamada, and R. Lama. 2021. "Financial Crises, Investment Slumps, and Slow Recoveries." IMF Working Paper 21/170, International Monetary Fund, Washington, DC.
- Cole, S., M. Melecky, F. Moelders, and T. Reed. 2020. "Long-Run Returns to Impact Investing in Emerging Markets and Developing Economies." NBER Working Paper 27870, National Bureau of Economic Research, Cambridge, MA.
- Colecchia, A., and P. Schreyer. 2002. "ICT Investment and Economic Growth in the 1990s: Is the United States a Unique Case? A Comparative Study of Nine OECD Countries." *Review of Economics Dynamics* 5 (2): 408-442.
- Comin, D., and M. M. Ferrer. 2013. "If Technology Has Arrived Everywhere, Why Has Income Diverged?" NBER Working Paper 19010, National Bureau of Economic Research, Cambridge, MA.
- Corcoran, A., and R. Gillanders. 2015. "Foreign Direct Investment and the Ease of Doing Business." *Review of World Economics* 151 (1): 103-126.
- Dappe, M. H., M. Melecky, and B. Turkgulu. 2022. "Fiscal Risks from Early Termination of Public-Private Partnerships in Infrastructure." Policy Research Working Paper 9972, World Bank, Washington, DC.
- Dappe, M. H., A. Musacchio, C. Pan, Y. V. Semikolenova, B. Turkgulu, and J. Barboza. 2022. "Smoke and Mirrors: Infrastructure State-Owned Enterprises and Fiscal Risks." Policy Research Working Paper 9970, World Bank, Washington, DC.
- Didier, T., M. A. Kose, F. Ohnsorge, and L. S. Ye. 2015. "Slowdown in Emerging Markets: Rough Patch or Prolonged Weakness?" Policy Research Note 4, World Bank, Washington, DC.
- Echandi, R., M. Maliszewska, and V. Steenberg. 2022. *Making the Most of the African Continental Free Trade Area*. Washington, DC: World Bank.

- Eichengreen, B., P. Gupta, and O. Masetti. 2018. "Are Capital Flows Fickle? Increasingly? And Does the Answer Still Depend on Type?" *Asian Economic Papers* 17 (1): 22-41.
- Engel, E., R. Fischer, and A. Galetovic. 2020. "When and How to Use Public-Private Partnerships in Infrastructure: Lessons from the International Experience." NBER Working Paper 26766, National Bureau of Economic Research, Cambridge, MA.
- Erden, L., and R. G. Holcombe. 2005. "The Effects of Public Investment on Private Investment in Developing Countries." *Public Finance Review* 33 (5): 575-602.
- ESMAP (Energy Sector Management Assistance Program). 2020. "Regulatory Indicators for Sustainable Energy (RISE) 2020: Sustaining the Momentum." World Bank, Washington, DC.
- Essl, S., S. K. Celik, P. Kirby, and A. Proite. 2019. "Debt in Low-Income Countries." Policy Research Working Paper 8794, World Bank, Washington, DC.
- Farla, K., D. de Crombrughe, and B. Verspagen. 2016. "Institutions, Foreign Direct Investment and Domestic Investment: Crowding Out or Crowding In?" *World Development* 88 (December): 1-9.
- Feldstein, M. 2008. "Did Wages Reflect Growth in Productivity?" NBER Working Paper 13953, National Bureau of Economic Research, Cambridge, MA.
- Ferreira, F. H. G. 1995. "Wealth Distribution Dynamics with Public-Private Capital Complementarity." Discussion Paper TE/95/286. London School of Economics and Political Science, London.
- Field, E. 2005. "Property Rights and Investment in Urban Slums." *Journal of the European Economic Association* 3 (2-3): 279-290.
- Foster, V., A. Rana, and N. Gorgulu. 2022. "Understanding Public Spending Trends for Infrastructure in Developing Countries." Policy Research Working Paper 9903, World Bank, Washington, DC.
- Freund, C. 2016. "The Global Trade Slowdown and Secular Stagnation." *Trade and Investment Policy Watch* (blog), April 20, 2016. <https://www.piie.com/blogs/trade-and-investment-policy-watch/global-trade-slowdown-and-secular-stagnation>.
- G20 (Group of 20). 2016. "Developments in Investment and Policy Challenges." Paper for G-20, June. Organisation for Economic Co-operation and Development, Paris.
- G20 (Group of 20). 2019. "G20 Principles for Quality Infrastructure Investment." Annex 6.1. G20 Finance and Central Bank Meeting June 2019. Fukuoka, Japan.
- Garcia-Escribano, M., and F. Han. 2015. "Credit Expansion in Emerging Markets: Propellor of Growth?" IMF Working Paper 15/212, International Monetary Fund, Washington, DC.
- Gardner, C., and P. B. Henry. 2021. "The Global Infrastructure Gap: Potential, Perils, and a Framework for Distinction." Working Paper, New York University, New York.
- Gaspar, V., D. Amaglobali, M. Garcia-Escribano, D. Prady, and M. Soto. 2019. "Fiscal Policy and Development: Human, Social, and Physical Investments for the SDGs." Staff Discussion Note 2019/003, International Monetary Fund, Washington, DC.
- Getachew, Y. Y. 2010. "Public Capital and Distributional Dynamics in a Two-Sector Growth Model." *Journal of Macroeconomics* 32 (2): 606-616.
- Guénette, J. D., M. A. Kose, and N. Sugawara. 2022. "Is a Global Recession Imminent?" EFI Policy Note 4, World Bank, Washington, DC.
- Gutierrez, G., and T., Philippon 2017. "Investmentless Growth: An Empirical Investigation." *Brookings Papers on Economic Activity* (Fall): 89-169.
- Hofstede, G. H. 2001. *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations*. Thousand Oaks, CA: Sage.
- Hsieh, C.-T., and P. Klenow. 2007. "Relative Prices and Relative Prosperity." *American Economic Review* 97 (3): 562-585.
- Huang, Y., M. Pagano, and U. Panizza. 2020. "Local Crowding-Out in China." *The Journal of Finance* 75 (6): 2855-2898.
- Huidrom, R., M. A. Kose, and F. Ohnsorge. 2016. "A Ride in Rough Waters." *Finance & Development* 53 (3): 1-4.
- Huidrom R., M. A. Kose, H. Matsuoka, and F. Ohnsorge. 2020. "How Important Are Spillovers from Major Emerging Markets?" *International Finance* 23 (1): 47-63.

- IEA (International Energy Agency). 2022. "World Energy Outlook 2022." Paris: International Energy Agency.
- IEA (International Energy Agency). 2021. "Net Zero by 2050 A Roadmap for the Global Energy Sector." International Energy Agency, Paris.
- IFC (International Finance Corporation), and WTO (World Trade Organization). 2022. "Trade Finance in West Africa." Geneva: World Trade Organization and Washington, DC: International Finance Corporation.
- IMF (International Monetary Fund). 2015. "Private Investment: What's the Holdup?" Chapter 4, *World Economic Outlook*, April. Washington, DC: International Monetary Fund.
- IMF (International Monetary Fund). 2016. "Global Trade: What's Behind the Slowdown?" In *World Economic Outlook—Subdued Demand: Symptoms and Remedies*, Chapter 2. October. Washington, DC: International Monetary Fund.
- IMF (International Monetary Fund). 2019. "Reigniting Growth in Low-Income and Emerging Market Economies: What Role can Structural Reforms Play?" In *World Economic Outlook: Global Manufacturing Downturn, Rising Trade Barriers*, Chapter 3. October. Washington, DC: International Monetary Fund.
- Inklaar, R., and J. Yang. 2012. "The Impact of Financial Crises and Tolerance for Uncertainty." *Journal of Development Economics* 97 (2): 466-80.
- IPCC (Intergovernmental Panel on Climate Change). 2022. "Climate Change 2022: Mitigation of Climate Change." IPCC Sixth Assessment Report. Cambridge, U.K. and New York: Cambridge University Press.
- Irwin, D. A. 2019. "Does Trade Reform Promote Economic Growth? A Review of Recent Evidence." Working Paper 19-9, Peterson Institute for International Economics, Washington, DC.
- Izquierdo, A., R. Lama, J. P. Medina, J. Puig, D. Riera-Crichton, C. Vegh, and G. Vuletin. 2019. "Is the Public Investment Multiplier Higher in Developing Countries? An Empirical Exploration." Working Paper 19/289, International Monetary Fund, Washington, DC.
- Kilic Celik, S., M. A. Kose, and F. Ohnsorge. 2020. "Subdued Potential Growth: Sources and Remedies." In *Growth in a Time of Change: Global and Country Perspectives on a New Agenda*, edited by H.-W. Kim and Z. Qureshi, 25-73. Washington, DC: Brookings Institution.
- Kim, J.-H., J. A. Fallov, and S. Groom. 2020. *Public Investment Management Reference Guide*. Washington, DC: World Bank.
- Kiyotaki, N., and J. Moore. 2005. "Financial Deepening." *Journal of the European Economic Association* 3 (2/3): 701-713.
- Kose, M. A., and F. Ohnsorge, eds. 2020. *A Decade after the Global Recession: Lessons and Challenges for Emerging and Developing Economies*. Washington, DC: World Bank.
- Kose, M. A., F. Ohnsorge, L. S. Ye, and E. Islamaj. 2017. "Weakness in Investment Growth: Causes, Implications and Policy Responses." Policy Research Working Paper 7990, World Bank, Washington, DC.
- Kothari, S. P., J. Lewellen, and J. B. Warner. 2015. "The Behavior of Aggregate Corporate Investment." MIT Sloan Research Paper 5112-14, Massachusetts Institute of Technology, Cambridge.
- Lakatos, C., and F. Ohnsorge. 2017. "Arm's-Length Trade: A Source of Post-Crisis Trade Weakness." Policy Research Working Paper 8144, World Bank, Washington, DC.
- Li, D., N. Magud, and F. Valencia. 2015. "Corporate Investment in Emerging Markets: Financing vs. Real Options Channel." Working Paper 15/285, International Monetary Fund, Washington, DC.
- Lian, W., N. Novta, E. Pugacheva, Y. Timmer, and P. Topalova. 2019. "The Price of Capital Goods: A Driver of Investment Under Threat." IMF Working Paper WP/19/134, International Monetary Fund, Washington, DC.
- Libman, E., J. A. Montecino, and A. Razmi. 2019. "Sustained Investment Surges." *Oxford Economic Papers* 71 (4): 1071-1095.
- Lim, J. J. 2014. "Institutional and Structural Determinants of Investment Worldwide." *Journal of Macroeconomics* 41 (September): 160-77.
- Magud, N., and S. Sosa. 2015. "Investment in Emerging Markets. We Are Not in Kansas Anymore...Or Are We?" IMF Working Paper 15/77, International Monetary Fund, Washington, DC.
- Maliszewska, M., and D. van der Mensbrugghe. 2019. "The Belt and Road Initiative: Economic, Poverty and

- Environmental Impacts.” Policy Research Working Paper 8814, World Bank, Washington, DC.
- Mandl, U., A. Dierx, and F. Ilzkovitz. 2008. “The Effectiveness and Efficiency of Public Spending.” *Economic Papers* 301, European Commission, Brussels.
- McQuade, P., and M. Schmitz. 2016. “The Great Moderation in International Capital Flows: A Global Phenomenon?” ECB Working Paper 1952, European Central Bank, Frankfurt.
- Medeiros, V., R. S. M. Ribeiro, and P. V. M. do Amaral. 2021. “Infrastructure and Household Poverty in Brazil: A regional Approach Using Multilevel Models.” *World Development* 137 (January): 105118.
- Mensah, J., and N. Traore. 2022. “Infrastructure Quality and FDI inflows. Evidence from the Arrival of High-Speed Internet in Africa.” Policy Research Working Paper 9946, World Bank, Washington, DC.
- Moelders, F. 2016. “Global Productivity Slowdown and the Role of Technology Adoption in Emerging Markets.” International Finance Corporation, Washington, DC.
- Moïsé, E., and F. Le Bris. 2013. “Trade Costs—What Have We Learned?: A Synthesis Report.” OECD Trade Policy Papers 150, Organisation for Economic Co-operation and Development, Paris.
- Moszoro, M. 2021. “The Direct Employment Impact of Public Investment.” IMF Working Paper 21/131, International Monetary Fund, Washington, DC.
- Munemo, J. 2014. “Business Start-Up Regulations and the Complementarity Between Foreign and Domestic Investment.” *Review of World Economics* 150 (4): 745-61.
- Muñoz-Najar, A., A. Gilberto, A. Hasan, C. Cobo, J. P. Azevedo, and M. Akmal. 2021. “Remote Learning during COVID-19: Lessons from Today, Principles for Tomorrow.” World Bank, Washington, DC.
- Mutreja, P., B. Ravikumar, and M. J. Sposi. 2014. “Capital Goods Trade and Economic Development.” Working Paper 2014-012B, Federal Reserve Bank of St. Louis.
- Nabar, N., and J. Joyce. 2009. “Sudden Stops, Banking Crises, and Investment Collapses.” *Journal of Development Economics* 90 (2): 163-189.
- OECD (Organisation for Economic Co-operation and Development). 2015. “Lifting Investment for Higher Sustainable Growth.” In *OECD Economic Outlook 1*, Chapter 3. Paris: OECD Publishing.
- OECD (Organisation for Economic Co-operation and Development). 2016a. *Compendium of Productivity Indicators 2016*. Paris: OECD Publishing.
- OECD (Organisation for Economic Co-operation and Development). 2016b. “Using the Fiscal Levers to Escape the Low-Growth Trap.” In *OECD Economic Outlook*, Chapter 2. Paris: OECD Publishing.
- OECD (Organisation for Economic Co-operation and Development). 2020. “Building Back Better: A Sustainable, Resilient Recovery After COVID-19.” OECD Policy Responses to Coronavirus (COVID-19), OECD, Paris.
- OECD (Organisation for Economic Co-operation and Development) and IDB (Inter-American Development Bank). 2016. “Broadband Policies for Latin America and the Caribbean: A Digital Economy Toolkit.” Paris: OECD Publishing.
- Ohnsorge, F., and S. Yu. 2021. *The Long Shadow of Informality: Challenges and Policies*. Washington, DC: World Bank.
- Okunogbe, O. M., and F. Santoro. 2021. “The Promise and Limitations of Information Technology for Tax Mobilization.” Policy Research Working Paper 9848, World Bank, Washington, DC.
- Perez Sebastian, F., and J. Steinbuks. 2017. “Public Infrastructure and Structural Transformation.” Policy Research Working Paper 8285, World Bank, Washington, DC.
- Qureshi, Z., J. L. Diaz-Sanchez, and A. Varoudakis. 2015. “The Post-Crisis Growth Slowdown in Emerging Economies and the Role of Structural Reforms.” *Global Journal of Emerging Market Economies* 7 (2): 179-200.
- Reinikka, R., and J. Svensson. 2002. “Coping with Poor Public Capital.” *Journal of Development Economics* 69 (1): 51-69.
- Restuccia, D., and R. Rogerson. 2008. “Policy Distortions and Aggregate Productivity with Heterogeneous Establishments.” *Review of Economic Dynamics* 11 (4): 707-720.
- Rozenberg, J., and M. Fay, eds. 2019. *Beyond the Gap: How Countries Can Afford the Infrastructure They Need While Protecting the Planet*. Washington, DC: World Bank.

- Sahay, R., M. Čihák, P. N'Diaye, A. Barajas, R. Bi, D. Ayala, Y. Gao, et al. 2015. "Rethinking Financial Deepening: Stability and Growth in Emerging Markets." IMF Staff Discussion Note 15/08, International Monetary Fund, Washington, DC.
- Schivardi, F., and E. Viviano. 2011. "Entry Barriers in Retail Trade." *The Economic Journal* 121 (551): 145-170.
- Shapiro, M. D., O. J. Blanchard, and M. C. Lovell. 1986. "Investment, Output, and the Cost of Capital." *Brookings Papers on Economic Activity* 1986 (1): 111-64.
- Songwe, V., N. Stern, and A. Bhattacharya. 2022. "Finance for Climate Action: Scaling Up Investment for Climate and Development." Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science, London.
- Sposi, M., K.-M. Yi, and J. Zhang. 2021. "Trade Integration, Global Value Chains and Capital Accumulation." *IMF Economic Review* 69 (3): 505-539.
- St. Aubyn, M., A. Pina, F. Garcia, and J. Pais. 2009. "Study on the Efficiency and Effectiveness of Public Spending on Tertiary Education." *Economic Papers* 390, European Commission, Brussels.
- Stenberg, K., O. Hanssen, T. Edejer, M. Bertram, C. Brindley, A. Meshreky, J. E. Rosen, J. Stover, P. Verboom, R. Sanders, and A. Soucat. 2017. "Financing Transformative Health Systems Towards Achievement of the Health Sustainable Development Goals: A Model for Projected Resource Needs in 67 Low-Income and Middle-Income Countries." *Lancet Global Health* 5: e875-887.
- Stiglitz, J. E. 2020. "The Pandemic Economic Crisis, Precautionary Behavior, and Mobility Constraints: An Application of the Dynamic Disequilibrium Model with Randomness." NBER Working Paper 27992, National Bureau of Economic Research, Cambridge, MA.
- Stocker, M., J. Baffes, M. Some, D. Vorisek, and C. Wheeler. 2018. "The 2014-16 Oil Price Collapse in Retrospect: Sources and Implications." Policy Research Working Paper 8419, World Bank, Washington, DC.
- Strand, J., and M. Toman. 2010. "Green Stimulus, Economic Recovery, and Long-Term Sustainable Development." Policy Research Working Paper 5163, World Bank, Washington, DC.
- UNCTAD (United Nations Conference on Trade and Development). 2014. "Investment in SDGs: An Action Plan." *World Investment Report*. New York: United Nations.
- United Nations. 2019. *Financing for Sustainable Development Report 2019*. New York: United Nations.
- United Nations. 2022. *Financing for Sustainable Development Report 2022: Bridging the Finance Divide*. New York: United Nations.
- Vagliasindi, M., and N. Gorgulu. 2021. "What Have We Learned about the Effectiveness of Infrastructure Investment as a Fiscal Stimulus?" Policy Research Working Paper 9796, World Bank, Washington, DC.
- Vashakmadze, E., G. Kambou, D. Chen, B. Nandwa, Y. Okawa, and D. Vorisek. 2018. "Regional Dimensions of Recent Weakness in Investment: Drivers, Investment Needs and Policy Responses." *Journal of Infrastructure, Policy and Development* 2(1): 37-66.
- Vorisek, D., and S. Yu. 2020. "Understanding the Cost of Achieving the Sustainable Development Goals." Policy Research Working Paper 9146, World Bank, Washington, DC.
- Wacziarg, R., and K. H. Welch. 2008. "Trade Liberalization and Growth: New Evidence." *The World Bank Economic Review* 22 (2): 187-231.
- Wilichowski, T., C. Cobo, A. Patil, and M. Quota. 2021. "How to Enhance Teacher Professional Development Through Technology: Takeaways from Innovations Across the Globe." Blog. *Education for Global Development* (blog). September 23, 2021. <https://blogs.worldbank.org/education/how-enhance-teacher-professional-development-through-technology-takeaways-innovations>.
- World Bank. 2015. *Global Economic Prospects: Having Fiscal Space and Using It*. January. Washington, DC: World Bank.
- World Bank. 2016a. *Global Economic Prospects: Spillovers amid Weak Growth*. January. Washington, DC: World Bank.
- World Bank. 2016b. *South Asia Economic Focus: Investment Reality Check*. World Bank, Washington, DC.
- World Bank. 2017. *Global Economic Prospects: Weak Investment in Uncertain Times*. January. Washington, DC: World Bank.
- World Bank. 2018. *Global Economic Prospects: Broad-Based Upturn, but for How Long?* January. Washington, DC: World Bank.

World Bank. 2019. *Global Economic Prospects: Heightened Tensions, Subdued Investment*. June. Washington, DC: World Bank

World Bank. 2020a. *Benchmarking Infrastructure Development 2020: Assessing Regulatory Quality to Prepare, Procure, and Manage PPPs and Traditional Public Investment in Infrastructure Projects*. Washington, DC: World Bank.s

World Bank. 2020b. *The African Continental Free Trade Area: Economic and Distributional Effects*. Washington, DC: World Bank.

World Bank. 2021a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2021b. *Global Economic Prospects*. June 2021. Washington, DC: World Bank.

World Bank. 2022a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2022b. *World Development Report 2022: Finance for an Equitable Recovery*. Washington, DC: World Bank.

World Bank. 2022c. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Bank. 2022d. "Climate and Development: An Agenda for Action - Emerging Insights from World Bank Group 2021-22 Country Climate and Development Reports." World Bank, Washington, DC.

World Bank. 2022e. "The Food and Energy Crisis - Weathering the Storm." Development Committee Paper October. Washington, DC: World Bank.

World Bank. 2022f. *South Asia Economic Focus: Coping with Shocks: Migration and the Road to Resilience*. October. Washington, DC: World Bank.

World Bank. 2022g. "Vietnam Country Climate and Development Report." CCDR Series. Washington, DC: World Bank.

Zhang J., J. Zhang, and R. Lee. 2003. "Rising Longevity, Education, Savings, and Growth." *Journal of Development Economics* 70 (1): 83-101.