

# Building Opportunities for Growth in a Challenging World

**2019 Latin American and Caribbean Macroeconomic Report**

Coordinated by  
**Eduardo Cavallo** and **Andrew Powell**





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# Preface

Last year's report noted that despite strong global growth, Latin America and the Caribbean would only attain moderate growth rates. One year later, while the region has recovered, the global economic outlook has weakened. The Chinese economy is expected to decelerate, some European economies are posting considerably weaker activity, and the United States economy also appears to be slowing down. Moreover, while there have been some positive developments, such as the signing of the U.S.-Mexico-Canada trade agreement, the Federal Reserve taking a pause on interest rates, and the announced delay on any escalation of U.S.-China tariffs, there are also significant downside risks.

Indeed, there is uncertainty in the United States about whether further increases in the U.S. policy interest rate are forthcoming or not. The market appears to expect no further rate rises this year, but the official position is that incoming data should signal if rate rises are required. While such increases may now be considered less likely than they were a few months ago, if they do occur, they would have a greater impact on global asset prices, interest rates, and capital flows. There is also greater confidence that the United States and China will resolve their differences over trade. However, at the time of writing, no confirmed agreement is in place. Moreover, as Europe slows, BREXIT continues to add uncertainty. The first part of this report analyzes some of these risks and their potential implications for our region.

In particular, Chapter 1 employs a statistical model of the world economy to analyze the impacts of these risks for Latin America and the Caribbean. Chapter 2 details the implications of a rise in U.S. interest rates on the borrowing rates for countries in the region. The chapter also considers how far the region is from a sudden stop in capital flows that would require significant adjustment in the current account. Chapter 3 analyzes how countries might use monetary policy to respond to a negative shock on global interest rates. It also considers whether a crowding out effect may arise as firms that had previously borrowed from abroad seek greater finance at home. Chapter 4 shows that those firms that issued bonds have stronger balance sheets, but that indicators of firm solvency have declined, and investment has fallen. Bond issuance has now fallen significantly, but the fact that firms are issuing somewhat more in local currency and at longer maturities may be due more to weaker demand than to restricted supply. The same chapter analyzes how sovereign debt composition has recently deteriorated at the margin. Chapter 5 considers the fiscal adjustment plans that many countries continue to pursue. The trend in the composition of

adjustment as reported in previous reports appears to be maintained. Less adjustment is being planned in capital spending, while higher revenues and larger cuts in government consumption are planned. This is good news as it should lead to a smaller negative impact on growth. Still, the adjustment plans continue to fall short of that required to stabilize debt; thus, debt ratios may continue to rise, albeit at a slower pace.

While the first part of the report focuses on the outlook, the risks, and the potential policy responses, the second part comes back to the basic issue of low growth. In last year's report, a meta-analysis across several methodologies suggested that greater infrastructure investment was a critical need for many countries to boost underlying or potential growth rates. Chapters 6 and 7 of this report focus on infrastructure. New estimates in Chapter 6 find that, compared to peers, the region faces gaps in access, quality, and sustainability of infrastructure. The chapter also dissects current private financing of infrastructure and suggests ways to relieve bottlenecks in infrastructure financing. Chapter 7 argues that infrastructure has significant impacts on growth and that different infrastructure interventions may have different impacts on productivity across an economy. Ultimately, the best infrastructure investment for a country must consider many country-specific features. These chapters are then complemented by a set of online Country Infrastructure Briefs written by IDB country economists. These briefs consider the challenges and the interventions that might yield the biggest bang for the buck for each country. Moreover, as detailed in Chapter 1, if the larger countries in the region could boost infrastructure investment by relatively modest amounts, the entire region could enjoy higher growth rates.

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## CHAPTER 1

# A Complicating World Economy: Risks and Opportunities

**E**stimates of global growth have weakened compared to last year's Latin American and Caribbean Macroeconomic Report. In early 2018, there was considerable optimism about both the strength and the balanced nature of growth across the world. Growth for 2019 was projected to be 3.9% and projections for the United States, China, and Europe for 2019 were all higher in early 2018 compared to those in 2017.<sup>1</sup> But one year later the global economy has changed once again. Growth projections for 2019 are now 3.5% and rising just 0.1% to 3.6% for 2020 with weaker growth expected in the three main economic areas. This Chapter reviews growth projections for the United States, China, and Europe, risks to the world economy, and the implications for Latin America and the Caribbean. At the same time, there are opportunities to boost growth in the region. Chapters 6 and 7 argue that greater investment in infrastructure could yield much needed higher growth. This Chapter concludes with an exercise to illustrate that increasing growth in some countries could have significant positive impacts throughout the region.

### Growth in the United States, China, and Europe

Growth in the United States is expected to slow from 2.9% in 2018 to 2.5% in 2019 as the impacts of the fiscal stimulus wane, policy uncertainty on trade impacts investment, and global weakness affects the United States. The baseline projections include the effects of tariffs implemented in 2018 and a potential escalation of tariffs, following a truce announced at the Buenos Aires G20 Summit in November 2018 and retaliatory measures by trading partners.<sup>2</sup> They do not include an additional 25% tariff on another US\$267 billion of Chinese imports or any further retaliation. At the time of writing, there is downside risk

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<sup>1</sup> The IMF's U.S. growth projections for 2019 were 0.6% higher in early 2018 compared to those in the fall of 2017 (IMF, 2018c, 2017b).

<sup>2</sup> Specifically, it includes 10% tariffs on all aluminum imports, 25% tariffs on all steel imports, a 25% tariff on US\$50 billion of China imports, a 10% tariff on a further US\$200 billion of imports rising to 25%. The baseline also includes retaliatory measures by all trading partners on aluminum and steel and by China on the China-specific tariffs (see Scenario Box 1, IMF, 2018b).

from these additional trade actions but there is also upside risk if an agreement to de-escalate is reached. Good news towards the end of 2018 included the trade agreement reached between Canada, Mexico, and the United States, although this has yet to be ratified by the United States Congress. If uncertainty on global trade matters persist, then it will likely continue to weigh on economic activity, particularly investment and confidence.

Much discussion has focused on the monetary policy stance in the United States. The Federal Reserve has signaled considerable uncertainty regarding what is referred to as the neutral rate of interest.<sup>3</sup> While U.S. authorities stressed that future policy would be data dependent, as of December 2018 the median FOMC member considered that further policy interest rate rises would be required in 2019 and the December minutes indicated further gradual increases in interest rates. A telling change in wording in the January minutes suggests that the Federal Reserve will now be “patient” as it determines what future changes might be appropriate. Market sentiment also shifted strongly after the January meeting and the market now expects the policy interest rate to stay around current levels through this year. However, considerable uncertainty reigns as evidenced by the various opinions of the individual members of the Federal Reserve Open Market Committee and the probability distribution of potential interest rate hikes as extracted from market prices.<sup>4</sup>

Currently, consumer price inflation remains close to the 2% target, but wage inflation has been relatively strong given low unemployment and tight labor markets. The Federal Reserve has adopted a wait-and-see or patient attitude, allowing incoming data to provide more information, including further evidence regarding its own monetary stance. If new data suggest the stance remains expansionary, rather than neutral or restrictive, or consumer price inflation rises above the target and the Federal Reserve communicates a greater chance of further rate rises, then the market may react aggressively, as it did in December when equity prices fell around 20%. While this may seem a less likely scenario given recent data, it implies that the market reaction (in longer-term rates and in stock prices) would be stronger if this scenario did materialize.

A set of developments that might prompt particular concern would be indications of stronger inflation, even as the economy slows, suggesting that potential growth is lower than previously thought. Other worrisome signs would be weaker earnings reports by U.S. firms in the first part of the year, continued trade uncertainty, and political rumblings given a divided congress. Interest rate hikes later in the year to contain inflation in this context could then provoke a sharp reassessment of asset prices and lower growth projections.

<sup>3</sup> Some participants in the Federal Reserve Open Market Committee have stated that the current stance may even be slightly restrictive (see Federal Reserve Bank of St. Louis, 2019).

<sup>4</sup> See Federal Reserve System (2018, 2019) and the CME FedWatch Tool available at <https://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html>. On February 13th, the latter indicated a 79.4% probability that the target rate for the federal funds rate in December, 2019 would be between 2.25% and 2.50%.

Chapter 2 analyzes periods of interest rate rises in the United States and their impacts. The analysis draws on recent work explicitly attempting to disaggregate the impact of anticipated and unanticipated rate increases. In this Chapter, a statistical model is employed to consider the potential impacts of a negative shock to U.S. growth and a negative global asset price shock on Latin America and the Caribbean.

Growth in China is expected to slow to 6.2% for 2019, down from 6.9% in 2017 and an estimated 6.6% in 2018. China is still transitioning to a more consumption and domestic demand-based economy away from an investment export-led model as income levels and wages rise. Chinese GDP per capita is now about US\$9,600, roughly on a par with that of Brazil and up from about US\$3,500 in 2008. Still, the trade measures reviewed above will impact growth and any escalation could pose greater threats to growth. There are still financial challenges given debt levels and regulatory measures aimed at safe deleveraging. A particularly negative scenario would be that concerns over debts prompt tougher measures to speed deleveraging coupled with trade actions hitting the real side of the economy. While this development might be offset by additional fiscal stimulus, it could complicate the challenges to manage the large transitions that are taking place. Any significant decline in growth in China would impact Latin America and the Caribbean, directly through trade and commodity prices and potentially on investment, and indirectly through China's effects on other regions since it is now such a large part of the global economy. The following section considers the impacts of a shock to Chinese growth on Latin America and the Caribbean.

European economies are also expected to slow. The baseline growth projection for the Euro area is 1.6% for 2019, down from 2.4% in 2017 and 1.8% in 2018. Germany, France, Italy, and Spain are all expected to slow. The reduction in the 2019 growth projection for Germany from October, 2018 to January, 2019 is as much as 0.6% of GDP. What was perceived by many as a temporary blip for car manufacturing due to enhanced regulatory measures seems to have become a more general concern about export demand given global trade uncertainties, BREXIT, and general weakness across the Eurozone.<sup>5</sup> Exports of goods and services represent over 45% of German GDP. Moreover, survey evidence suggests that France's private sector actually contracted in December, 2018<sup>6</sup> while Italy's fiscal position and persistent low growth raise concern over debt sustainability.<sup>7</sup>

BREXIT remains a particular concern in Europe and beyond. The baseline projections assume the United Kingdom leaves the European Union at the end of March, 2019 in an orderly fashion with an agreement in place that implies trade will not be unduly affected. At the time of writing, no such agreement has been approved by the U.K. Parliament and

<sup>5</sup> See for example "Low growth is new normal for Germany as eurozone economy slows – PMI's" Financial Times, December 14, 2018.

<sup>6</sup> See, for example, "French private sector sinks in contraction, survey shows" Financial Times December 14, 2018.

<sup>7</sup> See, for example, Blanchard, Merler, and Zettelmeyer (2018).



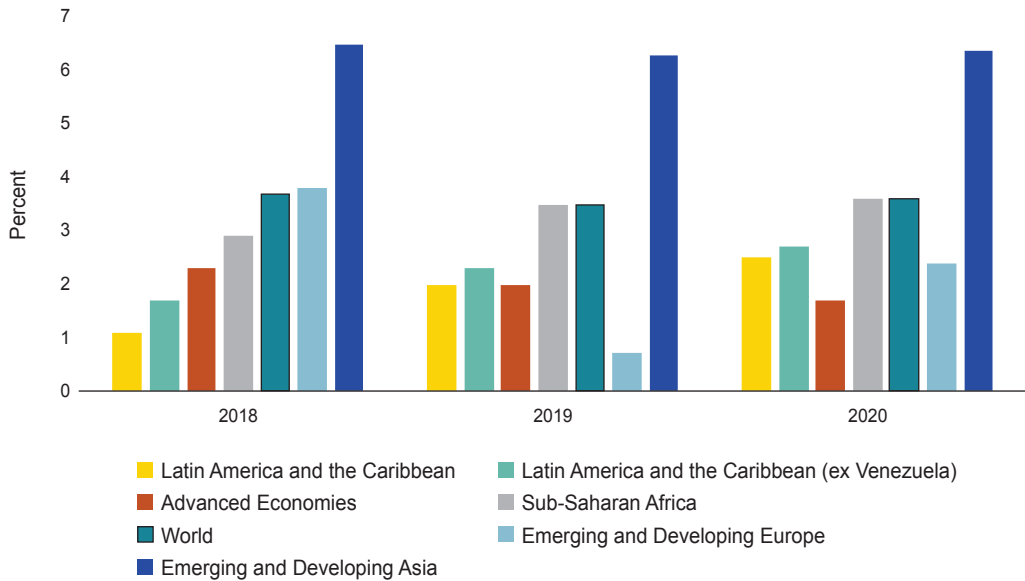
considerable uncertainty remains as to whether the United Kingdom would leave with no agreement, a last-minute agreement would be reached, or the end of March deadline might be delayed. The United Kingdom is an important export market of the European Union that in total represents more than a fifth of the world's GDP.<sup>8</sup> The U.K.'s direct impact on Latin America and the Caribbean is relatively small, but if a disorderly BREXIT impacts European growth in addition to the slowdown already underway then this remains a potential risk to the global economy and, hence, to Latin America and the Caribbean. A simulation using a statistical model of the global economy suggests a negative scenario for Europe, triggered by a BREXIT shock, could significantly impact growth in Latin America and the Caribbean.

The global economy has entered a period of considerable uncertainty. The United States, China, and Europe are all expected to slow compared to growth in the previous two years. Growth expectations in Europe have changed quite dramatically. Each economic area has its own challenges and, in addition, disagreements on trade hang over the world economy with uncertainty impacting investment. While it is hoped that agreements are reached and uncertainty declines, the possibility remains that additional tariffs will be announced and further trade actions may be forthcoming. Monetary normalization in the United States has also entered a new phase. While some see interest rates now at or close to neutral levels, there is considerable doubt regarding what level is actually neutral. The Federal Reserve suggests new data in the coming months may bring greater clarity. The market now expects close to zero interest rate rises for 2019. However, if new data point to higher required rates, a sharp market reaction could be forthcoming, affecting global interest rates, stock markets, and capital flows. Net capital flows to Latin America and the Caribbean have already declined. The risks of further declines in capital flows and increases in the cost of capital for the public and private sectors are themes in the subsequent chapters of this report. In the next section of this Chapter, a set of risks to the global economy and its potential impact on Latin America and the Caribbean is analyzed through the lens of a statistical model.

## Risks and Opportunities for Latin America and the Caribbean

As discussed above, the global outlook has weakened and while there are some upside risks to the baseline there are also significant negative risks facing the world economy. At the same time, Latin America and the Caribbean continues to be one of the slowest growing regions in the world. Growth for the region in 2018 was just 1.2% and is expected to pick up to just 2% in 2019 and 2.5% in 2020. The regional statistics are lowered currently by

<sup>8</sup> The 2018 GDP of the European Union was almost US\$18 trillion while that of the world was almost US\$85 trillion (IMF, 2019).

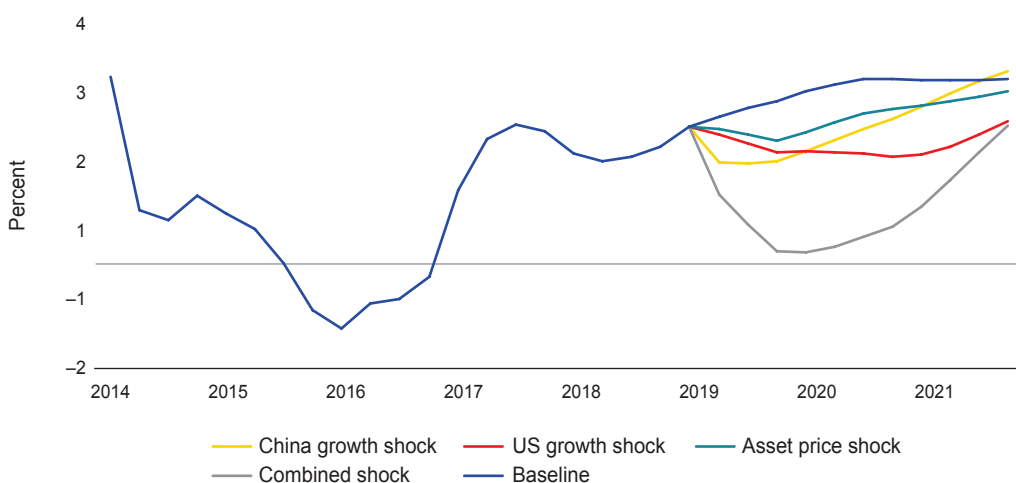
**FIGURE 1.1** ► **Growth Rates of Selected World Regions**

Source: IDB staff calculations based on IMF (2019) and Werner (2019).

the exceptional case of Venezuela, which remains in hyperinflation and a deep economic crisis. Even excluding Venezuela, Latin America and the Caribbean is expected to grow at just 2.3% in 2019 and 2.7% in 2020 (see Figure 1.1).

As will be reviewed in Chapter 5, a number of countries in the region continue to face fiscal adjustment in order to stabilize rising debt ratios that will place a drag on growth. That Chapter reviews current adjustment plans and discusses how to minimize the impacts on growth. As detailed in Chapter 3, there is little space for monetary policy to assist countries that are growing at less than potential. Indeed, the underlying problem is relatively low potential growth. Chapters 6 and 7 of this report are devoted to the role of infrastructure. If the region could invest more in much needed infrastructure, this could provide a welcome boost to the economies of the region. In this chapter, a statistical model of the world economy, including 14 countries in Latin America and the Caribbean, is employed to explore both the potential risks and opportunities.

A particular risk is an escalation of trade measures impacting growth, particularly in China. The IMF's October 2018 *World Economic Outlook* (IMF, 2018b) contained an analysis of these risks. The bottom line was that a fall in growth in China implied a loss of about 1.8% of GDP. A shock of this magnitude could lower growth in China to 5.3% in 2019 and in 2020 from 6.2% for both years in the baseline. This shock was estimated considering the impacts of the trade measures as well as further impacts on confidence and investor sentiment. Deploying a Global Vector Auto-Regression (or G-VAR) model, the potential

**FIGURE 1.2** ► **Latin America and Caribbean Growth Scenarios**

Source: IDB staff calculations; the baseline is drawn from IMF (2018) and IMF (2019).

impact of such a shock on Latin America and the Caribbean is illustrated in Figure 1.2.<sup>9</sup> The results indicate a significant impact for the region; growth falls by 0.5% per annum for three years for a total loss of 1.5% of regional GDP. The effect is larger for the Southern Cone (excluding Brazil), but all subregions are negatively affected. Central America and the Caribbean are the least affected. Indeed, oil prices would fall under this scenario, which might benefit several oil importers, but as the United States is negatively affected, the net impact on this region is negative. The baseline growth rates and the results from this shock for the region are detailed in the first and second columns of Table 1.1

A second potential shock is lower growth in the United States given an escalation in trade actions, weaker than expected corporate earnings, and higher than expected inflation, forcing interest rate hikes later in the year. This shock is calibrated as a decline in growth of one half a standard deviation spread over two years, or a 0.8% loss of GDP over the eight quarters.<sup>10</sup> This lowers U.S. growth from the baseline of 2.5% and 1.8% for 2019 and 2020 to some 2.1% and 1.4%, respectively. The model suggests that the impact on Latin America and the Caribbean would be to lower growth by some 0.8% of GDP per annum for three years, or a loss in GDP of almost 2.4%. This shock is also illustrated in Figure 1.2 and the second column of Table 1.1.

If these two shocks occurred together, then the fall-out in financial markets would likely be significant. Indeed, as markets appear to expect no further increases in interest rates in the United States and may be expecting some resolution of the trade tensions,

<sup>9</sup> For details of the G-VAR model please refer to Powell (2012), Appendix B, and Cesa-Bianchi et al. (2012).

<sup>10</sup> This shock is also roughly of the same magnitude as that considered in IMF (2018b).

**TABLE 1.1** ► **Impact of Selected External Shocks on Latin America and the Caribbean**

Country	Baseline growth	Difference in growth with respect to baseline (2019–2021 average)			
	Average (2019–2021)	China growth	US growth	Financial shock	Combined shock
<b>Latin-America and the Caribbean</b>	<b>2.4%</b>	<b>–0.5%</b>	<b>–0.8%</b>	<b>–0.4%</b>	<b>–1.7%</b>
Southern Cone except Brazil	1.9%	–0.8%	–1.0%	–0.5%	–2.3%
Andean Region	3.4%	–0.4%	–0.7%	–0.3%	–1.3%
Central America and The Caribbean	2.3%	–0.1%	–0.2%	–0.1%	–0.4%
The Caribbean	1.6%	–0.2%	–0.1%	0.0%	–0.3%
Brazil	2.3%	–0.4%	–0.8%	–0.3%	–1.5%
Mexico	2.4%	–0.4%	–1.0%	–0.5%	–1.9%

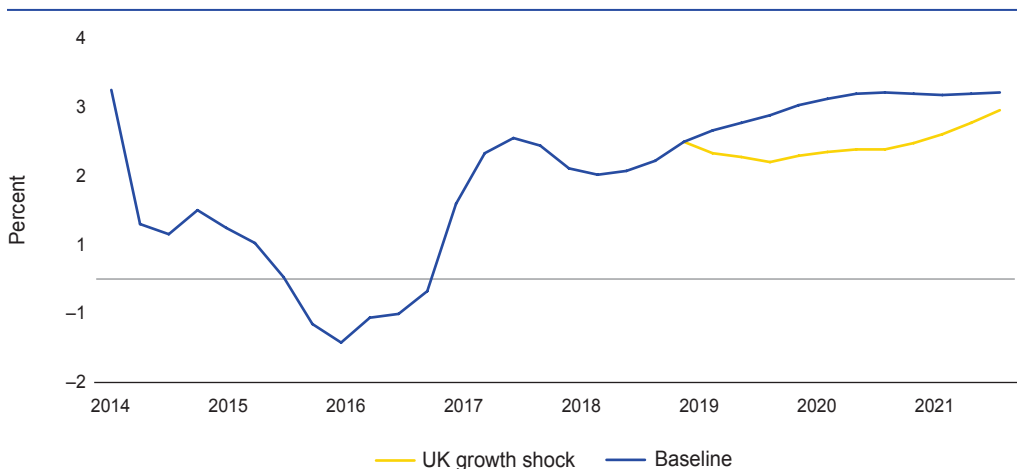
Source: IDB staff calculations.

Note: The results stem from a G-VAR model. See Powell (2012), Cesa-Bianchi et al. (2012) and Dees et al. (2007).

such unanticipated developments could provoke a sharp repricing of financial assets. A financial shock is then added to the two preceding shocks on China and the United States. This is calibrated as a one half a standard deviation fall in equity prices in the United States, the United Kingdom and in the Euro area. The combined shock is illustrated in Figure 1.2; the financial shock and combined shock are detailed in the third and fourth columns of Table 1.1. The combined shock would reduce growth by 1.7% per annum in the region each year for the next three years, bringing the region close to zero growth.

A further risk relates to the ongoing discussions regarding how the United Kingdom may leave the European Union, known as BREXIT. At the time of writing, there is still considerable uncertainty as to how BREXIT might unfold. Given this uncertainty, it's hard to gauge the impacts on the United Kingdom and elsewhere. As an illustration, consider the case that the United Kingdom suffers a loss in GDP of half a standard deviation of its growth rate, which is almost 1% of U.K. GDP. This would be a significant blow—but by no means catastrophic—to the United Kingdom, which is expected to grow at 1.5% in 2019 under the baseline.<sup>11</sup> Employing the G-VAR statistical model, this could have a significant impact on Latin America and the Caribbean of about 0.6% of GDP (see Figure 1.3, which illustrates the effect). The U.K. economy impacts the Eurozone and even the United States. The impact is somewhat greater for South America (which trades more with Europe) and is significantly less for Central America and the Caribbean. The model illustrates how the world is interconnected; while the direct links between the United Kingdom and Latin America and the Caribbean may be small, there could still be significant effects.

<sup>11</sup> The Bank of England suggested the impact of BREXIT could be much larger, particularly if it was disorderly with no deal and no transition (see Bank of England, 2018).

**FIGURE 1.3** ► Impacts of a BREXIT-Inspired Shock on Latin America and the Caribbean Growth

Source: IDB staff calculations; the baseline is drawn from IMF (2018b, 2019).

Given the weakening outlook for the global economy, relatively low baseline growth for Latin America and the Caribbean, and the current spectrum of risks in the world economy, it would be extremely beneficial to find ways to boost potential output. As will be discussed in Chapters 6 and 7, greater investment in infrastructure may provide one route to relax constraints and boost private sector activity. Moreover, as countries in the region interact, boosting growth in one country may have positive impacts on others. Indeed, higher growth in the larger countries would stimulate growth across the region. To illustrate this point, consider a positive growth shock of just 0.3% of GDP growth in the five largest economies (Argentina, Brazil, Chile, Colombia, and Mexico) spread over two years. This expansion would add about US\$13 billion of GDP across the five countries, perhaps generated by greater infrastructure investment. The interesting aspect of simulating this shock using the G-VAR model of the global economy is that it takes into account the interactions between countries and the dynamic and persistent effects on each individual country. Thus, while the initial shock to GDP is just US\$13 billion, the total impact is some US\$71 billion. This translates into about 0.5% higher growth for Latin America and the Caribbean for each of three years, on top of the baseline 2.4% growth; in other words, a total increase of about 1.5% of regional GDP. The size of this shock was somewhat arbitrarily chosen. If the size of the shock were doubled, then the impacts would also roughly double.<sup>12</sup> The shock and the total impact of the shock is detailed in Table 1.2.

<sup>12</sup> While the basic model is essentially linear the interactions imply some non-linearities in the simulations.



**TABLE 1.2** ► **The Impact on Regional Growth of Shocks to Five Large Economies**

Country	Shock US\$ billion	Impact US\$ billion	Average 2019–2021 growth	Increase in average 2019–2021 growth
<b>Latin America and the Caribbean</b>	<b>13</b>	<b>71</b>	<b>2.4%</b>	<b>0.5%</b>
Southern Cone	8	42	2.2%	0.5%
Andean Region	1	9	3.4%	0.4%
Central America, Mexico and The Caribbean	4	20	2.4%	0.5%

Source: IDB staff calculations.

Note: This simulation is of a growth shock of 0.3% of GDP to Argentina, Bolivia, Brazil, Chile and Colombia. The model also includes Costa Rica, Ecuador, El Salvador, Jamaica, Mexico, Nicaragua, Paraguay, Peru, and Trinidad and Tobago.

## Conclusions

Growth in the region is projected to be just 2% this year, rising to 2.5% for 2020. However, a set of potential risks face the world economy that could negatively impact the region. If inflation rises above the 2% target in the United States and the Federal Reserve is forced to consider interest rate hikes later this year, and if disputes regarding trade escalate, then growth may suffer in the United States and China. European growth has already been downgraded, but further risks include a no-agreement BREXIT or continuing uncertainty. If these risks materialize, then financial markets could react aggressively as they did in December, 2018; the volume of capital flowing to Latin America and the Caribbean would likely be further reduced and its cost would increase. The following chapters consider the particular situation of Latin America and the Caribbean given these risks and how the region might counter such problems. This situation underscores the need for the region to find ways to boost potential growth. Interestingly, a modest positive growth shock (perhaps from greater infrastructure investment) could boost regional growth significantly. Chapters 6 and 7 discuss how to attract greater financing for and how to get the biggest bang for the buck from infrastructure investment.



## CHAPTER 2

# Monetary Normalization: Impacts on Global Capital Markets and Capital Flows

**T**he ongoing monetary normalization and tapering of the extensive balance sheets of the United States Federal Reserve (Fed), the European Central Bank and the Bank of Japan will continue to reduce global liquidity, putting upward pressure on global interest rates. The risk of capital outflows and exchange rate pressures in emerging economies will consequently rise. The danger of a sudden stop—a sharp outflow of capital—is particularly great in countries with significant fiscal or external imbalances and whose financial systems have substantial assets and liabilities denominated in foreign currencies. This chapter focuses on recent developments in monetary policy in the United States, and the possible implications on borrowing costs, capital flows, and the specter of sudden stops in Latin America and the Caribbean.

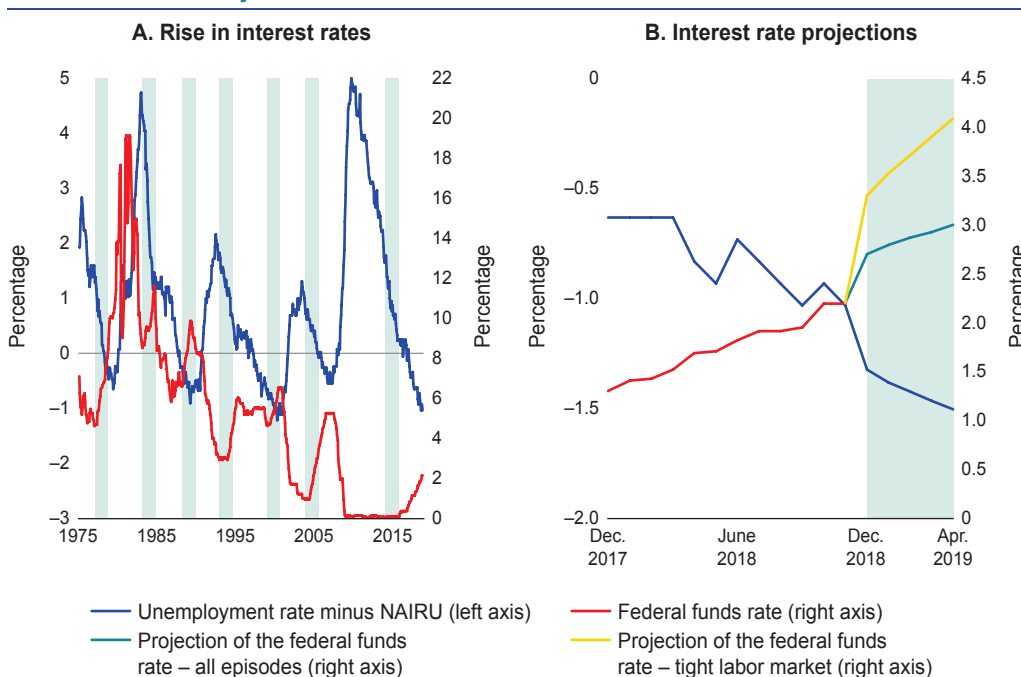
### Labor Markets and Monetary Policy Normalization in the United States

Periods of monetary policy tightening in the United States have been characterized by economic booms and tight labor markets. In such periods, the fast pace of economic activity tends to put pressure on wages and retail prices, fueling inflation which, in turn, calls for a contractionary monetary policy stance. Figure 2.1, Panel A documents the historical path of the Federal Funds interest rate;<sup>1</sup> the shaded areas highlight the episodes in which the stance was contractionary.<sup>2</sup> A pattern that stands out is that during periods of contractionary monetary policy, unemployment has fallen such that the *unemployment gap*—defined as the unemployment rate *minus* the “Non-Accelerating Inflation Rate of Unemployment” (NAIRU)—has decreased.<sup>3</sup>

<sup>1</sup> The federal funds rate (or Fed Funds rate) is the interest rate at which depository institutions like banks lend reserve balances to other banks on an overnight basis. Reserves are excess balances held at the Federal Reserve to maintain reserve requirements. It is sometimes also known as the U.S. policy interest rate.

<sup>2</sup> Episodes are identified as follows: An episode starts if the current period policy rate is greater than the value at  $t-1$ ; then the period continues as long as the policy rate is above the cumulative average. Seven episodes have been identified since the mid-1970s.

<sup>3</sup> The non-accelerating inflation rate of unemployment (NAIRU) is the specific level of unemployment that is evident in an economy that does not cause inflation to rise. The Bureau of Labor Statistics' estimate of

**FIGURE 2.1** ► **Federal Funds Rate and Unemployment Gap (All Episodes) and Projections of Federal Funds Rate**

Source: IDB staff calculations based on Federal Reserve Bank of St. Louis and Bureau of Labor Statistics.

Note: Panel A) Shaded areas represent periods of rising interest rates that meet the following conditions: i) interest rate value at time  $t$ , has to be greater than or equal to the value at  $t-1$  (once the upward trend of interest rate increases is identified) and ii) the value has to be above the cumulative average. Panel B) Forecast based on the estimated elasticity of the interest rates on unemployment for i) all episodes and ii) episodes with tight labor markets.

Contractionary monetary policy episodes in the United States are further divided into two categories: all episodes, and; episodes that occurred under tight labor market conditions —i.e., when the unemployment gap fell below a certain threshold (0.5%). The main takeaway from this categorization is that the Federal Reserve has raised its policy rate more when labor market conditions have been tighter. The average increase of the policy rate during tight labor market episodes was 243 basis points (bps), while for all episodes, the average increase was 191 bps.

This historical analysis suggests that further tightening of the labor market, as predicted by official U.S. forecasts, may call for more contractionary monetary policy in order to prevent inflationary pressures.<sup>4</sup> Figure 2.1, Panel B presents two alternative paths for the

NAIRU is not a constant. For example, permanent shocks to labor demand will result in a change to the NAIRU and the unemployment level will drift to a new equilibrium. See <https://www.bls.gov/opub/mlr/2017/article/full-employment-an-assumption-within-bls-projections.htm>.

<sup>4</sup> A caveat to this analysis, however, is that during this tightening episode the level of interest rates remains relatively low and consumer price inflation at the time of writing remains close to the 2% target.

policy rate, taking as given the projection of the unemployment gap, which is computed from official forecasts of the unemployment rate and the NAIRU.<sup>5</sup> The two paths for the U.S. policy rate are simulated using the estimated historical elasticity of the policy rate to labor market conditions for all episodes, and the elasticity under tight labor markets only, respectively. The assumption is that the unemployment gap is the only driver of the relationship. The projected path of the policy rate using the elasticity drawn from all the contractionary monetary policy episodes ends at around 3% by April, 2019. Alternatively, the projected policy rate using the elasticity drawn from episodes when labor market conditions were tighter increases to 4%.

Additional forces can create inflationary pressures in the U.S. economy and, therefore, can force a different policy stance. If the Phillips curve, which summarizes the relationship between unemployment and overall prices, is steeper at lower values of unemployment, then the increase in real wages currently observed (Panel A of Figure 2.2), could spill over into the overall price level, thereby increasing inflationary pressures and demanding a larger monetary policy response. Moreover, expansionary fiscal policy may increase inflationary pressures through aggregate demand. The combination of tight labor markets and expansionary fiscal policy is unprecedented in recent history (see Figure 2.2, Panel B); therefore, the implications for monetary policy are unclear. On the flip side, the current period of unprecedentedly low interest rate levels may imply that the historical elasticities are no longer valid. Moreover, the unwinding of the very significant holdings of assets on the balance sheet of the Federal Reserve could tighten monetary conditions without further changes in the policy rate. Last, but not least, concerns about the growth prospects of the U.S. economy, which in part may have driven the stock markets high volatility during late 2018 and early 2019, may slow the pace of interest rate hikes. This would be in line with the recent downward shift in market expectations regarding future policy rates, following the January 2019 Federal Open Market Committee (FOMC) meeting.

The bottom line is that there are upward and downward risks to the monetary policy forecasts in the United States. Moreover, labor markets are currently tight by historical standards, which has usually implied larger rate hikes than under less tight labor market conditions.

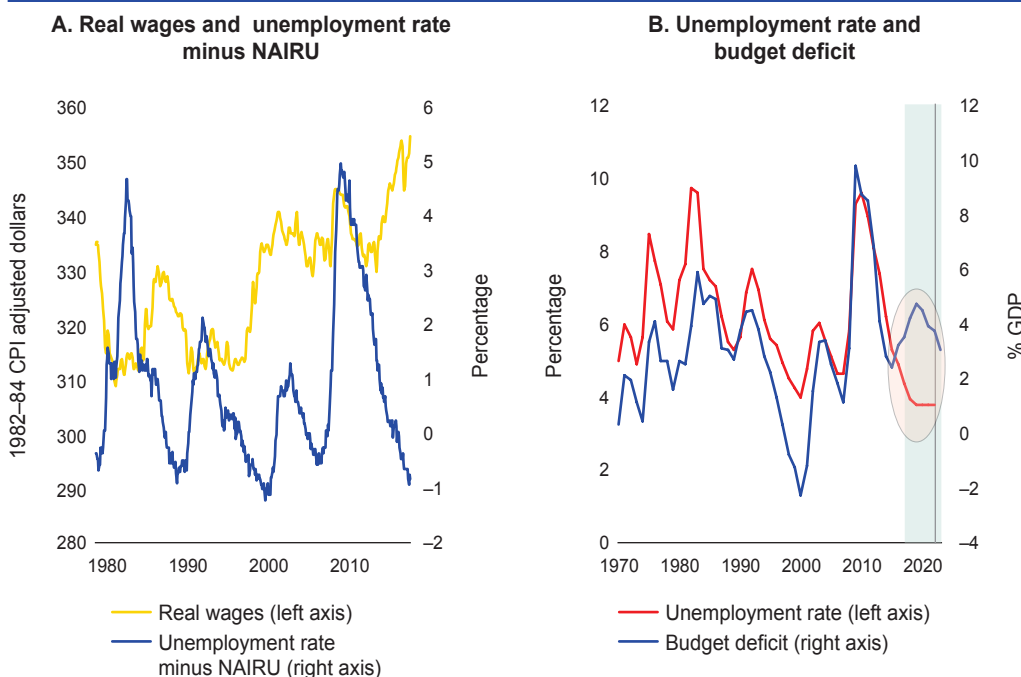
## Effects on Risk Premia in Emerging Markets

The stance of U.S. monetary policy affects capital flows to emerging market economies.<sup>6</sup> Periods of expansionary policy, for example, like the one experienced since the

<sup>5</sup> Official forecasts for NAIRU and the unemployment rate come from the Federal Reserve Bank of St. Louis and the Congressional Budget Office, respectively. Monthly forecasts are obtained by linearly interpolating quarterly official estimates.

<sup>6</sup> See Calvo, Leiderman, and Reinhart (1993).



**FIGURE 2.2 ► U.S. Tight Labor Markets and Pro-Cyclical Fiscal Policy**

Source: Panel A) IDB staff calculations based on Federal Reserve Bank of St. Louis and Bureau of Labor Statistics. Panel B) IDB staff calculations based on Office of Management, Budget and Bureau of Labor Statistics (Current Population Survey) and Bloomberg L.P.

Note: Panel A) Real wages are the median weekly earnings of wage and salaried workers 16 year and over employed full-time. Unemployment gap calculated as the difference between the unemployment rate and the NAIRU.

Panel B) Shaded circle represents the change in the correlation between the variables starting in 2016. Shaded rectangle area represents the start of the forecast for both series (2017). Last available forecast value for the unemployment rate is 2022.

global financial crisis of 2008–2009 until recently, have usually been characterized by net capital flowing into emerging markets.<sup>7</sup> It is also well known that such episodes can end abruptly. The same dynamics are usually observed for spreads of Emerging Market Economies (EME) debt.<sup>8</sup> Therefore, changes in U.S. monetary policy from expansionary to contractionary are key turning points, driving capital outflows, raising risk premia on external debt, and depressing economic activity in EMEs.

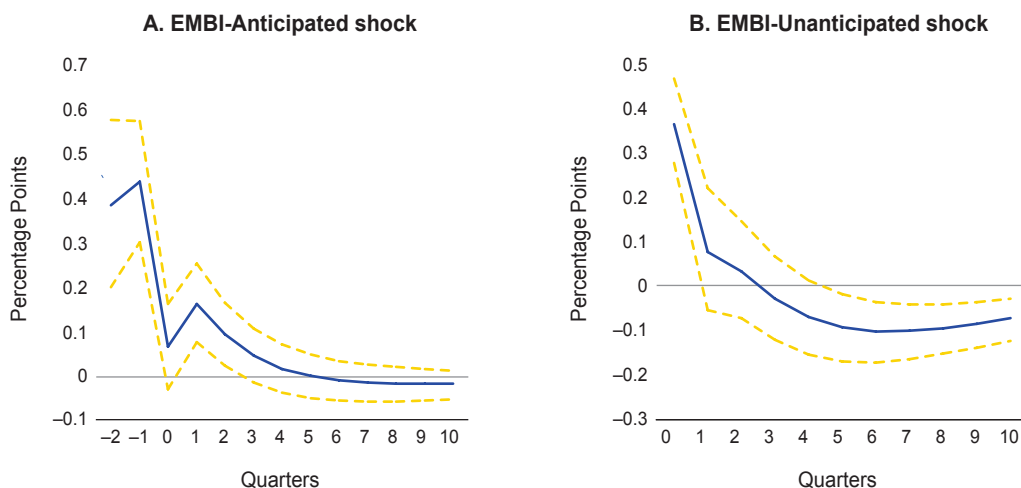
<sup>7</sup> An additional amplifying mechanism comes from the fact that such periods are often characterized by low levels of global risk perception, which translate into low spreads on sovereign and corporate debt. (See Akinci, 2013, and Caballero, Fernández, and Park, forthcoming).

<sup>8</sup> Uribe and Yue (2006), for instance, find that sovereign bond spreads respond to changes in the U.S. interest rate, although with a lag: spreads peak more than one percent above their initial level two quarters after an unexpected one percent increase in the (real) 3-month U.S. Treasury Bills rate. Akinci (2013) documented how the main channel through which this effect takes place is via the direct effect of U.S. policy rates on global risk (as proxied by the VIX) which then percolates into EME's risk premia. Recently, Caballero, Fernández, and Park (forthcoming) found even stronger effects of external factors on the spreads of debt issued by corporations from EMEs in international capital markets.

A challenge when trying to quantify the effects of changes in U.S. monetary policy on EMEs is that many of these changes are anticipated days, if not months, before the actual policy change.<sup>9</sup> This means that only considering the impacts of shocks (unanticipated changes) may underestimate the total impact of monetary policy changes on emerging markets. One way to try to disentangle the impacts of anticipated changes versus unanticipated surprises is to first consider changes in the prices of interest rate futures contracts as anticipated changes in the interest rate; then, consider the difference between the estimated prediction embedded in those prices and actual interest rates as the unanticipated or surprise element. This is the approach taken by Vicondoa (2019), who finds that anticipated changes in the Federal Funds interest rate account for about half of its variability. Moreover, following this methodology, anticipated and unanticipated U.S. interest rate shocks explain a significant share of economic activity in EMEs.

This approach can be extended to simulate potential future impacts. The impact of anticipated and unanticipated 25 bps increases in the Federal Funds rate on EMBI spreads is illustrated in Figure 2.3. The overall effect is estimated to increase the EMBI spread between 75 and 80 bps. This implies a 100 to 105 bps increase in bond yields (i.e., the actual cost of borrowing for emerging markets considering the 25 bps increases in the U.S. rate). Total effects can be decomposed between the anticipated and unanticipated components. A 25 bps increase in the U.S. policy rate increases EMBIs by 40bps–45bps

**FIGURE 2.3** ► **The Impacts of Anticipated and Unanticipated Shocks on EMBI Spreads**



Source: IDB staff calculations based on Vicondoa (2019).

Note: Panel A illustrates the impulse response function (IRF) of EMBI spreads from a two-quarter anticipated increase in the Fed funds rate of 25 basis points using a panel of emerging markets. Panel B illustrates the IRFs from an unanticipated shock of the same magnitude. Results are obtained from the methodology in Vicondoa (2019).

<sup>9</sup> Indeed, as discussed in Chapter 1, the Federal Reserve spends a considerable amount of time and effort signaling what its future policies will be.

before the actual increase materializes. A 25 bps unanticipated rate hike increases EMBIs by an additional 35 bps (Panel B).

What do these estimates imply for EMBI spreads in Latin America and the Caribbean? The December 2018 FOMC members' forecasts for the policy rate (also known as the "dot plots") for 2019 had a 50 bps increase in the Fed funds rate on average throughout this year. If the Fed Funds rate were to increase by that amount and the hikes were fully anticipated, then average EMBI spreads could increase by between 80 and 90 bps, according to the above-mentioned elasticities. In that case, Latin America and the Caribbean EMBI spreads would increase to between 648 and 658 bps by year-end 2019 from 568 bps at the end of 2018. Larger policy rate hikes—as, for example, the ones that could materialize under tighter-than-expected labor market conditions—could have a bigger impact on EMBI.

## The Specter of Sudden Stops

Sudden stops in capital flows occur when foreign financing available to borrower countries unexpectedly dries up. Sudden stops became known as a form of financial crisis whose trigger is based on supply shocks stemming from world capital markets rather than on domestic policy failings (i.e., "push" rather than "pull" factors).<sup>10</sup>

Current spread levels for sovereign borrowers are below the levels prevailing at the time of the Asian/Russian financial crisis and the global financial crisis of 2008–2009. However, the analysis in the previous section suggests that factoring in the possible impact of higher policy interest rates in the United States, EMBI spreads could reach 660 bps—a level similar to that observed during the financial crisis. Several previous episodes of tightening in U.S. monetary policy were accompanied by financial turmoil in Emerging Markets, sometimes ending in crises. When sudden stops materialize, they are usually costly in terms of output losses. They impose difficult adjustments, particularly in countries with large stocks of debts denominated in foreign currency.<sup>11</sup>

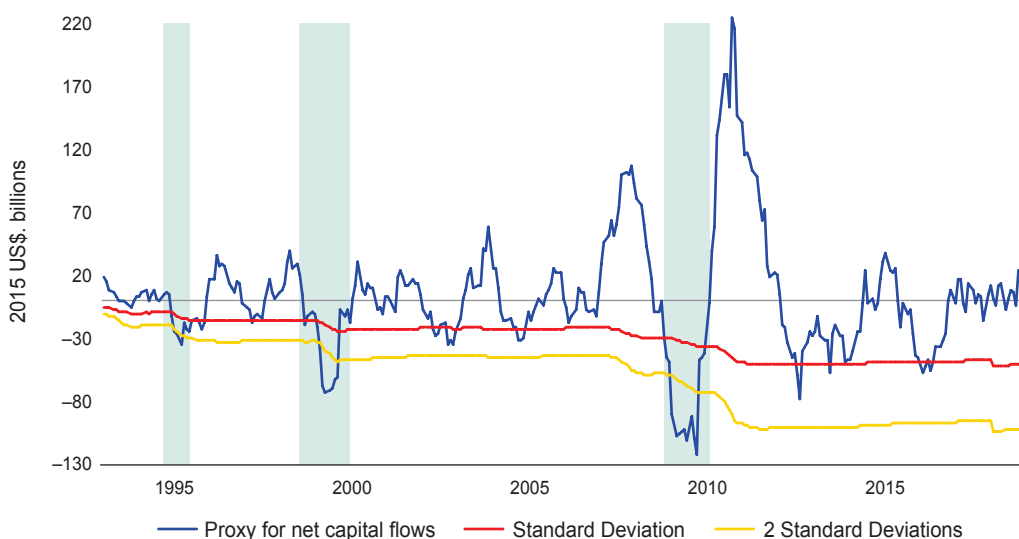
The international financial context facing the region raises the possibility of tighter financial conditions for emerging markets in the future. The question is whether the response of net capital flows raises the specter of a sudden stop?

Figure 2.4 presents a monthly estimate of net capital flows constructed by subtracting the trade balance (real exports minus imports) from the change in international reserves.<sup>12</sup>

<sup>10</sup> The idea that capital flows may be driven by "push" (external) rather than "pull" (domestic) factors has a long tradition in the literature (see Calvo, Leiderman, and Reinhart, 1996). The first analytic approach to the problem of sudden stops is Calvo (1998a).

<sup>11</sup> See Cavallo and Izquierdo (2009).

<sup>12</sup> Researchers typically use Balance of Payments (BoP) data on capital flows to identify sudden stops empirically. BoP is readily available at a quarterly frequency for a large set of countries from the IMF's BOPS (Balance of Payments Statistics) database. The limitation is that quarterly capital flows data is published with a lag; therefore, it does not provide a good gauge for assessing how far countries are from a sudden stop at present.

**FIGURE 2.4** ► **Net Capital Flows to Latin America and the Caribbean**

Source: IDB staff calculations based on data from IDB's Latin Macro Watch (LMW) database, complemented by data from the International Financial Statistics (IFS) and the Institute of International Finance (IIF).

Note: This figure presents a proxy of net capital flows (The proxy is the change in international reserves minus the trade balance) at monthly frequency based on Calvo, Izquierdo, and Mejía (2008). Figures are in real 2015 U.S. dollars. The regional proxy is the sum of 14 individual country series.

The estimate is available for 14 countries in Latin America and the Caribbean from January 1992 to December 2018.<sup>13</sup> A sudden stop is an episode in which net capital flows fall by more than two standard deviations below the mean. The region has suffered three sudden stops (shaded blocks): the Tequila crisis in the mid-1990s; the aftermath of the Asian and Russian financial crises in the late 1990s, and; the global financial crisis of 2008–2009. The figure also shows a noticeable increase in the level of net capital flows into and out of the region before and after the global financial crisis of 2008–2009. Since 2012, net capital flows have returned to pre-crisis levels. By the end of the sample, net capital flows had fallen from their post-crisis peaks; however, they were still above the one and two standard deviation thresholds, suggesting that the region was not yet close to entering sudden stop mode again.

While it is good news that net capital flows to the region are showing resilience, there are reasons to remain vigilant. First, the higher volatility in capital flows during the global financial crisis of 2008–2009 increased the sudden stops identification thresholds as illustrated by the one and two standard deviation lines. However, milder bouts of capital flows volatility that may be precipitated by relatively small increases in EMBI spreads—for example, the ones in the simulations of the preceding section—could still have a sizable impact on GDP, even if the subsequent fall in net capital flows is not large enough to qualify

<sup>13</sup> Going back to the early 1990s captures the volatility associated with the crises of that decade.

as a sudden stop.<sup>14</sup> Second, experience suggests that capital flows can fall significantly fast and unexpectedly; that is, after all, the genesis of the term *sudden stop*. For example, net capital flows fell below 2 standard deviations from levels similar to the current one in the four months between September 2008 and January 2009. Third, the regional aggregate hides a degree of intraregional heterogeneity: while a few countries have entered or are close to sudden stop territory, the majority remain some distance away. The next section explores the role of buffers and domestic fundamentals in assessing countries' vulnerabilities to sudden stops.

## Building External Buffers: The Role of Foreign Reserves

Sudden stops are episodes with an external trigger. This implies that the spark that ignites sudden stops originates outside the affected country, more specifically, in the supply of foreign financing that can halt for reasons that may be unrelated to the affected country's domestic conditions. Yet a spark cannot generate a fire unless combustible materials are present. The literature has established that a set of *domestic macroeconomic fundamentals* are the combustible materials that make some countries more vulnerable than others. Higher fiscal deficits, larger current account deficits, and higher levels of liability dollarization are manifestations of weak fundamentals that increase vulnerability. On the flip side, international reserves provide buffers that can help countries offset the risks. Table 2.1 shows the state of those fundamentals in the region in 2018 and compares them with the levels observed in 2007, the year prior to the global financial crisis. The comparison is useful since the region was able to withstand the negative effects of the global financial crisis in large part thanks to the strength of domestic fundamentals prior to the crisis.<sup>15</sup>

In the table, countries are separated into three groups according to their monetary regime: Established Inflation Targeters (EITs), Recent Inflation Targeters (RITs), and countries

**TABLE 2.1** ► **Factors Affecting the Expected Loss in Case of a Sudden Stop**

(% of GDP)	Fiscal Surplus		Current Account		Liability Dollarization		Reserves	
	2007	2018	2007	2018	2007	2018	2007	2018
Established IT	1.2%	−3.6%	0.4%	−1.8%	8.4%	11.1%	13.4%	17.6%
Recent IT	−0.5%	−2.7%	−4.5%	−1.6%	18.3%	22.1%	14.1%	18.2%
Intermediate	0.7%	−4.1%	−2.5%	−4.6%	20.5%	18.4%	21.4%	17.0%

Source: IDB staff calculations based on IMF (2018).

<sup>14</sup> See Cavallo et al. (2015).

<sup>15</sup> See Izquierdo and Talvi (2009) and Powell (2014).



with Intermediate Exchange Rate Regimes (IERs).<sup>16</sup> Countries in the region vary widely in terms of their fundamentals. Fiscal positions have deteriorated in all three groups since 2007. The most serious deterioration was among countries with intermediate regimes. Current account balances deteriorated in established inflation targeters and in countries with intermediate regimes. Instead, they improved in recent inflation targeters especially because this group includes Jamaica, where a very large current account deficit in 2007 has since declined. Liability dollarization increased in the two inflation targeter groups and remained nearly unchanged for countries with intermediate regimes. Regarding international reserves, the two groups of inflation targeters increased reserves holdings between 2007 and 2018; instead, countries with intermediate regimes reduced their holdings.

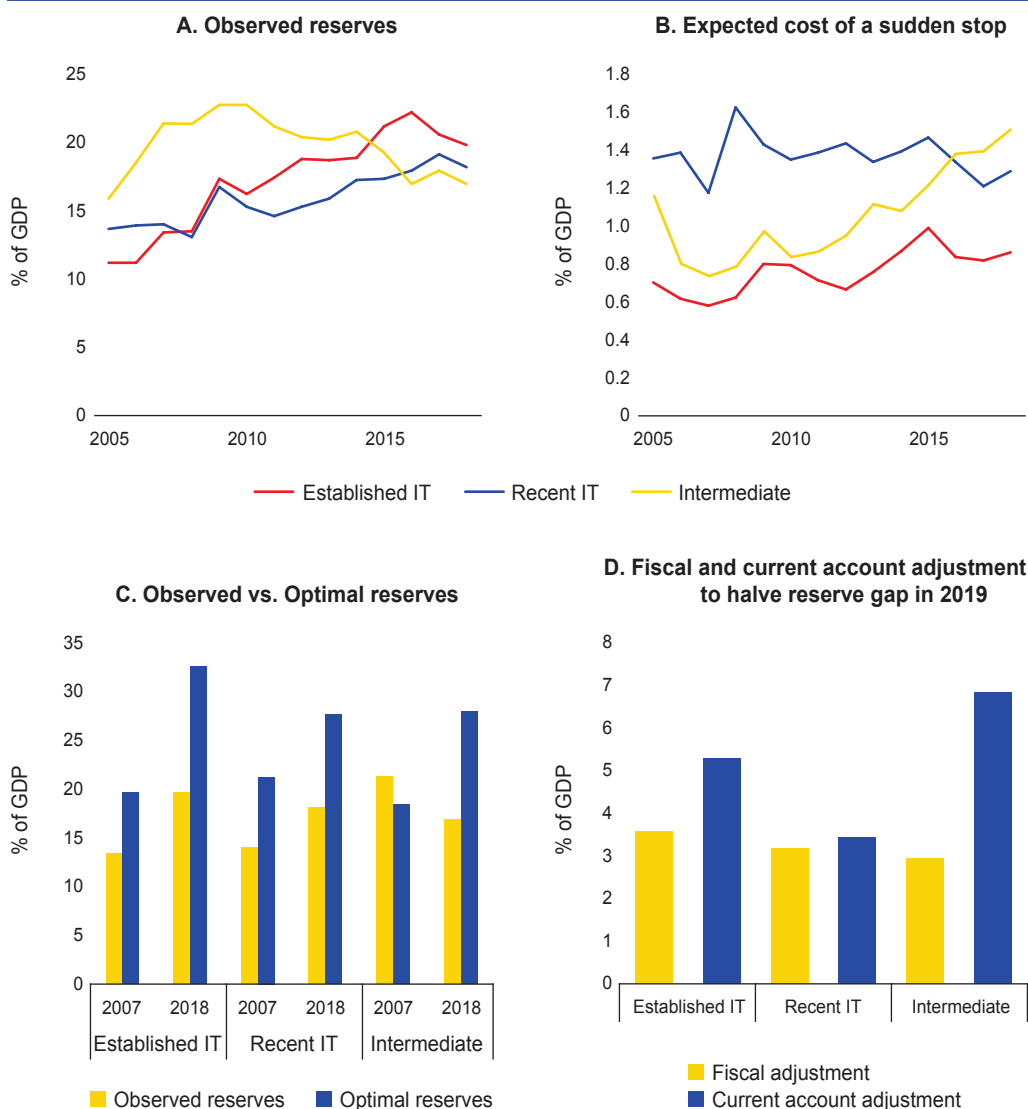
A proposed framework assesses how the changes in fundamentals weigh on countries' vulnerabilities (Calvo, Izquierdo, and Loo-Kung, 2013). Figure 2.5 presents the results of this framework applied to countries in Latin America and the Caribbean. Panel A illustrates how international reserves (as a percentage of GDP) have evolved in the region since the mid-2000s. The evolution of international reserves together with variations in other domestic fundamentals determine the expected cost of sudden stops depicted in Panel B.

The expected costs are the estimated percentage decline in GDP conditional on a sudden stop. They provide a metric of countries' exposure to the risk of sudden stops. Countries with intermediate regimes experienced the biggest increase in expected costs because all the domestic fundamentals depicted in Table 2.1 deteriorated, and reserve levels fell compared to 2007. The expected cost also increased for established inflation targeters, suggesting that the higher reserves accumulated in those countries since 2007 has not been enough to offset the larger fiscal and current account deficits, and the higher level of liability dollarization. However, the exposure to risk of established inflation targeters, proxied by the expected cost, is approximately one-half of that of countries with intermediate regimes. In the case of recent inflation targeters, expected costs have remained stable—albeit above the levels in established inflation targeters—as increases in fiscal deficits and liability dollarization since 2007 were offset by lower current account deficits and higher levels of reserves.

The *optimal* level of international reserves, in turn, balances the expected cost of a sudden stop against the cost of holding those reserves. A good proxy for the cost of holding reserves is the difference (or spread) between the interest rate on the country's debt and the return on U.S. Treasuries. The gap between observed and optimal reserves for the three groups of countries widened in 2018 vis-à-vis 2007 (see Panel C).

While these results may call for faster international reserve accumulation especially in countries with weaker domestic fundamentals in order to reduce vulnerabilities, doing

<sup>16</sup> EITs: Brazil, Chile, Colombia, Mexico, and Peru. RITs: Costa Rica, The Dominican Republic, Guatemala, Jamaica, Paraguay, and Uruguay. IERs: Argentina, Bolivia, Honduras, and Nicaragua. See Appendix A for more details.

**FIGURE 2.5** ▶ **Optimal Reserves**

Source: IDB staff calculations based on national sources, IMF (2018b) and World Bank's World Development Indicators Database.

Note: In Panel A, the figure illustrates the average observed level of international reserves as a percentage of GDP. Panel B depicts the expected cost of a sudden stop, which is calculated as the probability of suffering a sudden stop times the cost in GDP terms. Established IT: Brazil, Chile, Colombia, Mexico, and Peru; Recent IT: Costa Rica, Dominican Republic, Guatemala, Jamaica, Paraguay, and Uruguay; Intermediate: Argentina, Bolivia, Honduras, Nicaragua, and Venezuela.

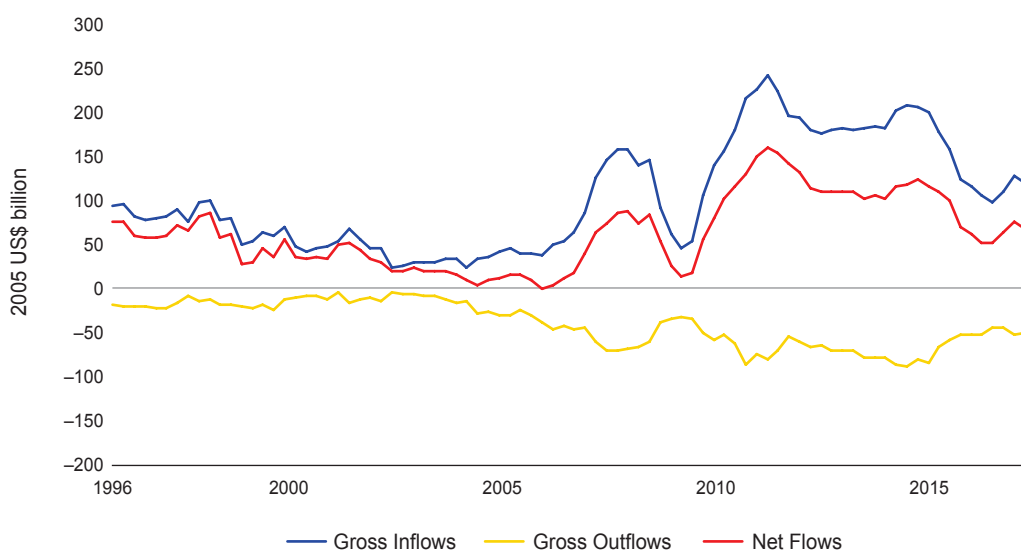
so may be challenging in the current global context. The alternative is to strengthen countries' fiscal and external accounts and to reduce liability dollarization where possible. Figure 2.5, Panel D shows, for example, the adjustments in fiscal or current account balances required to reduce the gap between observed and optimal reserves to one half

of its current level (assuming domestic liability dollarization remains unchanged). Thus, countries with intermediate regimes could reduce the risks by either increasing the fiscal balance by 3.0% of GDP on average or by increasing the current account balance by about 6.8% of GDP on average, or some combination of the two. Recent inflation targeters could reduce the reserves gap to one-half of its current level by improving fiscal balances by 3.1 percentage points of GDP; or the current account balance by 3.4 percentage points, on average. Established inflation targeters could also reduce the risks by improving fiscal balances and/or reducing current account deficits; however, doing so is less important from a risk standpoint because the expected cost of a sudden stop is significantly lower than in the other country groups.

### Domestic Antidotes to Sudden Stops

While net capital inflows to the region grew substantially over the last decade, gross capital flows have risen much more (see Figure 2.6).<sup>17,18</sup> The flip side of the increase in gross outflows is the accumulation of foreign assets by residents. These, in turn, may be repatriated

**FIGURE 2.6** ► Gross and Net Capital Flows

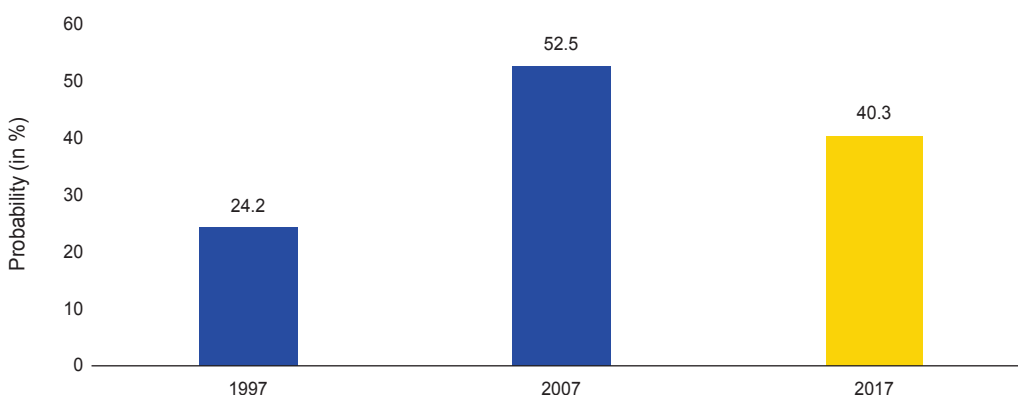


Source: IMF Balance of Payments and International Investment Position Statistics.

Note: The figure illustrates the sum of gross and net capital flows to Argentina, Brazil, Chile, Colombia, and Mexico. Net capital flows are the sum of gross inflows and gross outflows following the IMF Balance of Payments conventions.

<sup>17</sup> In the balance of payments convention, Gross Capital Inflows are defined as changes in the stock of international liabilities owed by residents. Similarly, Gross Capital Outflows are defined as changes in the stock of the foreign asset holdings of residents.

<sup>18</sup> This phenomenon reflects higher levels of financial integration. See Cavallo et al. (2015).

**FIGURE 2.7** ▶ **Estimated Probability of Preventing a Sudden Stop**

Source: IDB staff calculations based on Cavallo, Izquierdo, and León-Díaz (2017).

Note: This figure plots the average probability of preventing a net flow sudden stop conditional on a sudden stop in gross inflows. The estimates are based on the result of a panel regression across 55 countries and the out-of-sample data for 11 countries in Latin America and the Caribbean.

to offset a fall in gross inflows, thereby potentially resulting in more stable net capital flows. Emerging market economies suffered more volatile *net* capital flows than advanced economies in the past because they benefited less from offsetting gross inflows and gross outflows, not because gross inflows in developing countries were more volatile.<sup>19</sup> The fact that gross flows have been increasing in Latin America and the Caribbean over the last decade begs the question whether the region can start benefiting from more offsetting.

In periods of global distress in capital markets, the ability of a country to prevent a net flow sudden stop rests heavily on the soundness of domestic conditions that entice resident investors to repatriate foreign assets (Cavallo, Izquierdo, and León-Díaz, 2017). Sudden stops in net capital flows are more likely to be prevented in countries with a strong institutional background and credible macroeconomic frameworks. In contrast, it is harder to prevent sudden stops in countries with high levels of foreign-currency liabilities and higher inflation.

Figure 2.7 shows the estimated probability of preventing a sudden stop in net capital flows. This is estimated using the average values of the factors that appear as determinants for preventing a sudden stop in net capital flows conditional on a foreigners sudden stop (i.e., a two standard deviation decline in gross inflows from foreign investors). The average probability of prevention was only 24% in 1997 prior to the Asian and Russian financial crises. It increased to over 50% prior to the global financial crisis in 2008–2009 on the heels of improved domestic fundamentals. Presently, the probability of prevention

<sup>19</sup> See Cowan et al. (2008) on this point.

is estimated somewhere in between the two other periods as fundamentals have deteriorated vis-à-vis 2007 but remain stronger than in the late 1990s.

Additional factors can entice prevention. When it comes to foreign assets, for example, the ease with which they can be repatriated is key for their insurance value.<sup>20</sup> But one way or the other, the ability and desire of locals to bring their money home and prevent a full-fledged sudden stop in net capital flows can make all the difference. It can prevent painful adjustments that can ripple through the economy.

## Conclusions

Financial markets reward countries with solid fundamentals and have begun to punish those deemed as the weakest, perhaps more than warranted by their underlying conditions. To reduce the impending vulnerabilities arising from an uncertain global environment, and the risks posed by ongoing monetary policy normalization in the context of tight labor market conditions in the United States, Latin American and Caribbean countries should maintain healthy reserve levels and make adjustments in fiscal and external accounts that are consistent with stability in this new global macroeconomic and financial environment. International reserves are a buffer for countries to mitigate the risks of external shocks. In addition to accumulating international reserves—which may be difficult in the current environment—countries should strengthen domestic fundamentals to build resilience and to create conditions such that other foreign asset holdings of local investors add to the existing buffers. Only under favorable domestic conditions can domestic investors feel comfortable bringing in resources at a time when foreigners are pulling out of emerging markets and thus insulate their country from a shock.

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<sup>20</sup> See Cavallo, Fernández-Arias, and Marzani (2017).

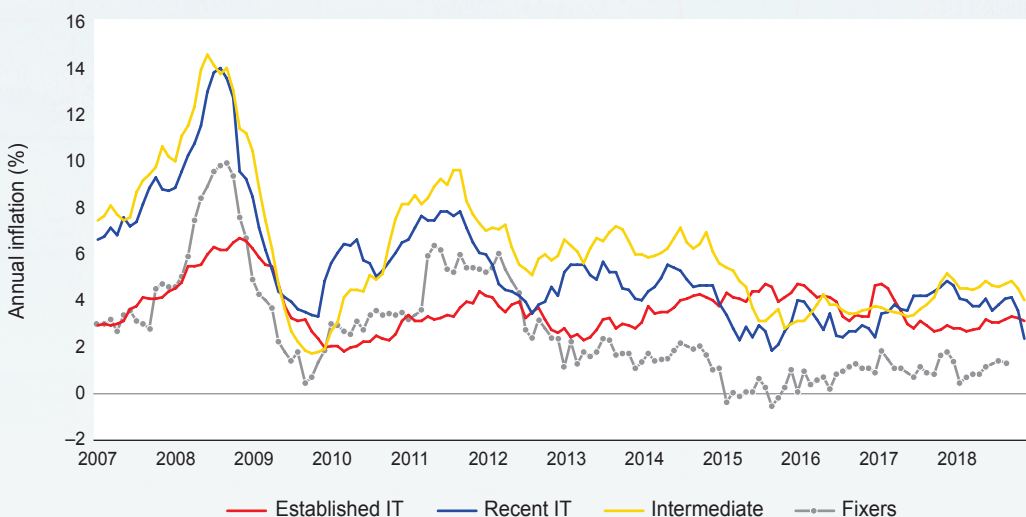


## CHAPTER 3

# Interest Rates and Monetary Policy: Implications for Investment and Output

Against the backdrop of heightened global uncertainty regarding the pace of monetary policy normalization in advanced economies and the possible implications for emerging markets, inflation remains low in most countries in the region; median inflation was 3.6% in the second half of 2018 and across a variety of monetary policy regimes (see Figure 3.1). The exceptions are Venezuela, which is in a serious economic crisis and experiencing hyperinflation, and Argentina, where a sharp devaluation pushed inflation up to close to 50 percent, and led to the implementation of a strict monetary program backed by an IMF Standby Arrangement. The group of countries with fixed exchange rates has the lowest inflation, while those with intermediate regimes have the highest, but the spread between the median of the two groups is only about 3 percentage points. Inflation targeters that had seen inflation rise above the relevant target tended to see inflation fall.

**FIGURE 3.1** ► Inflation Rates across Regimes



Source: IDB staff calculations based on Latin Macro Watch data.

Note: This graph illustrates median inflation rates for different exchange regimes. Established IT: Brazil, Chile, Colombia, Mexico, and Peru; Recent IT: Costa Rica, Dominican Republic, Guatemala, Jamaica, Paraguay, and Uruguay; Intermediate: Argentina, Bolivia, Honduras, and Nicaragua; Fixers: The Bahamas, Barbados, Ecuador, El Salvador, and Panama.



This is welcome news, particularly in those cases where output growth is low, as it implies a more accommodative monetary policy stance may be adopted while ensuring that inflation expectations remain anchored. This chapter first considers the monetary policy choices facing selected inflation targeters and secondly, what countries across the region may expect in terms of investment and output in response to an interest rate shock such as the one considered in the previous chapter.

## Output and Inflation Gaps among Inflation Targeters

On average, established inflation targeters have suffered four years (2015 to 2018) of low growth and negative “output gaps” (output below potential) coupled with positive inflation gaps (inflation above target). However, average output gaps began narrowing in 2018 and inflation targeters (although still hovering in the difficult quadrant of inflation above target and output below potential) may find that policy trade-offs will be less difficult in the coming months than they have been in the recent past (see Figure 3.2, Panel A). Simulating a dynamic monetary model with an estimated monetary policy reaction function and assuming no new shocks, inflation should stay at target and growth should rise to narrow output gaps in the coming months.<sup>1</sup>

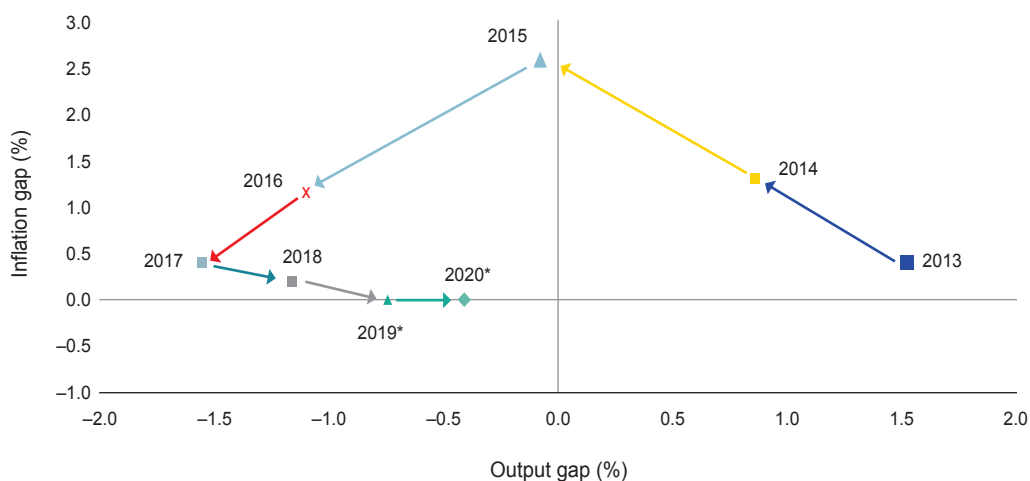
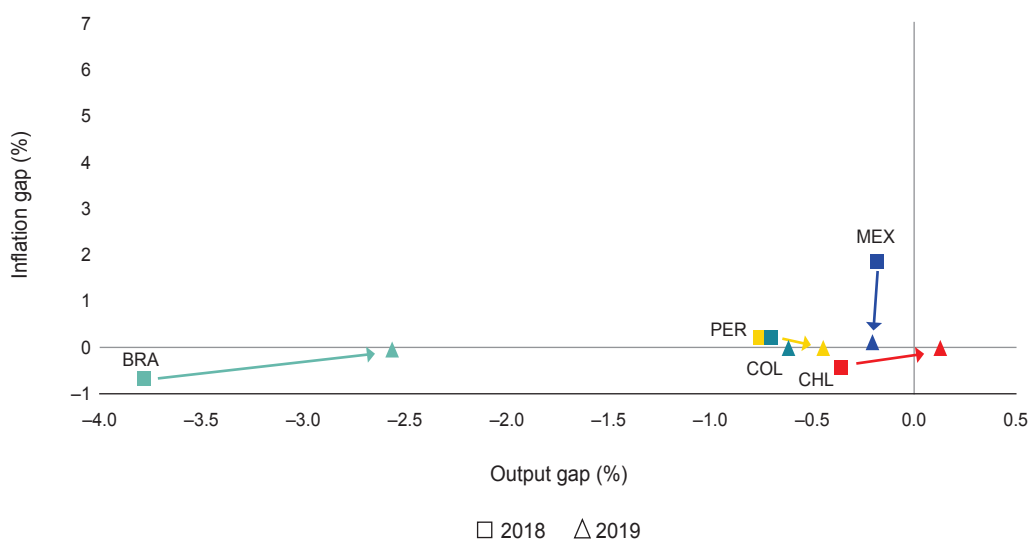
As a group, inflation targeters should then enjoy anchored inflation expectations; but as output remains below potential, a more accommodative monetary policy stance may be justified. Indeed, the median policy rate of the group of countries analyzed here fell in the second half of 2018, continuing the trend identified in last year’s edition of this report (see Figure 3.3).

While looking at averages is informative, it can mask differences across countries. Inflation among most inflation targeters is now close to their targets (Figure 3.2, Panel B). Mexico had somewhat higher inflation, but that is now falling such that inflation in all countries is expected to be close to their target levels in 2019. All countries had negative output gaps, but these are expected to close as growth reaches potential in 2019 for all except Brazil. Growth in Brazil remains below potential as the country recovers from recession. The main challenge in this case is fiscal (see Chapter 5 for details), with monetary policy now finely balanced and likely to depend on the pace of fiscal reforms.

## Monetary Responses to Financial Turbulence

As discussed in Chapter 2, a more contractionary stance in the United States could spark financial turbulence in emerging markets via a direct channel—through interest rate

<sup>1</sup> For further details of the model please refer to Powell (2017) Appendix A. The model is a monetary version of the multi-country framework in Fernández, González, and Rodríguez (2018) and is calibrated to the five Latin American economies with inflation targeting regimes since at least 2005, namely Brazil, Chile, Colombia, Mexico, and Peru.

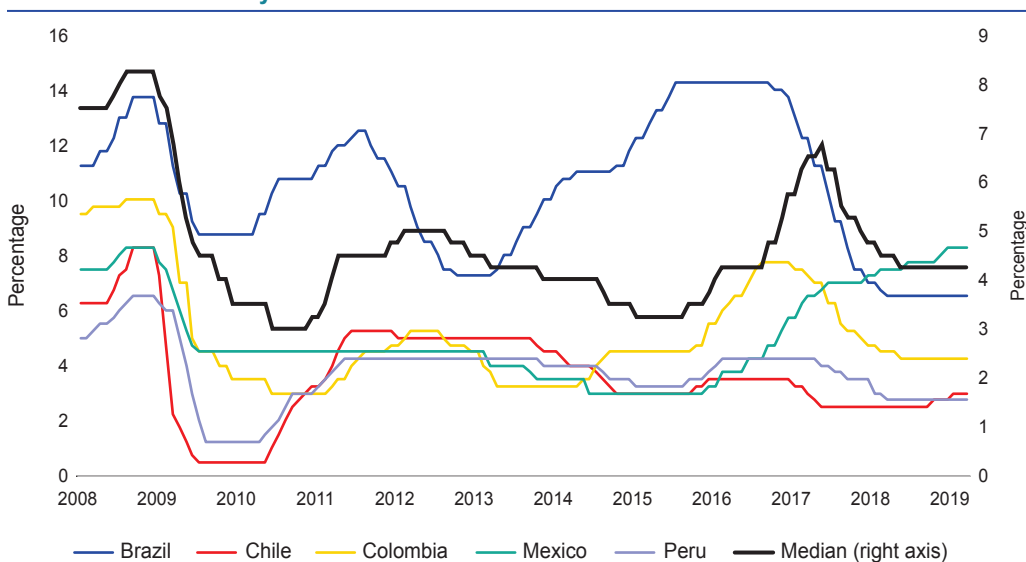
**FIGURE 3.2** ► Inflation and Output Gaps for Established Inflation Targeters (EIT)**A. EIT average****B. Country estimates**

Source: IDB staff calculations based on IMF (2018c), Latin Macro Watch and central bank data.

Note: The inflation gap is the difference between the inflation rate and the target in each country. The output gap is the difference between output and its potential level. IMF (2018c) projections are used to compute the 2019 gaps.

increases worldwide—and an indirect channel—via foreign investors' greater risk aversion in emerging market debt. What can central banks in the region do in the event of such turbulence and higher than expected interest rates?

A dynamic monetary model illustrates what might happen to policy rates under such circumstances. For example, if risk premia in international markets rise by just over 20

**FIGURE 3.3** ▶ **Policy Interest Rates**

Source: IDB staff calculations based on Latin Macro Watch data.

basis points (one standard deviation of the risk premia in the sample analyzed), then the simulated response in monetary policy interest rates is as depicted in Figure 3.4.

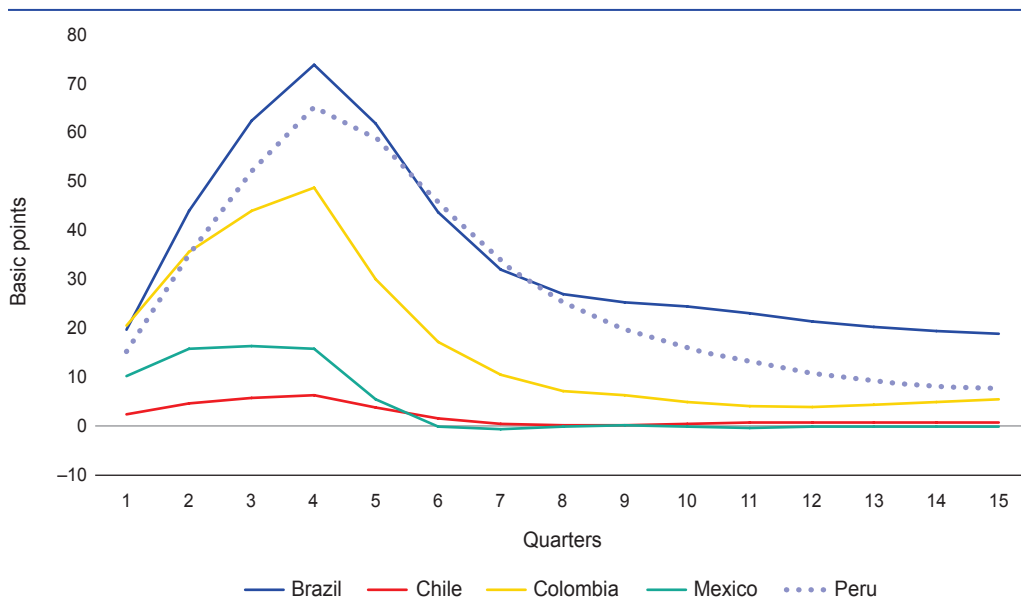
Using the historical statistical relationships between the policy rate and other macroeconomic variables, the model predicts that in all five economies, the policy rate rises the moment the shock occurs and continues to do so for about a year; thereafter, it gradually returns to previous values. To understand this response, note that the negative shock induces a sharp depreciation of the currency which, in turn, passes through to inflation.

As argued in previous editions of this report, to put this procyclical interest rate policy response into context, it is important to understand the impact on exchange rates. Much discussion has focused on whether such exchange rate depreciations are expansionary or contractionary.<sup>2</sup> Suffice it to say that while recent depreciations have had only a mildly positive effect on exports, neither have they provoked severe corporate or banking balance sheet issues.<sup>3</sup> There is greater evidence, however, of positive impacts on output through import substitution effects.<sup>4</sup>

<sup>2</sup> See, for example, Bebczuk, Galindo, and Panizza (2010) and the literature review therein.

<sup>3</sup> While the region has escaped large-scale corporate bankruptcies after sharp depreciations, there is evidence of impacts on investment, and corporate balance sheets do appear to have weakened (see Powell, 2016, Caballero, 2018, and Chapter 4 for further evidence and discussion).

<sup>4</sup> See Powell (2017) Appendix D and Moreira, Pierola, and Sánchez-Navarro (2017) on import-substitution impacts following depreciation in the region.

**FIGURE 3.4** ► **The Response of Nominal Interest Rates to a One-Standard-Deviation Risk Premium Shock**

Source: IDB staff calculations based on Latin Macro Watch data.

Note: The figure illustrates impulse response functions from a dynamic monetary model following a multi-country framework as in Fernández, González, and Rodríguez (2018). The figure displays the response of the annualized nominal interest rate to a one standard deviation shock in each country's risk premium. The size of the shock for Brazil is 0.24%, for Chile is 0.19%, for Colombia is 0.22%, for Mexico is 0.2%, and for Peru is 0.23%.

Still, the strength of the reaction in policy rates is heterogeneous. While in Chile the simulated increase in interest rates is minimal (less than 10 bps), in Brazil the increase is simulated to be in the range of 80 bps. Again, the variety in the responses is associated with the magnitude of the depreciation and the strength of the associated pass-through from the exchange rate to prices.

As emphasized in previous editions of this report, the estimated benefits on output from relaxing policy rates during these types of episodes is relatively small; meanwhile, the potential increase in inflation given the estimated pass-through from the exchange rate can be quite high. Moreover, the model assumes that the estimated policy rule, which is consistent with bringing inflation back to a mean or target level in the medium term, is fully credible. If inflation rises above the relevant target and remains elevated for some time, then additional costs may arise as the credibility of the target erodes.<sup>5</sup> While this analysis is conducted employing historical data to calibrate the model and is thus open to criticism for not fully taking into account recent developments, it suggests a cautious approach when considering further reductions in the policy rates in such instances.

<sup>5</sup> See Mariscal, Powell, and Tavella (2018) on the potential costs on credibility of inflation remaining above target.

## Impact of Monetary Policy Shocks on the Real Side of the Economy

The previous section explored how the varied monetary policy responses in the region to a more contractionary stance in the United States could spark financial turbulence in emerging markets. This section explores the implications of that scenario on investment and output.

Latin America and the Caribbean is composed of relatively open small economies. Therefore, external shocks can be expected to have significant impacts. Still, considerable debate revolves around the relationship between openness and vulnerability. It has been argued that the more open is an economy, the easier and less painful it may be to react to certain external shocks.<sup>6</sup> On the other hand, evidence suggests that very open economies may be more exposed.<sup>7</sup>

In this section, a particular framework is employed to consider how an increase in global interest rates interacts with the level of trade openness and the structure of financial sectors in the region. The framework is taken from Nuguer (2018). The setting is an open economy with households and firms that sell their products domestically, firms that export, and domestic banks that lend to the two types of firms and take deposits from households.<sup>8</sup> In this exercise, it is assumed that only firms that export can borrow from abroad (i.e., external borrowers are considered as naturally hedged as they earn income in foreign currency).<sup>9</sup>

The exercise consists of studying the effects on aggregate macroeconomic variables of a shock that increases the cost of borrowing from abroad (for example, due to a rise in global interest rates). It goes on to assess how the reaction differs depending on the level of countries' trade openness, proxied by exports plus imports over GDP. The interest rate shock considered in this exercise is the same as in the previous section, namely an average increase of just over 20 bps in the risk premium.

There are two principal mechanisms of shock transmission: a financial one, mainly through loans, and a real one through consumption. The financial mechanism works as follows. An increase in the U.S. interest rate leads exporting firms to borrow less from

<sup>6</sup> See, for example, Calvo, Izquierdo, and Loo-Kung (2006) and Edwards (2004).

<sup>7</sup> See Ozkan and Unsal (2012); Georgiadis (2016); and Blanchard, Das, and Faruquee (2010).

<sup>8</sup> The model also includes firms that import to produce the final good that is consumed, invested, and used as government expenditure. Banks are modeled as in Gertler and Karadi (2011) and Gertler and Kiyotaki (2011). They are financially constrained on how much they borrow from households, but they are not constrained on lending to the two sets of firms (non-exporting and exporting)

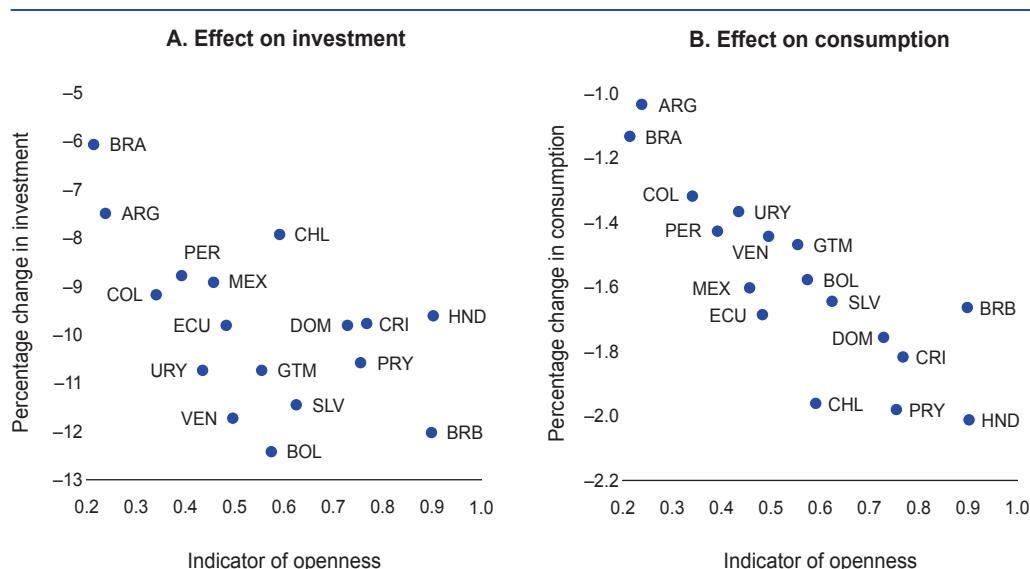
<sup>9</sup> Nuguer (2018) also considers cases where non-exporting firms borrow from abroad. That opens up an additional "balance sheet" channel and in general would lead to larger impacts. In the case of a commodity exporter, and if the exchange rate is highly correlated to the commodity price, then exporting may not provide a natural hedge to contracting debt in dollars as a depreciation may be accompanied by a fall in the relevant commodity price. In this case hedging the relevant commodity price may also be required or the results here may underestimate impacts.

abroad and increase their demand to borrow at home. This increased competition for funding in the domestic financial system crowds out domestic borrowing for firms that were not borrowing from abroad. This propagates the initial shock to other sectors. As a result, domestic interest rates rise and total borrowing in the economy (from abroad plus from domestic banks) declines and investment falls.

The rise in international interest rates also impacts consumption, as ultimately it is households that own the firms that are exporting and borrowing from abroad. As consumption falls, the price of nontradables versus tradables declines; in other words, there is a real exchange rate depreciation. As a result, exports increase and imports decline. The model is calibrated to 17 economies in the region to match the specific macroeconomic ratios of each selected country. In the simulations based on this calibration, the improvement in the trade balance is not enough to offset the negative impacts on investment and consumption. More open countries face larger potential effects through the two mechanisms described above; Figure 3.5 illustrates the estimated impacts of the shock on investment (Panel A) and on consumption (Panel B), depending on the openness of the country.

The sum of the impacts on consumption, investment, and net exports result in the total estimated effect on GDP. While all economies experience declines in output, the estimated impact is quantitatively larger in more open economies (see Figure 3.6). Indeed,

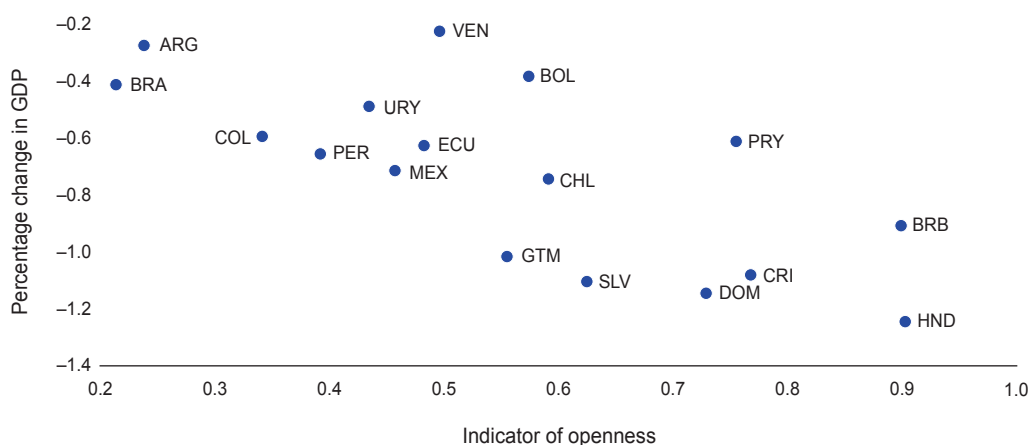
**FIGURE 3.5** ► Investment and Consumption Performance after a U.S. Interest Rate Increase



Source: IDB staff calculations based on IMF (2018).

Note: The effects are calculated following the methodology in Nuguer (2018) and are computed as the sum of the percentage changes (relative to the steady state) for 20 quarters, respectively.



**FIGURE 3.6** ► **Growth Performance after a U.S. Increase Rate Increase**

Source: IDB staff calculations based on IMF (2018).

Note: The effects are calculated following the methodology in Nuguer (2018) and computed as the sum of the percentage changes (relative to the steady state) for 20 quarters.

the assumed natural hedge of generating income in foreign currency does not insulate borrowing countries from tighter external borrowing constraints. In fact, if more firms borrow from abroad because the export sector is larger, then the opposite is the case as the shock of higher interest rates results in greater crowding out of finance as the larger exporting sector switches to seek more financing at home.

These results bring to the fore the discussion on nonconventional policy measures. For example, one suggested response is for the monetary authority to provide liquidity to the domestic financial system to help relieve the tighter borrowing constraints. A more controversial idea is for the monetary authority to lend directly to firms that borrow from abroad to dampen the ensuing credit crunch.<sup>10</sup> These policies could be helpful by reducing the crowding out of domestic credit and, therefore, the spreading of the external shock to the rest of the economy.<sup>11</sup> Multilateral agencies could also assist by boosting foreign currency reserves and providing financing to offset the liquidity crunch. For instance, ex ante insurance mechanisms such as the IMF's Flexible Credit Line (FCL) might play a role in this regard. For those countries that are more vulnerable to this crowding out of domestic finance, seeking external financial assistance sooner rather than later in the face of a shock is also likely to minimize economic disruption.

<sup>10</sup> According to their charters, many central banks are prevented from lending to nonbanks, let alone nonfinancial entities and may only lend to banks or financial entities under conditions that ensure the solvency of the borrower.

<sup>11</sup> See Calvo (2012) and Chang and Velasco (2017).

## Conclusions

Inflation remains low in the majority of countries in the region and among a group of inflation targeters has been falling and is expected to remain close to inflation targets. This implies that monetary policy is balanced but, in some cases could help countries bring growth back to its potential level, while ensuring the credibility of the inflation target. However, several risks remain on the horizon. Monetary normalization in the advanced economies continuous to be a significant risk and shocks (either anticipated days in advance, or not) in the process might provoke further currency depreciation. Given historical relationships, this might require the policy interest rate to be raised to varying degrees across the region. The impact of such tightening on output is estimated to be small, but the danger of not tightening at all, or relaxing monetary policy in the face of such a negative shock, would be to see inflation rise again above the target. If targets continue to be missed, then their credibility could be threatened. At the same time, exchange rate depreciation is expected to stimulate domestic production largely through import substitution effects with muted impacts on exports. The potential balance sheet impacts are discussed further in Chapter 4. An additional risk is that firms with debt contracted abroad increasingly seek credit at home as international interest rates rise. This could provoke impacts on output as credit becomes scarce and some firms are crowded out of the market. Note that this crowding out phenomenon can occur even if firms are fully hedged and display no balance sheet problems. Perhaps counter-intuitively, countries with larger export sectors may be more vulnerable. This would be the case if firms in that sector (that may have a hedge against currency movements) are the ones that have borrowed from abroad. More generally, if the borrowing from abroad in relation to the size of the domestic financial system is large, then vulnerability to this crowding out effect might be greater. The final chapter of this report discusses further the potential policy conclusions.



## CHAPTER 4

# Changes in Public and Private Balance Sheets

**T**he global rise in debt has been a source of much concern.<sup>1</sup> This chapter considers not just what has happened to the level of debt in the region but also its composition.<sup>2</sup> If debt is long-term and the amount that needs to be rolled over is low, then liquidity risks and the impact of changes in international interest rates may be reduced. If debt is predominantly in local currency, then risks from a sharp depreciation may be limited. And if debt is mostly at fixed interest rates, then hikes in international or local interest rates will take longer to propagate through the domestic economy. One view is that the period of exceptionally low international interest rates provided an opportunity to issue at competitive rates in foreign currency, boost investment, or improve liquidity positions and lengthen maturities. An alternative view is that dollar debt may pose balance sheet risks. Public debt ratios rose strongly, but have now stabilized. Firm leverage ratios have risen, but corporate bond issuance has now fallen off considerably. Debt composition is now changing. A danger is that debt structures will become riskier in this phase of rising interest rates with more debt in dollars, at shorter maturities, and at floating rates. This chapter reviews recent experience and discusses the potential implications.

### Public Sector Balance Sheets

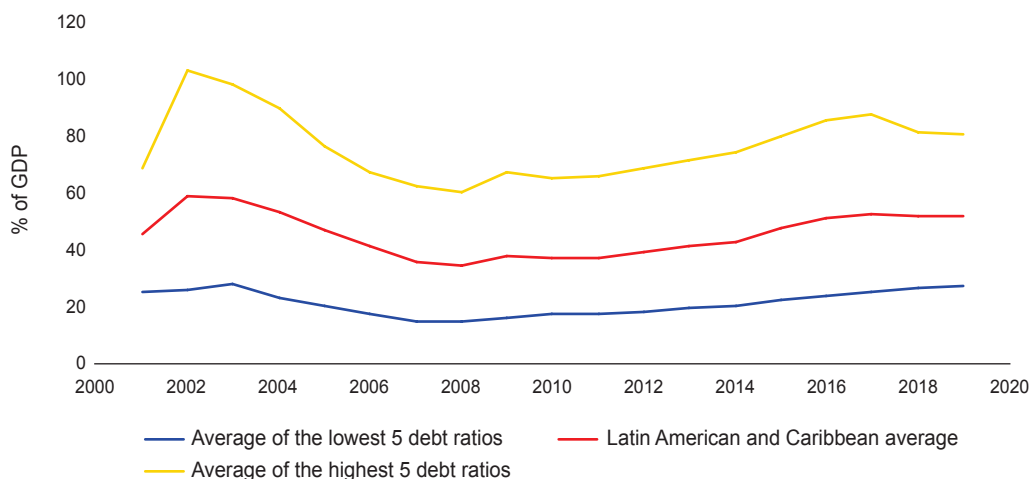
Sovereign debt ratios fell in the early 2000s but after the global financial crisis, they rose steadily until 2017 (see Figure 4.1). For the typical country, debt to GDP stabilized at around 52% and is expected to remain close to that level in 2019. The average ratio for the five countries with the highest debt-to-GDP was about 80%.<sup>3</sup> More recently, consolidation efforts have started to bring down debt in some cases, but debt reduction for this group of countries with higher debt ratios will be a theme for many years to come.

An interesting question is who holds the debt. If the debt is held mostly by locals and by regulated institutions, then roll-over risks may be low. But if debt is held by foreigners,

<sup>1</sup> See, for example, World Bank (2018), IMF (2018a), and Gaspar and Jaramillo (2018).

<sup>2</sup> The focus of this chapter is on sovereign debt and the debt of nonfinancial firms.

<sup>3</sup> For this analysis the debt statistics come from IMF (2018b).

**FIGURE 4.1** ▶ **Public Debt in Latin America and the Caribbean**

Source: IDB staff calculations based on IMF (2018b).

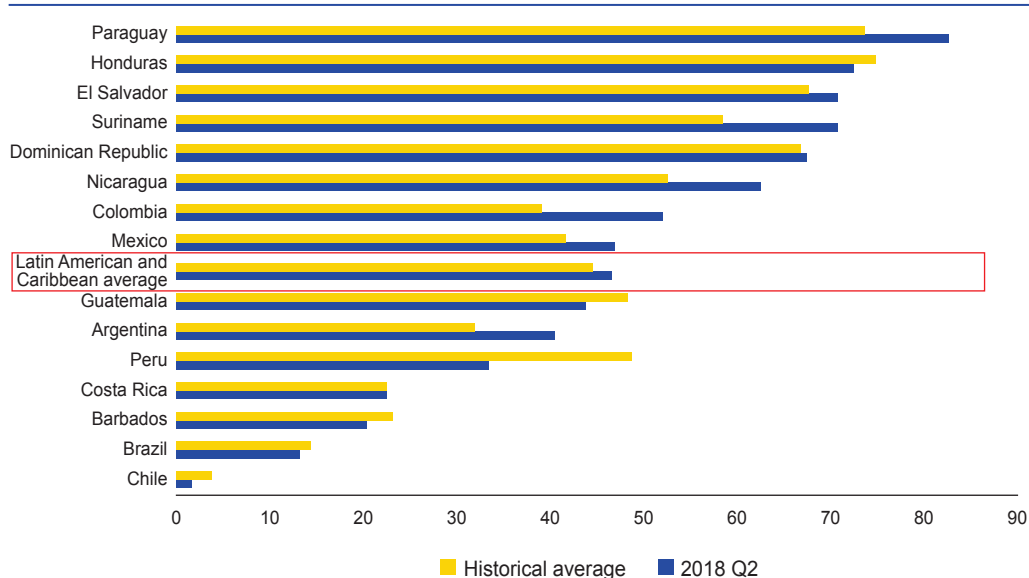
then liquidity risks may be higher as foreign investors may be subject to international shocks that can affect their liquidity positions. Moreover, the risk appetite of international investors may change, a phenomenon sometimes referred to as the risk-on risk-off cycle.<sup>4</sup> The share of debt held by nonresidents has been fairly stable at around 45% for the typical country. There is, however, considerable heterogeneity across countries ranging from Paraguay (with around 80% held by foreigners) to Chile (with just 2% foreign debt ownership) (see Figure 4.2).

Nonresident investors may include banks and nonbanks such as mutual and other investment funds. Concerns have been raised over the growth of investment funds as holders of sovereign debt as well as the concentration and sheer size of some fund managers.<sup>5</sup> Moreover, funds with very diverse holdings across countries may be quite fickle with respect to any single country. If a fund is highly diversified and one country suffers a small negative shock, then there may be substantial reallocation to other countries; diversification may increase the elasticity of investment to shocks.<sup>6</sup> In addition, the concern is that these markets have become less liquid as international investment banks have reduced their market making activities; thus, portfolio reallocations might provoke significant repricing. While the share of debt held by nonresidents has remained stable, the share of that debt held by nonbanks has increased significantly. While historically nonbanks held some 57% of all the debt held by nonresidents, they now hold 81% (see Figure 4.3).

<sup>4</sup> See Datta et al. (2017) for a review of measures regarding risk and risk-appetite.

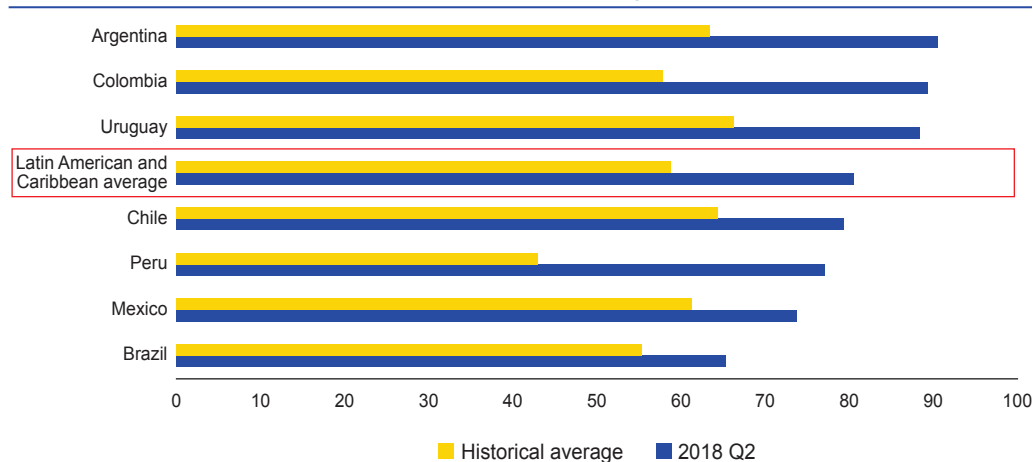
<sup>5</sup> See for example Miyajima and Shim (2014) for a discussion.

<sup>6</sup> Calvo (1998b) outlines this argument.

**FIGURE 4.2** ► **Foreign Ownership of Public Debt in Latin America and the Caribbean (%)**

Source: IDB staff calculations based on the World Bank's World Development Indicators database, and for Colombia, Arslanalp and Tsuda (2014).

Notes: The historical averages are calculated on a slightly different basis for each country; the data run from 2008 Q1 to 2018 Q2.

**FIGURE 4.3** ► **Nonresident Public Debt Ownership by Nonbanks (%)**

Source: IDB staff calculations based on data from Arslanalp and Tsuda (2014).

Notes: Historical average includes data from 2008 Q1 to 2018 Q2.

The composition of public sector debt varies considerably across countries. While the average share of debt in dollars is just over 50% and has hardly changed over time, in the second quarter of 2018, Chile had just 4% of its debt denominated in dollars while Paraguay had 83%. Five of the countries analyzed maintained more than 60% of their debt

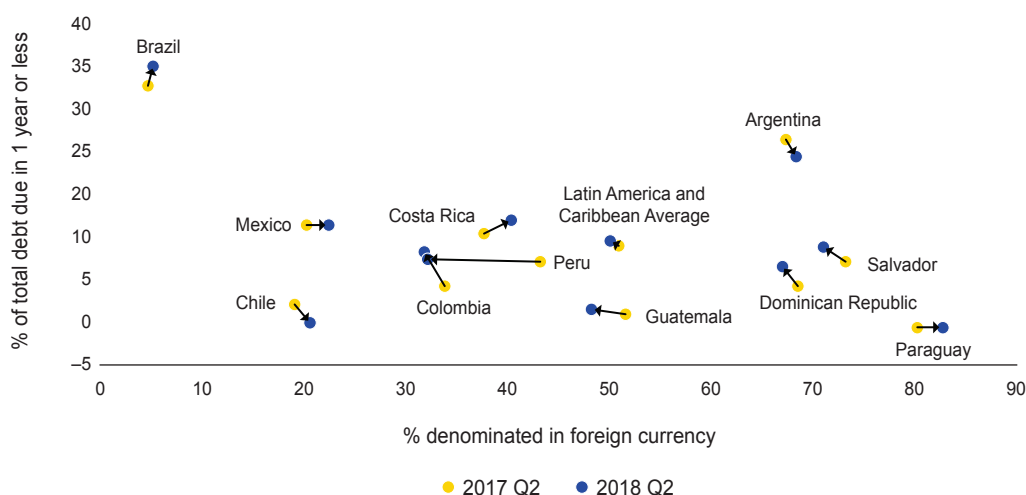


in dollars (Argentina, the Dominican Republic, El Salvador, Paraguay, and Suriname). On the other hand, Barbados, which has a high share of debt in local currency, has a fixed exchange rate. If there is real depreciation (through low or negative inflation) to maintain competitiveness, then Barbados may still suffer from a balance sheet problem even though debt is denominated in local currency. Brazil maintains a relatively low share of debt in foreign currency even though a significant portion of its local currency debt is at floating rates.<sup>7</sup> Debt maturity also varies and in particular, the percentage of debt that comes due within the next 12 months. Chile and Paraguay have virtually no debt coming due in this time frame, as of the second quarter of 2018. On the other hand, about 35% of debt comes due in a year in Brazil.

Debt structures represent a set of trade-offs. Longer average maturity may come with a larger proportion of debt in dollars; and while more debt in local currency may be safer from a currency volatility standpoint, accompanying shorter maturities might increase roll-over risks. On the other hand, if that local debt is held by regulated domestic institutions, such risks may be mitigated.

No country analyzed here managed to improve its debt structure between 2017 and 2018, in terms of reducing the share in foreign currency and reducing the amount coming due in 12 months (see Figure 4.4). Several countries chose a different point on the trade-off. Colombia, for example, reduced its share of foreign currency debt slightly

**FIGURE 4.4** ► **Changing Public Debt Structures**



Source: IDB staff calculations based on the World Bank's World Development Indicators database.

Notes: The last observation is different for Barbados (2017 Q4), Suriname (2018 Q1), Argentina (2017 Q4) and Peru (2017 Q4).

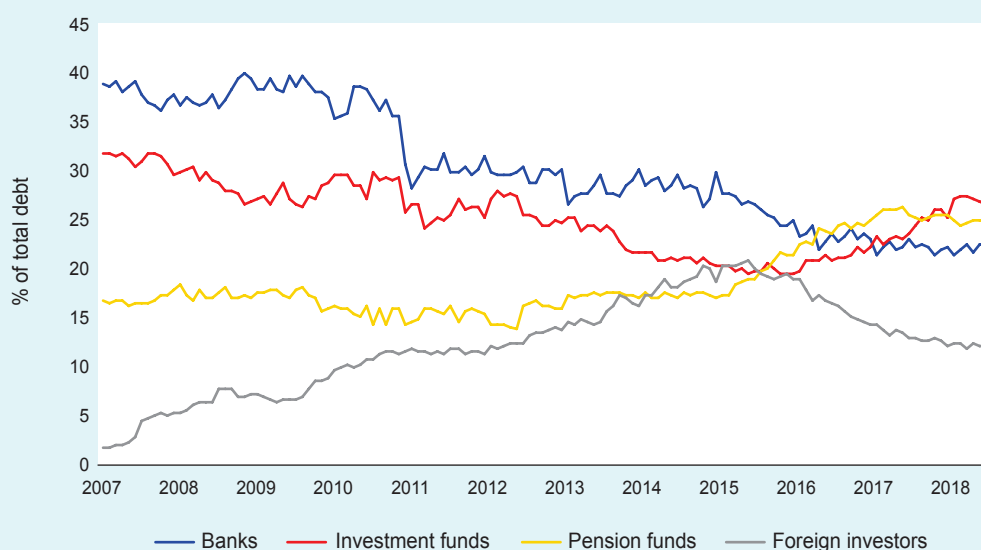
<sup>7</sup> If there is a depreciation in Brazil and interest rates rise as a result, then interest payments on debt will rise in local currency and may not fall by very much when measured in dollars.

but increased debt coming due in 12 months, as did Guatemala, the Dominican Republic, and El Salvador. Argentina and Chile reduced the amount of debt coming due in a year but increased the share of foreign currency debt. And for a couple of countries such as Brazil and Costa Rica, both indicators of risk increased slightly. Brazil faces particular challenges given debt levels and the current fiscal situation. Box 4.1 analyzes this case in more detail and discusses the changes in debt composition. If global interest rates rise, it will be important to monitor not only debt ratios but also indicators of risk regarding debt structures going forward.

### BOX 4.1 The Changing Structure of Debt in Brazil

Brazil, the largest economy in the region, has seen debt to GDP ratios rise significantly in recent years. Between the fourth quarter of 2014 and the second quarter of 2018, the stock of General Government Gross Debt (GGGD) relative to GDP increased from 62.3% to 88.4%, according to IMF figures. These figures differ from some official GGGD statistics as they include certain bonds held by the central bank, which were 6% of GDP in the fourth quarter of 2014 and just over 11% of GDP in the second quarter of 2018. Interestingly, the share of debt held by residents has increased significantly and the share held by foreign investors has declined (see Figure B4.1.1). Meanwhile, the share of the debt held by Brazilian banks also decreased while the share held by local pension funds and investment funds increased. While the decrease in the foreign holding of debt may suggest a higher perception of risk or a lower risk-appetite from nonresidents, the fact that more debt is now held by domestic and regulated institutions may reduce the impact of external shocks on borrowing rates and lower liquidity or roll-over risks.

FIGURE B4.1.1 ► Evolution of the Investor Base



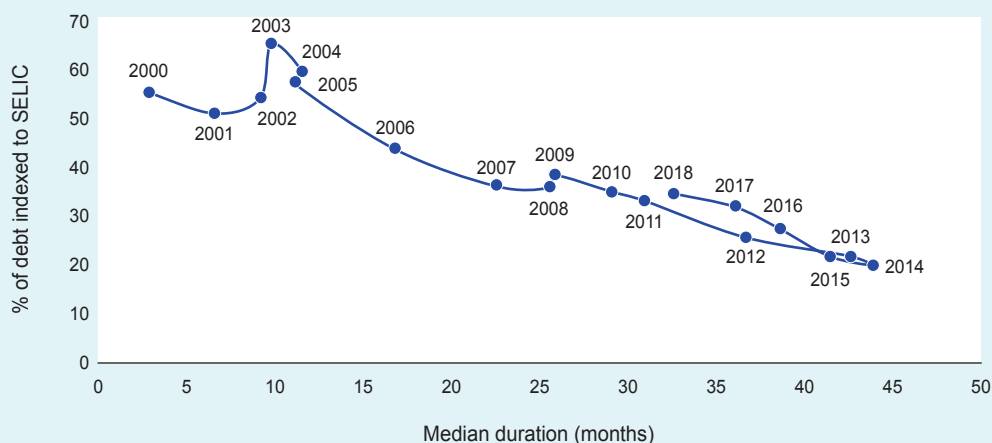
Source: Brazil, National Treasury Secretariat.

(continued on next page)

**BOX 4.1 The Changing Structure of Debt in Brazil** *(continued)*

Besides the change in the investor base, the type of instrument—and, consequently, the maturity structure and type of indexation—has also changed significantly. The share of floating rate debt (i.e., debt with interest rates indexed to the policy interest rate, Selic) has grown while the duration of the debt has decreased. Shorter durations and a higher share of floating debt is normally associated with investors becoming more risk-averse and hedging more against interest rate hikes. Governments may satisfy such changes in the pattern of demand in order to keep the costs of debt from rising too much. Note, however, the strong negative correlation between these two shares in the case of Brazil, as illustrated in Figure B4.1.2. Average debt duration increased to almost 45 months as the share indexed to the Selic fell to around 20%. Since then, average duration has fallen to around 33 months and the share of floating rate debt indexed to the Selic has increased to around 35%.

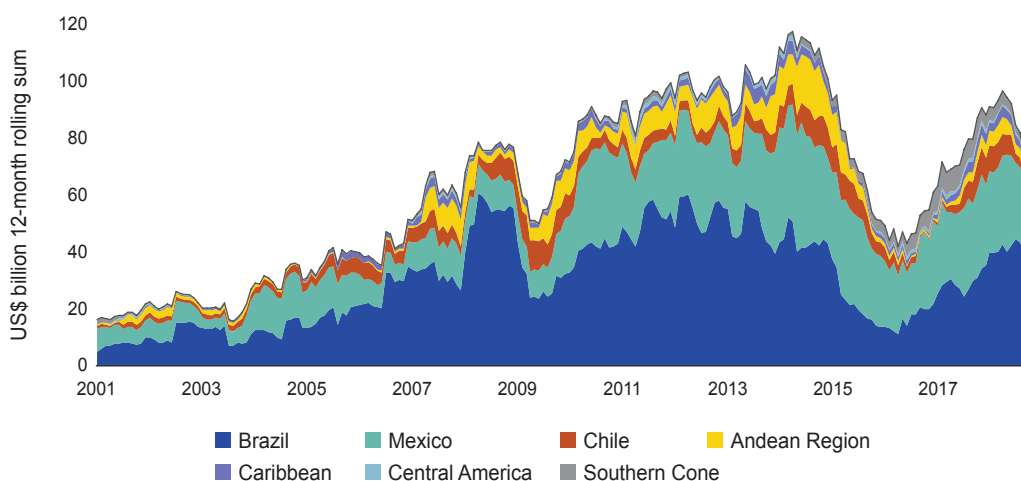
A link may also exist between the decreasing share of foreign investors holding public debt and these latter trends. Nonresidents appeared to favor longer-duration inflation-indexed debt while locals appear to hold more Selic-indexed floating rate instruments. Still, the changing composition does not explain the entire change and the average duration of most types of debt has also decreased in recent years. As the debate continues over the right set of fiscal reforms to stabilize and eventually bring down debt ratios to ensure sustainability, Brazil faces the challenge of managing debt composition to balance the costs of debt service and contain risks given changing patterns of demand.

**FIGURE B4.1.2** ► **Indexed Debt and Duration**

Source: Central Bank of Brazil.

**Corporate Balance Sheets and Corporate Issuance**

Bond issuance from Latin American and Caribbean nonfinancial firms recovered swiftly after the global financial crisis, reaching an annual rate of almost US\$120 billion in 2014

**FIGURE 4.5** ► **Corporate Bond Issuance**

Source: IDB staff calculations based on Thomson One.

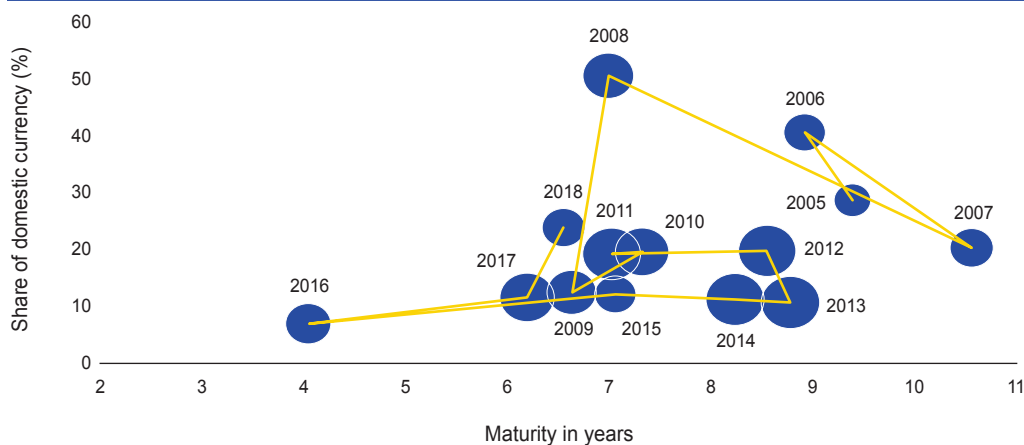
Note: Monthly frequency, last observation available as of October, 2018. Volumes calculated as the 12-month rolling sum of the issuance value. Classification of regions is as follows: Central America (Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, and Panama), Andean Region (Bolivia, Colombia, Ecuador, Peru and Venezuela), Caribbean (The Bahamas, Barbados, Jamaica, and Trinidad and Tobago), and Southern Cone (Argentina, Paraguay, Uruguay).

(see Figure 4.5).<sup>8</sup> The increased issuance, particularly in foreign markets, sparked much discussion. Were firms simply taking advantage of exceptionally low dollar interest rates? Or, would the level of issuance provoke serious balance sheet risks in the corporate sector or liquidity issues in financial systems as firms reduce debt levels when interest rates rise?<sup>9</sup> Firms in Brazil, Chile, and Mexico all witnessed significant increases in the volumes of issuance. While sharp currency depreciations in these and other countries did not spark widespread corporate defaults, firms that issued in dollars in countries that experienced depreciations showed balance sheet impacts on investment.<sup>10</sup> This may have affected output and reduced the effectiveness of the exchange rate as a stabilization tool. Since 2014,

<sup>8</sup> Authors' own calculations based on Thomson One. The dataset covers all those local and subsidiary nonfinancial corporates from the region available in Thomson One. The bonds covered are the following: (i) Nonconvertible (bonds that cannot be converted to company equity or stock), (ii) Preferred Stock (equity ownership), (iii) Mortgage/Asset Backed (financial security collateralized), (iv) Bonds Pipeline and Registrations, (v) MTN Programs (Medium Term Notes) and (vi) Debt Private Placements (Debt offering through a private placement and not IPO). This study follows Thomson One's sector classifications and defines nonfinancial corporate sector as the sum of the Telecommunications, Real Estate, Materials, Media and Entertainment, Industrials, Retail, Energy and Power, Consumer Staples, Consumer Products and Services, High Technology, and Healthcare sectors.

<sup>9</sup> One strand of the literature suggested nonfinancial firms have been acting like financial intermediaries (see Bruno and Shin, 2017) particularly in countries that implemented capital controls (see Caballero, Panizza, and Powell, 2016). In that case, as interest rates rise, while there may be a danger from balance sheet currency mismatches, there may also be an impact on the liquidity of domestic financial systems (see Powell, 2014, for a discussion).

<sup>10</sup> See Powell (2016) and Caballero (2018).

**FIGURE 4.6** ► **Characteristics of Corporate Bond Issuance**

Source: IDB staff calculations based on Thomson One.

Note: Monthly frequency, last observation available as of October, 2018. X-Axis: Weighted average maturity of bonds at the time of issuance. Size of the bubble: Total value of bonds issued per year.

issuance has fallen considerably and the latest data indicate an annual rate of issuance of some US\$67 billion. The decline in issuance may reflect lower demand for financing given relatively low growth, or higher interest rates may be reducing issuance volumes, or both. The changing nature of issuance may shed further light on the mechanisms at play. If issuance is moving to shorter maturities or to more issuance in dollars, then this suggests continued demand for financing but firms adjusting to higher interest rates. If firms are issuing longer-dated bonds and more in local currency, then this may suggest continued high liquidity in international markets and greater caution among firms in choosing debt structure under conditions of lower demand for financing.

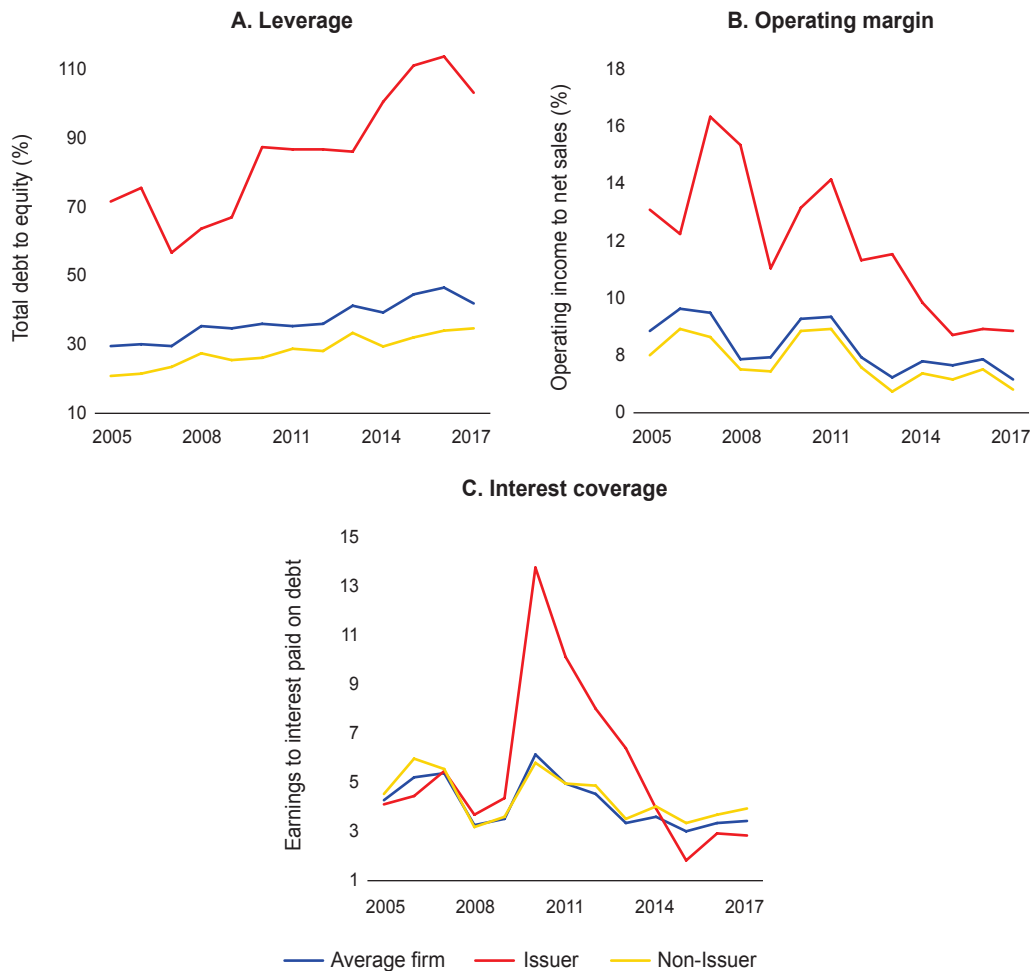
The recent experience can be divided into three phases. From 2005 to 2008, issuance in domestic currency increased significantly, in some years at the expense of shorter maturities.<sup>11</sup> In 2008, domestic currency issuance was 50% of the total but maturity dropped to about 7 years from over 10 years (see Figure 4.6). From 2009 to 2014, the share of issuance in domestic currency dropped markedly, to around 10% to 20% of the total with maturities lengthening to between 7 and 9 years. From 2014 to 2018, maturities fell but the share in domestic currency increased. The year 2016 was exceptional with a sharp fall in maturities to about 4 years, but since then maturities have lengthened somewhat and the share of issuance in domestic currency has increased slightly. The size of each bubble in Figure 4.6 represents the volume of issuance. As can be seen from the figure, issuance declined in 2016 from its 2015 level, as it did in 2018 compared to 2017. Considering the most recent developments, while issuance has declined, the maturity of the debt issued

<sup>11</sup> The plot shows the maturity at the time of bond issuance.

and the share in domestic currency have both risen. This suggests that firms are being more cautious in choosing less risky debt structures, and therefore that the decline in issuance may be due more to lower demand for financing than to a sharp restriction in supply.

A continuing concern is the health of corporate income and balance sheets in the region. Leverage ratios have been rising (albeit with a slight improvement in 2018) and operating income has been falling. The implication is that interest coverage ratios have been declining (see Figure 4.7). In particular, for those firms that issued bonds during the period of exceptionally low global interest rates (Figure 4.7, issuer), leverage ratios are particularly high, operating income has fallen sharply, and interest coverage ratios are lower than for the average firm.

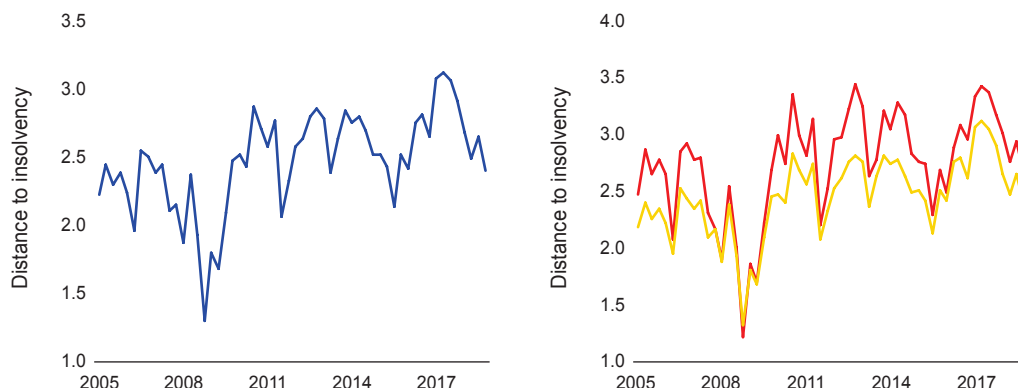
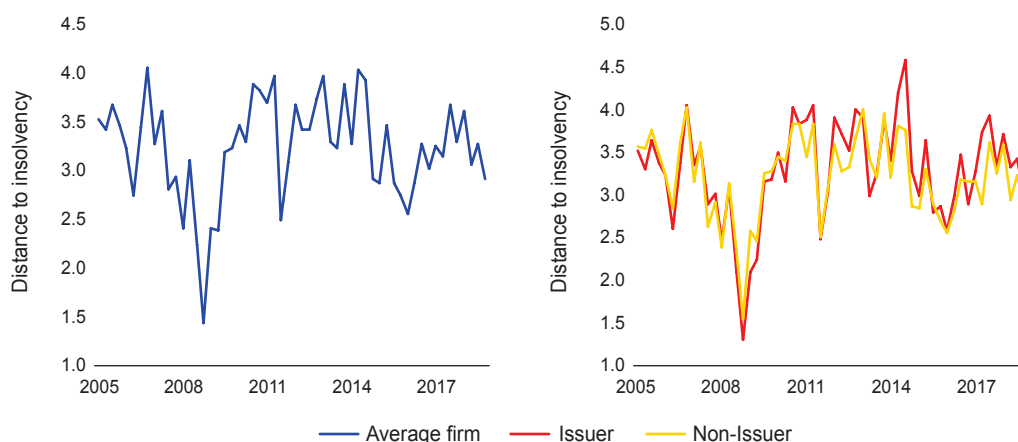
**FIGURE 4.7** ▶ **Leverage, Operating Margin, and Interest Coverage of Nonfinancial Firms**



Source: IDB staff calculations based on Thomson-Reuters Worldscope.

Note: The trend is computed as the simple average of the median firm in each country.



**FIGURE 4.8** ► **Distance to Insolvency****A. Emerging markets****B. Latin America and the Caribbean**

Source: IDB staff calculations based on Thomson-Reuters Worldscope.

Note: The figure shows the median of the measure "Distance to insolvency."

The weaker balance sheet indicators of firms in Latin America and the Caribbean are evident in emerging economies more generally. One way to summarize balance sheet strength is through a measure known as the distance to insolvency. This measure combines indicators of income and leverage with volatility to suggest how far away firms are from insolvency; put another way, it estimates the probability that assets would not cover liabilities.<sup>12</sup> Estimates of distances to insolvency illustrate a strong recovery for firms from emerging economies after the global financial crisis, but a deterioration from the first quarter of 2017 to the latest figures (see Figure 4.8, Panel A).

<sup>12</sup> See Atkeson, Eisfeldt, and Weill (2017) for a description of distance to insolvency measures and an analysis of U.S. firms. Previous work illustrated how the distance to insolvency measure is strongly correlated with firms' credit ratings – see Powell (2016).

**FIGURE 4.9** ► **Firm Capital Expenditures**

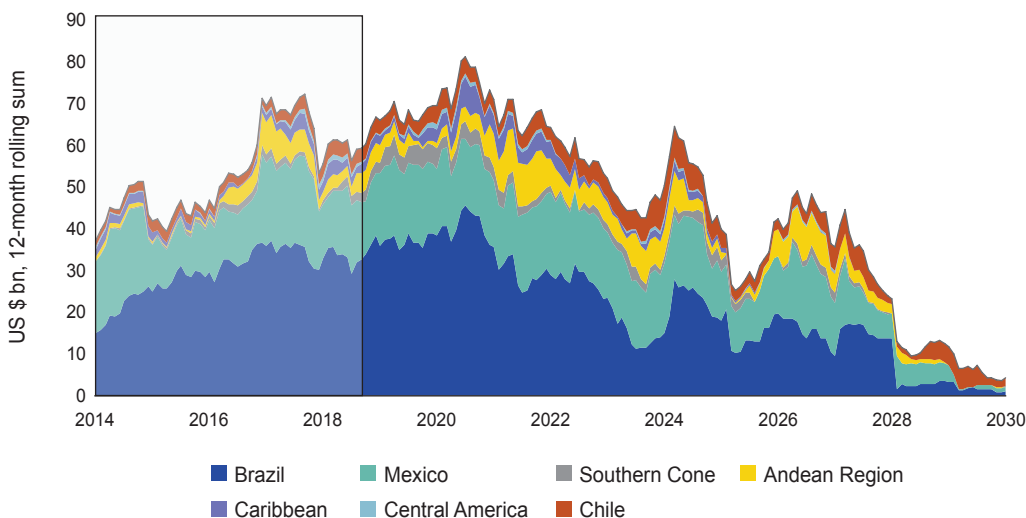
Source: IDB staff calculations based on Thomson-Reuters Worldscope.

Note: The trend is computed as the simple average of the median nonfinancial firm in each country.

Firms that issued when international interest rates were low have somewhat higher distance to insolvency than non-issuers, but this indicator has declined among both sets of firms in recent months. Firms from Latin America and the Caribbean have somewhat greater distance to insolvency than firms from all emerging economies (see Figure 4.8, Panel B) which implies that they have somewhat stronger balance sheets, but the trends are similar. While the distance to insolvency measure has decreased for firms in the region, current levels (at least for the average firm) are well above those reached during the global financial crisis and a far cry from crisis levels. Still, the weaker balance sheet conditions of firms in the region appears to have led to lower capital expenditures. The average firm spent some 5% of assets on capital before the global financial crisis but now spends just 3%. Firms that issued during the period of low global interest rates were clearly the stronger firms and had capital spending of almost 8% of assets in 2008. However, this has now fallen to about 5% (see Figure 4.9).

Considering firms that have issued bonds, amortization payments rose from 2014 through 2017 (see Figure 4.10). In dollar terms, Brazilian firms paid the most in amortization, followed by Mexican and Chilean companies. The numbers to the right of the dashed vertical line in this figure represent the amortization schedule of the bonds outstanding as of October 2018.<sup>13</sup> The data show scheduled payments rising to a peak of US\$80 billion in

<sup>13</sup> Assuming bonds issued in the data set are bullet, which means that their entire principal value is paid all at once at maturity date.

**FIGURE 4.10** ► **Actual and Scheduled Bond Amortizations**

Source: IDB staff calculations based on Thomson One.

Note: Monthly frequency. Shaded grey area represents the amortization payments of debt that have already expired until October 2018. From October 2018 to December 2030 the figure illustrates the amortization schedule of bonds outstanding as of October 2018. Volumes calculated as the 12-month rolling sum. Figure assumes all amortizations are at bond maturities. Classification of regions is as follows: Central America (Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala and Panama), Andean Region (Bolivia, Colombia, Ecuador, Peru, and Venezuela), Caribbean (The Bahamas, Barbados, Jamaica, and Trinidad and Tobago) and Southern Cone (Argentina, Paraguay, Uruguay).

capital payments per year, before amortizations then start to fall. Thus, firms in the region may be subject to growing financial pressure at least through 2020.<sup>14</sup> Additionally, given that most of this debt is in foreign currency, further currency depreciations may introduce additional risks.<sup>15</sup>

## Conclusion

Sovereign debt ratios have risen in the region but appear to be stabilizing and for countries with the highest debt ratios they have been falling for the last couple of years. For nonfinancial corporates, leverage ratios have risen and operating margins have decreased, implying lower interest-cost coverage ratios. At the same time, the amortization schedule suggests capital payments will grow through 2020. While firms that issued debt during the period of low international interest rates had stronger balance sheets, they have also seen the steepest declines in interest coverage and in distance to insolvency measures. Debt

<sup>14</sup> This analysis assumes that no new bonds are issued. Firms may, of course, issue new debt to finance amortization payments, but any new such borrowing will likely be at higher interest rates given global trends.

<sup>15</sup> Brazil is something of an exception as most (57%) of the outstanding corporate debt is in domestic currency.

composition varies considerably across sovereigns in the region and can be understood as a choice, given a set of trade-offs. While no country has enjoyed an increase in the share of debt in domestic currency combined with lengthening maturities in the past year or so, most countries have chosen a different position on this trade-off; few countries have suffered a significant overall deterioration in debt composition. Some countries have seen a significant increase in the share of debt held by residents, which may signal higher risk aversion by nonresidents but may also reduce roll-over risks. Firms experienced a sharp decline in the maturity of new debt issued and a lower share of debt issued in domestic currency in 2016, but since then both indicators have recovered. All in all, this does not seem to indicate a sharp contraction in the supply of financing, but rather that firms have been careful to ensure a reasonable composition of debt in the last couple of years, under conditions of lower demand.



## CHAPTER 5

# Fiscal Policy Challenges and Reform Opportunities

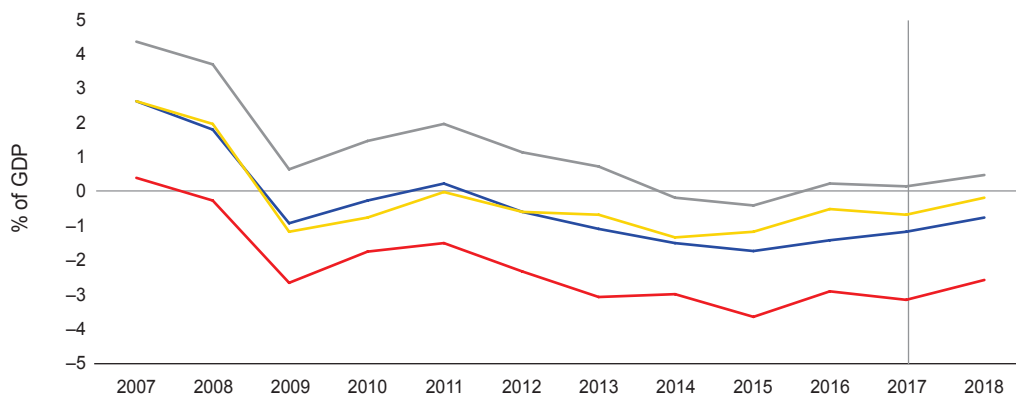
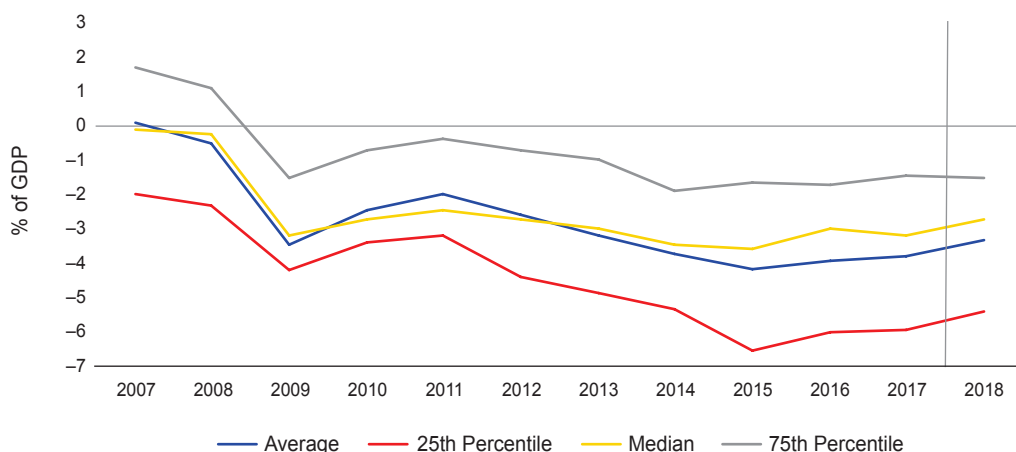
Last year's edition of this report analyzed the structural characteristics of fiscal policies that may be limiting growth in the region and discussed how to navigate the various trade-offs depending on individual country characteristics. A year later, fiscal trends in the region are improving, if gradually. In many countries, fiscal deficits remain high, but public debt-to-GDP ratios have stabilized for the typical country. Fiscal reforms have advanced in several countries that required larger adjustments. However, the fiscal situation remains fragile in many countries and moderate increases in interest rates or negative growth shocks could threaten debt sustainability, forcing countries to adopt additional fiscal adjustment measures.

This chapter analyzes current fiscal trends and then focuses on how fiscal rules can be designed—and existing fiscal rules can be reformed—in order to protect productive public investments during fiscal consolidations. This debate is timely because the majority of countries in the region are in the midst of fiscal adjustments to reduce high fiscal deficits; concurrently, fiscal rules are becoming an increasingly popular element of the toolkit to improve fiscal outcomes. While fiscal rules can effectively support consolidation efforts, this chapter argues that certain design features can also help address the bias against public investment in expenditure policies, which has been pervasive across the region and has had negative implications for growth.

### Fiscal Trends, Consolidation, and Composition

The fiscal consolidation process is advancing across Latin America and the Caribbean, albeit at different speeds. For the typical country, headline balances continue to improve: the average primary deficit was reduced from 1.2% of GDP in 2017 to 0.7% in 2018; the overall deficit declined as well, from 3.8% to 3.3% of GDP (Figure 5.1). The structural fiscal deficit narrowed by 0.25 percentage points of GDP on average, suggesting that fiscal policy was mildly contractionary in the typical country.<sup>1</sup> As a result, the growth rate of

<sup>1</sup> The change in the structural primary balance as a percent of potential output is often referred to as “fiscal impulse.” This measure is available for 17 countries across Latin America and the Caribbean. For details on the calculation of structural fiscal balances in the region, see Ardanaz, et al. (2016).

**FIGURE 5.1** ► General Government Fiscal Balances**A. Primary fiscal balance****B. Overall balance**

Source: IDB staff estimates based on national sources and IMF (2018b).

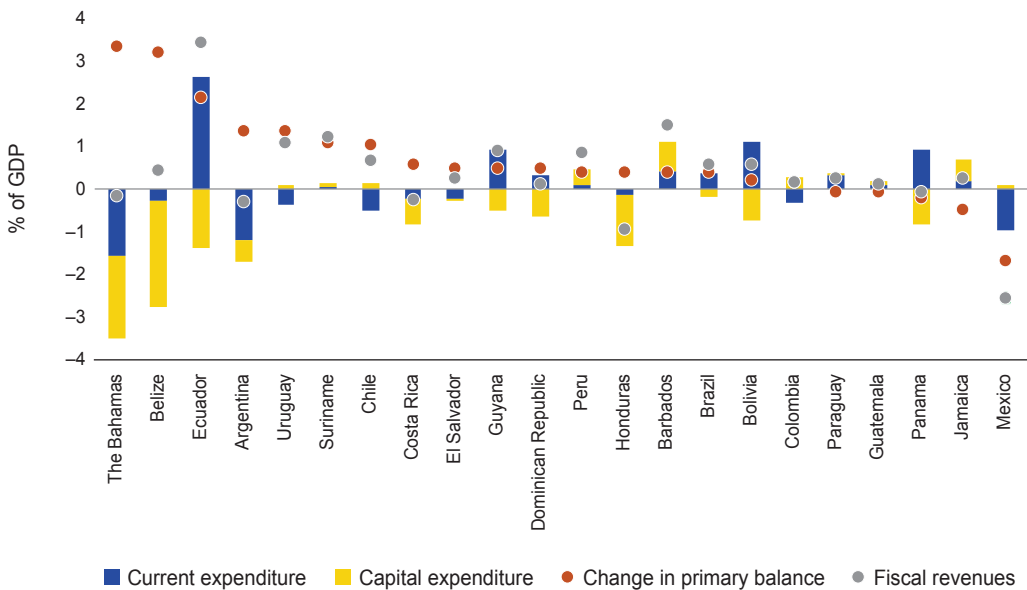
debt has decelerated, and the debt-to-GDP ratio has stabilized at approximately 52% in the typical country (see Figure 4.1 in Chapter 4).

Fiscal revenues rose and public expenditures fell in roughly equal amounts among the 18 countries that tightened fiscal positions in 2018 (see Figure 5.2).<sup>2</sup> In those countries that implemented the largest fiscal adjustments, the reduction in spending mostly relied on cutting public capital expenditures, thereby reinforcing the bias against capital expenditures that is built into public spending patterns in the region.<sup>3</sup>

<sup>2</sup> In this group of countries, the primary balance improved by 1.1 percentage points of GDP in 2018, explained by an increase in fiscal revenues (0.6% of GDP) and a decline in primary expenditures (0.5% of GDP).

<sup>3</sup> See Izquierdo, Pessino, and Vuletin (2018) and Cavallo and Powell (2018).



**FIGURE 5.2** ► **Change in Primary Balance, Revenues, and Expenditures 2017–18**

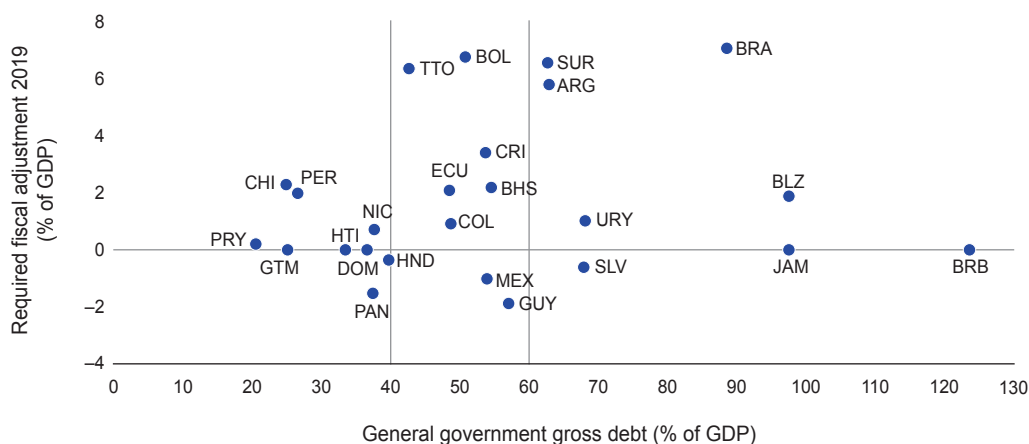
Source: IDB staff estimates based on national sources and IMF (2018b).

### Fiscal Space, Required Fiscal Adjustments, and External Shocks

As fiscal consolidation efforts and the growth rate of public debt decelerated, the average fiscal adjustment required to stabilize the debt-to-GDP ratio is estimated to be 1.8% of GDP—less than in preceding years and a level similar to 2015. The average, however, is driven by improvements in fiscal balances in countries that did not require large adjustments to begin with. Presently, six countries require fiscal adjustments larger than 3% of GDP to stabilize their debt-to-GDP ratios (Figure 5.3). Moreover, the average required adjustment for the 15 countries that require positive adjustments to stabilize their debt-to-GDP ratios is 3.3% of GDP. These estimates are lower compared to 2018, but higher than in preceding years (Table 5.1). Figure 5.4 shows that more countries require larger fiscal adjustments to stabilize the debt-to-GDP ratio in 2019 than in 2015.

Indicators of debt sustainability vary considerably across countries and therefore have different implications for the appropriate policy stance. For example, Barbados and Jamaica have high debt levels and have decided to adopt strong primary fiscal surpluses to reduce debt ratios. Jamaica has been running significant fiscal primary surpluses (of about 7% of GDP)<sup>4</sup> in the context of ongoing IMF programs in recent years. Barbados

<sup>4</sup> Jamaica Fourth Review under the Stand-By Arrangement, Request for Modification of Performance Criteria, and Monetary Policy Consultation Clause, IMF November 2018.

**FIGURE 5.3** ► **Estimated Required Fiscal Adjustments and Debt Levels**

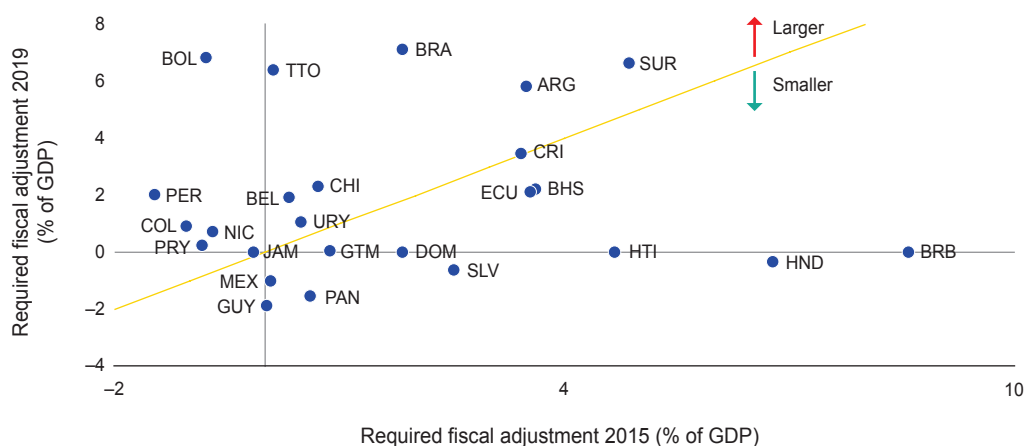
Source: IDB staff estimates based on IMF (2018b).

Notes: 1) Required fiscal adjustment estimates based on assumptions for potential growth and real interest rates. 2) Definitions of gross debt may vary across countries. 3) Jamaica and Barbados do not require additional fiscal adjustments to maintain current debt levels (in the context of programs with the IMF).

**TABLE 5.1** ► **Evolution of Required Fiscal Adjustments in the Region (%)**

		2015	2016	2017	2018	2019
All countries	Average	1.7	2.0	2.2	2.2	1.8
	Median	0.7	1.3	1.5	1.1	0.9
Countries with a positive required fiscal adjustment	Average	2.8	2.6	2.7	3.4	3.3
	Median	2.5	2.6	1.6	3.3	2.9

Source: IDB staff estimates based on IMF (2018b).

**FIGURE 5.4** ► **Change in Required Fiscal Adjustment: 2019 vs. 2015**

Source: IDB staff estimates based on national sources, IMF (2018b) and various Article IV reports.

has agreed on a program with the IMF and is planning a primary surplus of about 6% of GDP<sup>5</sup> for several years beginning in 2019 to reduce debt. At the other end of the spectrum, Chile and Peru have low debt levels and need only a modest fiscal adjustment to stabilize their debt ratios according to the methodology adopted here. Both countries took advantage of fiscal space to pursue expansionary fiscal policies to boost output when most needed, mainly through public investment projects. Moreover, Chile and Peru<sup>6</sup> both complied with their respective fiscal rules, which provided credibility regarding future fiscal sustainability. The size of the required fiscal adjustment is larger for countries with debt levels over 60% of GDP (Argentina, Brazil, and Suriname) and for commodity exporters with debt over 40% of GDP and high fiscal deficits (Bolivia, Ecuador, and Trinidad and Tobago). Debt in Mexico has risen to 54% of GDP; however, if the economy grows at potential and interest rates remain at projected levels, debt levels will remain stable with no fiscal adjustment.

### *Fiscal Adjustments and External Shocks*

The previous debt sustainability analysis assumes that economies grow at potential, and interest rates remain at average levels. Negative external shocks that, for example, increase interest rates or lower growth would alter these estimates. Under less favorable conditions, almost all countries in the region would have to enact additional fiscal adjustments to avoid increasing their debt levels or resorting to inflationary financing of the deficits.<sup>7</sup>

As discussed in Chapter 2, greater than expected tightening of monetary policy in the United States is a risk that could lead to higher borrowing costs and capital outflows from emerging markets and even trigger a sudden stop in capital flows. In an extreme scenario, where no new net foreign financing is available and the current account deficit must be eliminated, pressure would grow for real exchange rates to depreciate.<sup>8</sup> The real depreciation may provoke a “valuation effect” on the existing stocks of debt for those countries with high shares of debt denominated in foreign currency; that would then increase the required fiscal adjustment.

<sup>5</sup> Barbados Request for an Extended Arrangement under the Extended Fund Facility. IMF October 2018.

<sup>6</sup> Peru changed its structural fiscal rule in 2016 for the consolidated public sector, adding limits to the debt-to-GDP ratio, to the size of the overall fiscal deficit (as a percentage of GDP), to the general government’s growth rate of total non-financial expenditure and current expenditure.

<sup>7</sup> Calculations show that if the growth rate of GDP were 2% lower than potential, the average required fiscal adjustment to stabilize the debt would increase to 3.8% of GDP (up from 1.8%). If, in addition, average interest rates were 200 bps higher, then the required fiscal adjustments could reach 4.4% of GDP on average.

<sup>8</sup> This scenario assumes that countries receive no net inflows from nonresidents or repatriation of residents’ wealth invested abroad and do not draw down reserves.

In this section, a particular framework is employed to consider the issue of debt sustainability in the event of a sudden stop in capital flows. The framework is taken from Calvo, Izquierdo, and Talvi (2004).<sup>9</sup> The required real exchange rate depreciation to eliminate the outstanding current account deficit if a sudden stop were to materialize is 25% on average for the 21 countries in the region that are currently running current account deficits.<sup>10</sup> The required real exchange rate depreciation may have valuation effects on the debt-to-GDP ratio depending on the country-specific mismatch between the currency composition of debt, and the tradable to nontradable components of GDP. Taking each country's estimate, the debt-to-GDP of the countries that are currently running current account deficits is calculated to increase by an average of 4.4 percentage points.<sup>11</sup> In some cases, where the mismatches between debt and output composition are higher than the average, the debt-to-GDP ratios would increase by more: Argentina (+15.5 percentage points of GDP), El Salvador (+9.9 p.p.) and Bolivia (+8.0 p.p.).

The framework then combines a standard debt sustainability methodology with the potential effects of a relative price adjustment on the debt-to-GDP ratio via the valuation effect. While the required fiscal adjustment to stabilize debt increases only from 2.6% to 2.7% of GDP after the shock among the countries that are exposed,<sup>12</sup> the valuation effects imply that the debt-to-GDP ratio would stabilize at higher levels. A greater adjustment would then be required to bring debt back down to pre-sudden stop levels.

Sudden stops are usually accompanied by lower growth and higher interest rates. Assuming, for example, that interest rates increase 200 basis points in the aftermath of a sudden stop, the required adjustment to stabilize the debt would increase by an additional 1.2 percentage points of GDP on average (see Figure 5.5).<sup>13</sup> Moreover, El Salvador, Jamaica, and Honduras—which in the no shocks scenario did not have to resort to a fiscal adjustment to stabilize their debt-to-GDP ratios—would require an average fiscal adjustment of 1.2% of GDP under the sudden stop scenario. If, in addition to the valuation effects and the increase in interest rates, GDP growth were to fall by 2 percentage points after a sudden

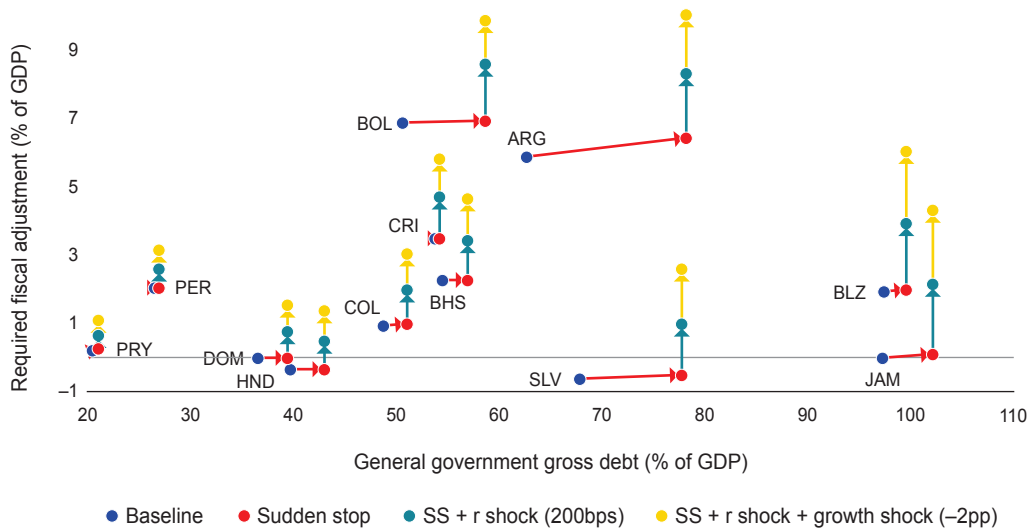
<sup>9</sup> The idea is to consider how countries that suffer a sudden stop in capital flows adjust their current accounts to ensure the balance of payments remains in balance. If net capital inflows fall from a substantial positive figure to zero, then, without other forms of financing, net exports must rise (i.e., the absorption of tradable goods must fall to restore equilibrium in the balance of payments). In order to engineer such an adjustment, the country must become more competitive, which implies a real exchange rate depreciation. This adjustment process, in turn, may have implications for debt sustainability.

<sup>10</sup> In 2019, some 21 countries are projected to run a current account deficit with an average size of 3.6% of GDP.

<sup>11</sup> The analysis is based on those countries that have a projected current account deficit in 2019, and where there would be an estimated increase in debt-to-GDP due to real exchange rate depreciation. The calculation of the valuation effect of a real depreciation on the public debt, and the fiscal adjustment required to stabilize it is based on the toolkit by Borensztein et al. (2013).

<sup>12</sup> Averages for countries that exhibit a required positive fiscal adjustment and where the debt-to-GDP ratio increases as a result of real depreciation.

<sup>13</sup> Unlike the analysis in the previous subsection, this is a lower bound estimate because it does not take into account the increase in amortizations due to higher interest rates.

**FIGURE 5.5** ► **Required Fiscal Adjustment and Debt Levels Under Sudden Stops**

Source: IDB staff estimates based on national sources and IMF (2018b).

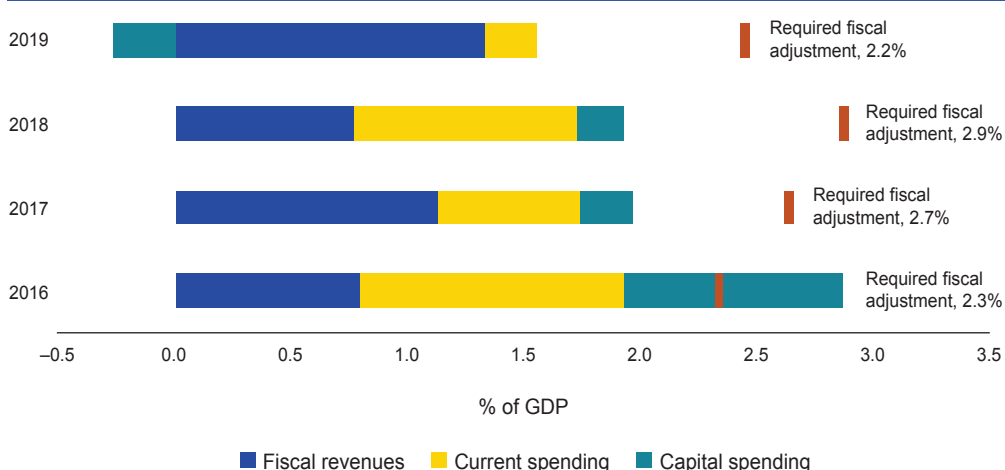
Note: This exercise includes those countries where: 1. debt-to-GDP increases due to real depreciation as a result of a sudden stop, and 2. the real interest rate ( $r$ ) is higher than the growth rate.

stop, then the required fiscal adjustment would increase by more than 4 percentage points of GDP in countries with higher debt levels (see Figure 5.5). Appendix B extends the debt sustainability analysis under sudden stops in a dynamic setting.

The bottom-line is that a sudden stop in the region could increase the debt-to-GDP ratios through valuation effects and, consequently, have sizeable fiscal consequences even among countries that would not otherwise require fiscal adjustments. However, even without an extreme sudden stop scenario, the fiscal situation is tight in many countries and higher interest rates or negative growth shocks would threaten debt sustainability, forcing many countries to make additional fiscal adjustments. This possibility calls for a continued cautionary approach to fiscal policy and limits the freedom countries have to either halt consolidation efforts or move towards an expansionary fiscal policy stance in order to boost growth.

### Countries' Fiscal Adjustment Plans

Thirteen borrowing member countries of the IDB have announced explicit fiscal adjustment plans (including expenditure cuts and/or tax reforms). According to those plans, the average improvement in the fiscal balance is projected to be 1.3% of GDP over a four-year period. These plans fall short of the (average) estimate of the required fiscal adjustment for those same countries; thus, debt is expected to rise, albeit at a slower pace. In contrast to previous years, fiscal consolidation plans have shifted toward increasing revenues to offset a smaller cut in current spending while at the same time attempting to protect capital spending

**FIGURE 5.6** ► **Required and Planned Fiscal Adjustments**

Source: IDB staff estimates based on national sources and IMF (2018b).

Note: The planned fiscal adjustment is the simple average across the 13 countries that have announced fiscal consolidation plans in the coming years.

(Figure 5.6), which in the past had borne a greater share of adjustments. While this is good news, the actual outcomes will determine the success of these programs. Although planned spending (as detailed in annual budget exercises) tends to be close to actual spending levels, in recent years revenue forecasts have been optimistic and have fallen short of those budgeted, provoking higher deficits than expected. Previous reports in this series discussed how to improve budgetary institutions to ensure deeds more closely match plans.

On the spending side, a proposed reform submitted in February 2019 to the Brazilian Congress relates to the pension system. If passed in a form close to the proposed draft, it would be an important component of Brazil's required fiscal adjustment. Reforms in tax systems currently under way are mainly aimed at simplifying and modernizing tax systems, reducing corporate tax rates and introducing investment incentives, and implementing or modifying value added taxes (VAT).<sup>14</sup> Colombia, Chile, and Peru are implementing reforms in their tax systems that seek to reduce tax evasion and make tax collection more efficient (see Box 5.1).

Brazil and Ecuador include in their reforms incentives to promote private investment. For example, they plan to reduce corporate tax rates and implement targeted tax incentives. Some of those features were included in the Colombian tax reform of 2018—corporate income tax rates were gradually lowered from 33% to 30%. The Colombian reform also introduced tax reductions for capital investments (i.e., greater deduction of VAT on the purchase of capital goods) and for key sectors of the economy. Countries in Central

<sup>14</sup> As discussed in the 2018 edition of this report, tax systems in the region include several distortionary features that impede an efficient allocation of resources and therefore reduce GDP growth (see Cavallo and Powell, 2018, Chapter 4 for details).

### Box 5.1 Recent Fiscal Reforms in the Region

#### Barbados

In October 2018, Barbados signed a 4-year Extended Fund Facility program with the IMF to lower the high debt burden (debt to GDP had reached 157% in 2017), strengthen the country's external position, and improve growth prospects. The cornerstone of the program is fiscal consolidation. To that effect, the authorities will conduct a comprehensive review of tax policies to make the tax system more progressive and seek greater balance in taxation between residents and tourists. Specific measures include: increasing taxes on tourism, setting a 40% top personal income tax rate, increasing the corporate income tax rate from 25% to 30%, and introducing a new contribution for health services. Altogether these measures are expected to yield about 3.7% of GDP in higher revenues. The fiscal adjustment will also be supported by adopting a fiscal rule, strengthening tax and customs administrations, and reforming the public financial management system. At the same time, the government intends to implement measures to protect social spending, reduce current expenditures (including lowering the wage and pension bills), and decrease transfers to state-owned enterprises (currently at 7.5% of GDP).

#### Colombia

The tax reform approved in December 2018 is expected to increase fiscal revenue by 0.7% of GDP in 2019. Key measures include a gradual decline in the corporate income tax rate from 33% to 30% by 2022 and measures to curb tax evasion. The reform introduced a simplified tax regime for small and medium-sized enterprises; it provides new incentives for large-scale investment projects; and introduces a lower corporate tax rate for the hospitality and tourism sector. The VAT tax rate remains unchanged at 19%, but the list of excluded goods and services has been adjusted, and a VAT on beer and soda was introduced. Colombia has also added electronic invoicing requirements that will become mandatory for all taxpayers by the end of 2019.

#### Costa Rica

The Law to Strengthen Public Finances approved in December 2018 includes revenue and expenditure measures and a new fiscal rule aimed at limiting the growth of current expenditures. On the revenue side, the reform turns the current sales tax into one that taxes value added and broadens its base to include services, with a reduced rate for basic goods. Additionally, it creates a dual income tax system, which homogenizes tax rates for capital income (15%), and creates two additional brackets (20% and 25%) in the personal income tax, thereby enhancing progressivity. These tax measures, in conjunction with additional administrative ones, are estimated to generate a revenue gain of about 1.5% of GDP over a four-year period; 80% of the increased tax burden will be concentrated among the first quintile of the income distribution. From the expenditure side, the reform includes measures to counteract the growth dynamics of current expenditure (especially wages and salaries) and introduce an expenditure fiscal rule that sets limits on the growth rate of current spending depending on output growth and debt levels. Fiscal savings on the expenditure side are estimated to deliver up to 1.6% of GDP over the medium term.

#### Peru

In September 2018, the government announced new tax measures to bolster revenue and to reduce tax evasion. Excise taxes on goods with negative externalities (diesel fuel, cigarettes, alcoholic beverages, sugary drinks, etc.) were raised, limits were placed on interest expense deductions for large firms, and

*(continued on next page)*



**Box 5.1 Recent Fiscal Reforms in the Region** *(continued)*

changes were introduced to reduce double taxation and to simplify the system for obtaining rebates on payments of VAT, particularly for medium and small firms. The government estimates that, thanks to these changes, tax revenue will increase to 15.9% of GDP by 2021 (from 13.3% in 2017). In addition, the government will start rationalizing tax exemptions that could lift revenue by an additional 1% of GDP annually. Reforms to the tax administration include improvements to fiscal databases, the full digitalization of VAT payments by 2019, and improved oversight by the tax authority. Peru also signed an agreement in the context of the G20-sponsored Base Erosion and Profit Shifting plan to fight fiscal evasion. On the expenditure side, measures aim to reduce noncritical expenses (spending limits for ministries and state-owned enterprises) to 0.3% of GDP. The government also introduced measures to strengthen the efficiency and sustainability of the Fuel Price Stabilization Fund, which are expected to create annual savings up to 0.2% of GDP.

America and the Caribbean are introducing or implementing VAT reforms. As part of the reform in their tax systems, The Bahamas increased the VAT rate from 7.5% to 12%; Belize expanded the basket of goods subject to VAT; Costa Rica migrated from a sales tax to a VAT tax with a uniform 13% rate and an expanded base in the 2018 reform.

As countries continue strengthening their tax systems, reform efforts can be complemented by innovative interventions to boost tax compliance. Box 5.2 provides several examples of how behavioral insights can be incorporated in the policy toolkit of tax administrations.

**Box 5.2 Improving Tax Compliance One Behavioral Intervention at a Time**

Behavioral interventions can increase tax compliance by making monitoring and penalties more salient to taxpayers (citizens and firms), as well as boosting tax morale by inducing reciprocity or leveraging peer effects. Substantial evidence corroborates the success of these interventions around the world,<sup>a</sup> and recent evidence across the region suggests a number of important lessons and policy implications.

**More and Better Communication with Taxpayers: The Importance of Message Content**

Several interventions randomly expose taxpayers to different messages in order to evaluate their effectiveness in terms of increasing tax compliance. In Guatemala, the intervention targeted taxpayers who had failed to pay their income tax (Kettle et al., 2016). These taxpayers were randomly selected to receive the letter originally used by the Guatemalan Tax Authority, or four variants adapted using behavioral design. While all letters increased the rate of declaration, two variants of the modified letter additionally succeeded at increasing the rate of payment and the average amount paid: i) a deterrent message framing non-declaration as a deliberate choice, and ii) a descriptive-norm message mentioning the percent of taxpayers that had already paid this tax. These two variants positively impacted both extensive and intensive margins, overall more than tripling tax receipts, with effects persisting after 12 months. In Argentina, tax bills with three different types of messages stressing either deterrence, legitimacy or equity content were sent to local taxpayers to increase compliance with the property tax (Castro and Scartascini, 2015). The most effective message was the deterrence treatment, which

*(continued on next page)*

### Box 5.2 Improving Tax Compliance One Behavioral Intervention at a Time

(continued)

listed the actual fines and potential administrative and judicial steps that the municipality might follow in case of noncompliance: compliance increased by almost 5 percentage points with respect to the control group, equivalent to reducing tax evasion by more than 10%. In Costa Rica, sending firms credible enforcement emails tripled the income tax filing rate and doubled the payment rate among previously non-filing firms (Brockmeyer et al., 2016). The effect was highest when the email listed examples of third-party reports of a firm's transactions, with the return on an email reaching US\$19.

#### Beyond Message Content: Delivery Mechanisms, Spillover Effects, and Positive Incentives

In Colombia, more than 20,000 taxpayers with unpaid liabilities were randomly assigned to a control group or one of three delivery mechanisms: a letter, an email or a personal visit (Ortega and Scartascini, 2015). Taxpayers in the treatment groups all received the same message, which informed them of outstanding liabilities and warned them about the consequences of not paying. The effect on tax compliance considerably differed across delivery methods. Among those effectively treated, the effect on payment of outstanding liabilities was 8 percentage points for letters, 17 percentage points for emails, and 88 percentage points for personal visits, implying that almost every person who received a visit by a tax agent made some kind of payment.<sup>a</sup> The average amount collected was around \$590 per email, \$550 per letter, and over \$2,000 for attempted in-person visits, with respective variable costs of \$0, \$0.5 and \$8. Behavioral interventions can also help identify spillover effects, namely: what happens to compliance with other taxes when authorities increase enforcement in one particular tax. Based on the experiment in Argentina, but focusing on taxpayers in the deterrence treatment who are also business owners, results show that publicizing fines and enforcement probabilities for those who do not comply with the payment of the property tax actually increases how much the same individual declared on their gross-sales tax (López-Luzuriaga and Scartascini, 2018).

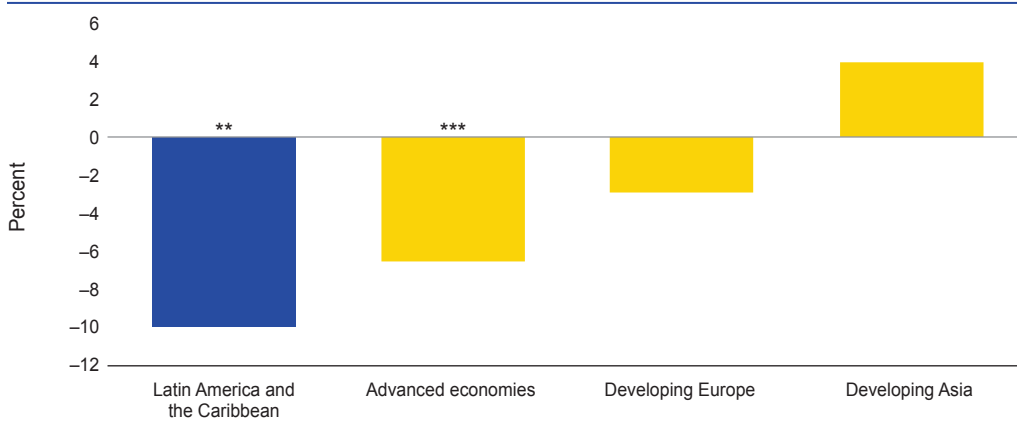
While much of the evidence reviewed above focuses on deterrence approaches to improve compliance, there is also room to experiment with the use of positive incentives. For example, the city of Santa Fe (Argentina) organized a lottery in an effort to reward good taxpayers and improve property tax compliance (Carillo, Castro, and Scartascini, 2017). The lottery, which entitled winners to the construction or renovation of a complete sidewalk, increased the likelihood of paying tax obligations on time by about 3.1 percentage points, and raised the probability that property taxes were paid within 3 months by 2.4 percentage points. Lottery winners were also 3 percentage points more likely to continue paying on time over the next few years.

<sup>a</sup> See Mascagni (2018), Slemrod (2016), and Hallsworth (2014) for reviews of this literature.

## Rule-based Fiscal Frameworks, Public Investment, and Fiscal Consolidations

Many IDB reports in recent years have expressed concerns about the dynamics of public investment in the region.<sup>15</sup> The share of public investment over total public expenditure has been declining over time. Moreover, countries forced to cut capital expenditures in bad

<sup>15</sup> See previous editions of this report: Powell (2014, 2016), Cavallo and Serebrisky (2016), and Cavallo and Powell (2018), as well as the Development in the Americas report, Izquierdo, Pessino, and Vuletin (2018).

**FIGURE 5.7** ► **Effect of Fiscal Consolidation on Public Investment Spending Growth**

Source: Ardanaz et al. (forthcoming).

Note: Bars represent the associated coefficient stemming from a regression of the growth rate in real public investment on a dummy variable identifying a fiscal consolidation. All regressions are estimated using panel data with country and time fixed effects. Statistical significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

times do not fully return to spending levels during good times.<sup>16</sup> In the typical country in the region, real public investment falls by 10% during fiscal consolidation years,<sup>17</sup> an effect that is more than double (and up to triple) that in other developing economies (see Figure 5.7).

Fiscal rules have been implemented in several countries to promote fiscal discipline, but can they also mitigate the negative effects of fiscal consolidation on public investment? Answering this question is relevant considering the potential growth enhancing properties of public investment, especially during downturns (Abiad, Furceri, and Topalova, 2016), when investment efficiency is high (Furceri and Li, 2017; IMF, 2014), or when the initial stock of public capital is low (Izquierdo, Lama, et al., 2018).

Fiscal rules have become increasingly popular over time: since the mid-1980s more than 90 countries (including 14 from Latin America and the Caribbean) have implemented different types of fiscal rules to improve fiscal performance. While fiscal rules have been effective in supporting better fiscal outcomes (i.e., lower fiscal deficits),<sup>18</sup> the implications of those rules for spending composition have received less attention.<sup>19</sup> Indeed, pioneer fiscal rule frameworks lacked flexibility mechanisms to accommodate shocks and therefore unintendedly encouraged fiscal procyclicality and poorly conceived adjustment measures

<sup>16</sup> Izquierdo, Puig et al. (2018) and Ardanaz and Izquierdo (2017).

<sup>17</sup> Fiscal consolidation is defined as a year in which the cyclically adjusted primary balance improves by at least 1.5% of GDP (see Appendix C and Ardanaz et al., forthcoming, for details).

<sup>18</sup> The correlation between fiscal rules and lower deficits is well documented in the literature (IMF, 2009) yet identifying the causal effect of fiscal rules on fiscal outcomes has been challenging. See Caselli and Reynaud (2018) for a recent attempt to explicitly address the problem of endogeneity.

<sup>19</sup> An exception is Izquierdo, et al. (2019). They show that having a fiscal rule is associated with a lower ratio of investment to current expenditures.

such as the over-compression of public investment to comply with fiscal targets (Caselli et al., 2018; Blanchard and Giavazzi, 2004). As a result, countries have been designing fiscal rules with more flexible features. “Flexibility” in this context does not mean lax. Instead, it means that the rules include design features such as cyclically adjusted fiscal targets, well-defined escape clauses in the case of unanticipated shocks,<sup>20</sup> and investment-friendly provisions, which are rules that exclude capital expenditures from the numerical targets imposed on fiscal aggregates (Guerguil, Mandon, and Tapsoba, 2017; Schaechter et al., 2012).<sup>21</sup> Have these features been effective in protecting public investment from budget cuts?

Recent estimates from a sample of 75 countries (including 17 Latin American and Caribbean economies) show that the response of public investment during fiscal adjustment episodes differs significantly depending on the fiscal rule design (Ardanaz et al., forthcoming).<sup>22</sup> In countries with rigid fiscal rules, a fiscal consolidation of at least 1.5% of GDP is associated with a 10% cut in capital expenditures (Figure 5.8, Panel A). However, in countries where the fiscal rule includes at least one of the flexible features listed above, the ensuing decline in investment is only about 1% and is not statistically significant (Panel B).<sup>23</sup>

These results suggest that the design of fiscal rules can improve public investment outcomes in the region. This is particularly relevant for countries that have yet to introduce flexibility features into their fiscal policy frameworks or have not yet opted for fiscal rules that aim at directly or indirectly protecting public investment. Table 5.2 describes some of the main features of fiscal rules across 14 countries in the region.<sup>24</sup> One of the most recent innovations in fiscal rule frameworks has been to impose limits on the growth rate of current expenditures.<sup>25</sup> Such constraints may help moderate spending pressures during good times, a key source of fiscal procyclicality in the region.<sup>26</sup> Among the flexibility features described in the table, several countries have introduced escape clauses, yet oftentimes such clauses have not been well defined in legislation or have been overused

<sup>20</sup> These include (i) a very limited range of factors that allow such escape clauses to be triggered in legislation, (ii) clear guidelines on the interpretation and determination of events (including voting rules), and (iii) specification on the path back to the rule and treatment of accumulated deviations (see IMF, 2009).

<sup>21</sup> While by 1998, less than 40% of countries with some type of rule had adopted at least one such flexible feature, by 2018 this share had increased to almost 80%.

<sup>22</sup> In contrast, having a fiscal rule per se does not change the marginal effects of fiscal consolidation on public investment significantly.

<sup>23</sup> These results are robust to an alternative definition of fiscal consolidation episodes, and similarly when comparing rules exclusively by their degree of investment friendliness. A placebo test in which the dependent variable is the growth rate in primary current expenditures shows that the response of the latter is not affected by fiscal rule design.

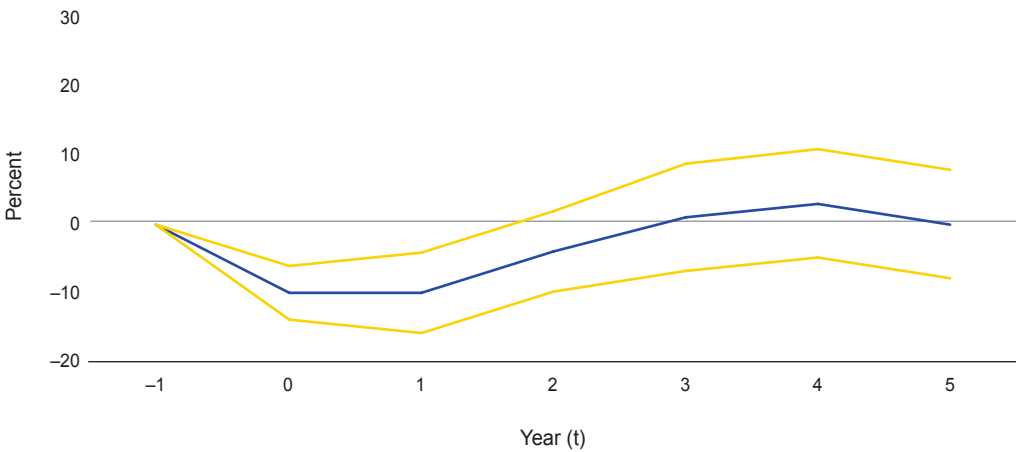
<sup>24</sup> For a recent survey of the evolution of fiscal rule frameworks across selected Latin American countries, see Barreix and Corrales (2018). For a discussion of reform alternatives across Caribbean countries, see Giles Alvarez (2018) and Wright, Granada, and Scott-Joseph (2017).

<sup>25</sup> See Izquierdo, Pessino, and Vuletin (2018) for a discussion.

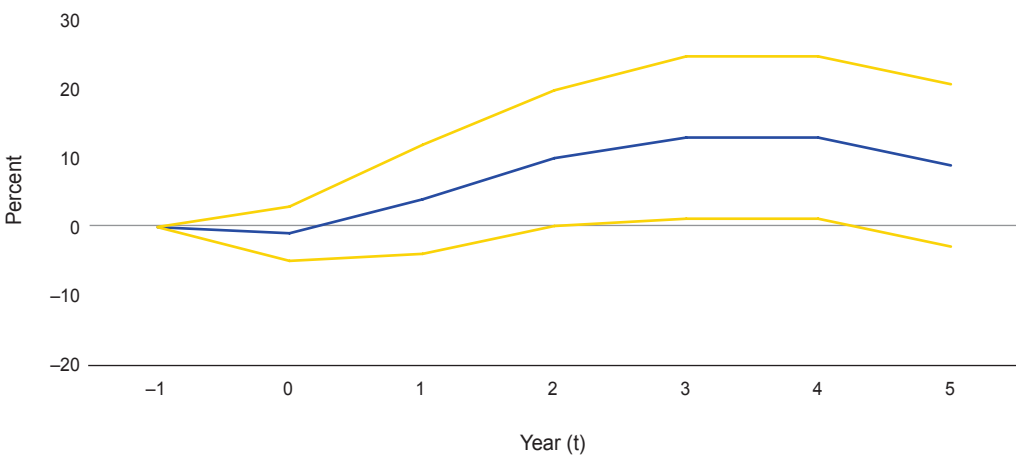
<sup>26</sup> See Ardanaz and Izquierdo (2017) for evidence on current expenditure upswings during good times in Latin America and the Caribbean. See also Powell (2014).

**FIGURE 5.8** ► **Effect of Fiscal Consolidation on Public Investment Growth, Conditional on Fiscal Rule Design**

**A. Inflexible fiscal rule**



**B. Flexible fiscal rule**



Source: Ardanaz, et al. (forthcoming).

Note: In both panels,  $t = 0$  is the year of fiscal consolidation, blue lines are estimated using the local projection method, yellow lines denote 95% confidence intervals. See Appendix C for details.

in practice, undermining the credibility of the rule itself.<sup>27</sup> Introducing structural targets has also raised implementation challenges, making the rule difficult to comply with and suggesting that important preconditions may need to be fulfilled before considering their formal introduction (Ter-Minassian, 2010).

<sup>27</sup> For example, by leaving too much scope for governmental discretion in triggering escape clauses, or by lacking provisions to specify the path back to the rule (correction mechanisms).

TABLE 5.2 ► Fiscal Rules in Latin America and the Caribbean: Targets, Scope, and Flexibility Features

Country	Expenditure rule	Budget balance rule	Debt rule	Revenue rule	Flexibility features		
					Specific escape clauses	Structural target	Exclusions in expenditure ceilings
<b>Argentina</b>	General Government (GG) Primary net current expenditure cannot grow faster than inflation	—	—	—	No	No	Yes
<b>Bahamas</b>	Public sector current expenditure cannot grow higher than long-term nominal GDP growth (After meeting 2020–2021 target)	Decreasing fiscal deficit target until 2020–2021 (0.5% of GDP after)	< = 50% of GDP	—	Yes	No	No
<b>Brazil</b>	Central Government (CG) primary real expenditure cannot grow faster than annual inflation	—	Ratios of net debt to net revenues limited to certain thresholds for SNG	—	Yes	No	Yes
<b>Chile</b>	—	Structural balance of the CG should be 0% of GDP (previously- 1% of GDP)	—	—	No	Yes	No
<b>Colombia</b>	—	Decreasing structural fiscal deficit target of the CG until 2022 (1% of GDP from then on)	—	—	No	Yes	No
<b>Costa Rica</b>	Limits nonfinancial public sector (NFPS) current expenditure growth, according to CG Debt-to-GDP ratio and growth rate of GDP	—	—	—	Yes	No	Yes
<b>Ecuador</b>	CG total expenditure cannot grow higher than potential GDP growth	Primary balance cannot be negative	< = 40% of GDP	—	Yes	No	No
<b>El Salvador</b>	NFPS Current expenditure < = 18.5% of GDP. Current expenditure (wage bill and goods and services) cannot grow faster than nominal GDP growth	Primary balance cannot be negative	< = 45% of GDP (65% of GDP, including pensions).	Tax Revenues > = 17 % of GDP	No	No	No

(continued on next page)

**TABLE 5.2** ► **Fiscal Rules in Latin America and the Caribbean: Targets, Scope, and Flexibility Features** (*continued*)

Country	Expenditure rule	Budget balance rule	Debt rule	Revenue rule	Flexibility features		
					Specific escape clauses	Structural target	Exclusions in expenditure ceilings
<b>Honduras</b>	CG current expenditure cannot grow faster than real GDP growth (average previous 10 years) plus inflation (next year)	NFPS fiscal deficit < = 1% of GDP (2019 onwards)	—	—	Yes	No	No
<b>Jamaica</b>	—	CG overall balance cannot be negative	To bring public sector debt down to 60% of GDP or below by 2025–2026.	—	Yes	No	No
<b>Mexico</b>	Public sector structural current spending cannot grow faster than potential GDP growth. This covers all current primary expenditures, except outlays governed by automatic rules	Targets on public sector borrowing requirements set in consistence with debt sustainability	—	—	No	Yes	Yes
<b>Panama</b>	NFPS current expenditure may not exceed the growth of potential GDP plus inflation	Decreasing fiscal deficit target until 2022 (1.5% of GDP from then on)	—	—	Yes	No	Yes
<b>Paraguay</b>	(i) The annual increase in public sector primary spending may not exceed the inflation rate plus 4%. (ii) Public wage bill can only grow according to proportional increases in the minimum wage	CG annual deficit < = 1.5% of GDP	—	—	No	No	Yes
<b>Peru</b>	(i) GG total expenditure real growth cannot be higher than the upper limit of long-term GDP growth rate range (+/– 1 p.p); (ii) GG current expenditure real growth rate cannot be higher than the lower limit of long-term GDP growth rate (+/– 1 pp)	NFPS fiscal deficit < = 1% of GDP	NFPS Debt < = 30% of GDP	—	Yes	No	Yes

Source: Author's compilation based on Barreix and Corrales (2018); Liedó et al. (2017); IMF (2017a) and national legislation.

Notes: CG (Central Government); GG (General Government), NFPS (Non-Financial Public Sector); SNG (Subnational Governments). See Appendix D for further details on flexibility features.



Overall, reforms in rule-based fiscal frameworks aimed at protecting growth friendly expenditure items should be accompanied by several safeguards. First, to ensure that additional capital expenditures effectively contribute to increasing potential GDP growth, improvements to public investment management institutions are needed (see Chapters 6 and 7 for further discussion). Second, investment friendly fiscal rules should mitigate opportunistic classifications of capital expenditures<sup>28</sup> by enhancing international transparency standards in government finance statistics. Third, strengthening public financial management institutions by, for example, enhancing medium-term fiscal frameworks, preparing budgets in a timely fashion, and -modernizing execution and accounting systems, would support effective implementation of fiscal rules. Finally, enforcement and monitoring mechanisms should be in place. For instance, independent fiscal councils can verify whether rules are being complied with or provide ex ante regular quality control to macroeconomic and fiscal assumptions underpinning the budget process.

## Conclusions

Fiscal consolidation continues in the region. Fiscal deficits remain high in many countries, and further adjustment will likely be required to eventually stabilize debt-to-GDP ratios. The risks from external shocks could negatively impact debt sustainability significantly. These are not uncharted waters for the region, which has already navigated through similar situations in the past with mixed results. The potentially negative consequences on debt sustainability of a sudden stop-like scenario bring to the fore the need to manage debt levels and debt composition carefully in order to minimize risks, as discussed in Chapter 4.

The global economy has become more complex and the potential benefits from reform efforts to ensure fiscal policies that support growth is arguably higher than ever. In particular, this chapter has documented how certain features of fiscal rules can help safeguard public investment during fiscal consolidation periods. Adopting them would be a step in the direction of solving one of the perennial problems with fiscal policy management in the region. Several countries have either introduced fiscal rules or are considering strengthening their policy management toolkits through rule-based fiscal frameworks. Including elements related to protecting public investment in the design of the rules can add a growth enhancing dimension to the fiscal sustainability concerns that have typically been the focus of fiscal rules in the past.

<sup>28</sup> That is, reporting as spending in infrastructures what is in fact current spending. These concerns are particularly relevant in Latin America and the Caribbean where fiscal transparency tends to be relatively weak on average (IDB, 2018).



## CHAPTER 6

# Financing Infrastructure: How to Close the Gaps

**G**rowth in the region is relatively low and expected to remain so for the next few years. As detailed in previous editions of the Latin American and Caribbean Macroeconomic Report, the limited provision of infrastructure services may be an important factor restricting both medium-term growth rates and the quality of life in many countries. This chapter analyzes the structure of current investment in infrastructure, presents different measures of infrastructure “gaps,” and suggests how such gaps may be closed by improving investment frameworks and using innovative financing structures.<sup>1</sup>

### Analyzing Infrastructure Investment in the Region

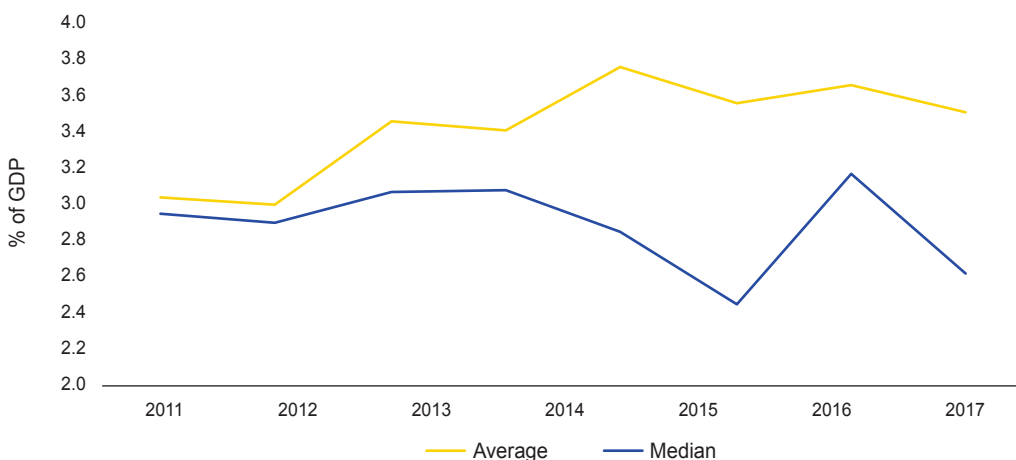
There is no single, comprehensive, and consistent estimate of total infrastructure investment in Latin America and the Caribbean. In recent years, the IDB, CAF, and ECLAC have jointly produced improved estimates of public investment and published them in the InfraLatam database.<sup>2</sup> In that database, public investment focuses on what goes through fiscal accounts. There are several alternative sources for data on private investment in infrastructure. To understand precisely who finances investment in the region, a commercial database known as IJ Global presents detailed information on individual projects and financiers.<sup>3</sup> Employing InfraLatam and this database, it is estimated that total investment in infrastructure in the region reached almost US\$483 billion over a recent five year period.<sup>4</sup>

<sup>1</sup> A set of Country Infrastructure Briefs will be made available at [www.iadb.org/macroeconomic](http://www.iadb.org/macroeconomic) as complementary material to this report.

<sup>2</sup> See <http://infralatam.info/> and Serebrisky et al. (2018).

<sup>3</sup> See <https://ijglobal.com/>. IJ Global is associated with the Infrastructure Journal. Note that InfraLatam employs the World Bank's Private Participation in Infrastructure database (PPI) to estimate private investment in infrastructure. IJ Global is one of the suppliers of information to PPI. Still, there are differences in coverage between the IJ Global and PPI. Here, an effort is made to include only those projects that actually result in a new infrastructure asset being built, excluding refinancing and any payments related to a change in ownership. A caveat is that IJ Global, like PPI, provides the amount of agreed financing, which is treated here as investment. InfraLatam estimates reflect actual investment in real assets.

<sup>4</sup> This five-year period is 2011–2015; this period is chosen to ensure a wide set of countries is included.

**FIGURE 6.1** ► **Estimated Infrastructure Investment in Latin America and the Caribbean**

Source: IDB staff calculations based on data from IJ Global.

Notes: In some years, missing data are replaced by that country's data from the previous year to ensure a balanced panel and reduce any effects from changes driven by the composition of included countries.

Infrastructure investment has risen to about 3.5% of GDP on average, but for the median country it remains under 3% of GDP (see Figure 6.1).<sup>5</sup>

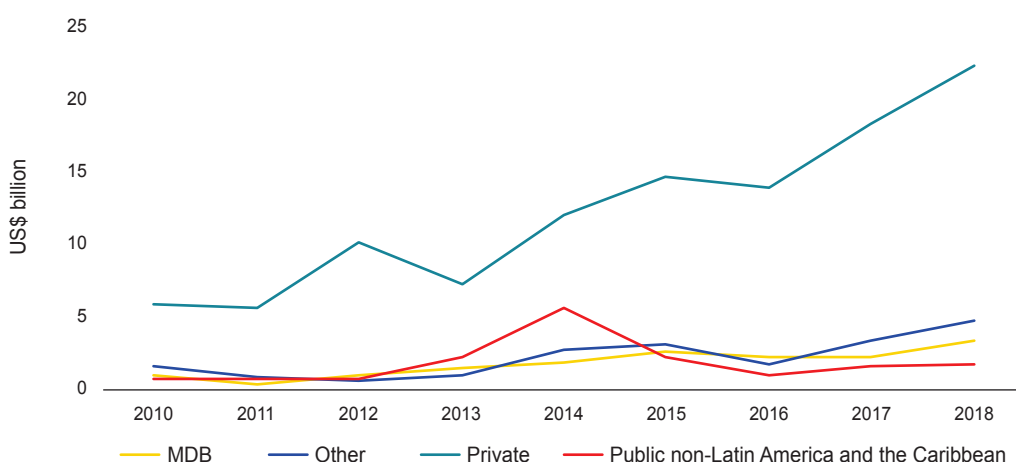
Several authors have attempted to estimate the amount of investment in infrastructure required to support growing populations, economic growth, and to meet the UN's agreed Sustainable Development Goals (SDGs). The results vary widely depending on the data and methodology, but most estimate gaps around 2.5% of GDP or about US\$150 billion per annum.<sup>6</sup> This suggests that substantial additional financing is required.

The majority of current infrastructure investment is public. But as discussed in Chapter 5, there are severe fiscal constraints to boosting public investment. Indeed, public investment in infrastructure as a percentage of GDP has been falling rather than rising.<sup>7</sup> At the same time, private and other types of investment from outside the region have been growing. While in 2010 only about US\$9 billion of financing came from sources other than

<sup>5</sup> The universe of countries is defined here as those countries in the region that have positive investment in both databases (InfraLatam and IJ Global). It is notable that total investment in the median country has fallen while average investment has remained higher. This implies a growing tail of countries with particularly low investment levels while other countries may have actually increased investment.

<sup>6</sup> See Serebrisky et al. (2015), Fay et al. (2017) especially Box 1.1, Cerra et al. (2016), and Castellani et al. (2018). This last paper suggests that the gap in 2014 was close to US\$170 billion (3.1% of the region's GDP) and it is expected to surpass \$717 billion (6.3% of the region's GDP) by 2030 if three Sustainable Development Goals (SDGs) are to be reached. Note that while gaps in Latin America and the Caribbean are often considered large compared to other regions, the Asian Development Bank also estimates significant infrastructure gaps on top of current spending on infrastructure for emerging Asia (see Deep, Kim, and Lee, 2019).

<sup>7</sup> But there is considerable variation across countries. In some countries, public investment in infrastructure has been rising strongly.

**FIGURE 6.2** ► **Private Infrastructure Investment in Latin America and the Caribbean**

Source: IDB staff calculations based on data from IJ Global.

Notes: "MDB" is Multilateral Development Bank, "Private" includes private banks, sponsors, developers and private funds, "Public non-LAC" includes public entities from outside the region including development banks and export credit agencies, "Other" refers to smaller financiers that were difficult to categorize. The graph excludes financing from public entities in the region and excludes financing through the fiscal budget. This means MDB sovereign lending or any other lending through the fiscal budget is excluded.

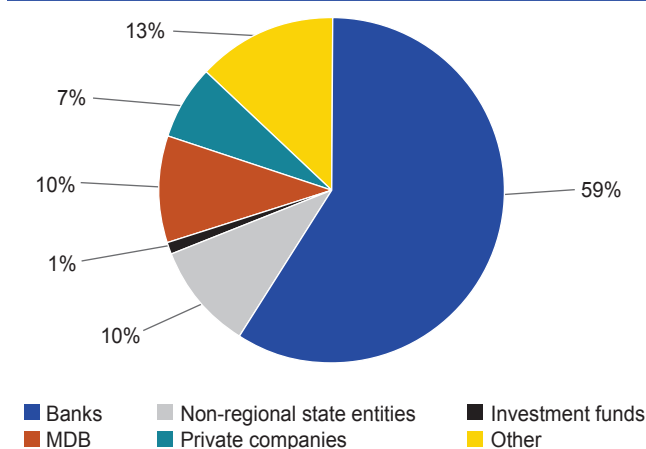
fiscal accounts and regional public entities, this figure had grown to US\$23 billion in 2015 and to some US\$32 billion in 2018 (see Figure 6.2).<sup>8</sup>

As this data represent agreed financing it may be lumpy and projects take several years to build. To give a more robust picture, it is useful to consider the sum of such financing over the last five years (2014 to 2018). Over this period, some US\$73 billion of financing has been provided by commercial banks, US\$12.4 billion from Multilateral Development Banks, another US\$12.4 billion by Official Entities from other countries (including governments, state banks, export credit, or other public agencies), US\$7.9 billion from private companies, (including private utilities, construction, and engineering companies) and just US\$1.1 billion from investment or infrastructure funds (see Figure 6.3, which depicts these amounts in terms of their shares).<sup>9</sup> In addition to the amounts detailed in Figure 6.3, about US\$21.3 billion was provided by state agencies from Latin America and the Caribbean (including national or state development banks, other types of official banks, and other types of national or state agencies).<sup>10</sup>

<sup>8</sup> Sources other than regional public entities include debt and equity type financing from any commercial lender (private bank, company, or fund) as well as public banks and other types of official or state entities from outside the region. In 2018, an additional US\$5.6 billion or so of investment came from public entities in Latin America and the Caribbean that do not go through fiscal accounts.

<sup>9</sup> These are the shares of financing excluding financing through fiscal accounts and public entities from the region. This, of course, understates the financing of infrastructure by MDB's as the majority of such finance may go through fiscal accounts.

<sup>10</sup> Some caveats are in order when analyzing this data. The projects included in the database are likely the larger ones with significant private investment. It may not capture all the smaller projects. Many projects are

**FIGURE 6.3** ► **Providers of Infrastructure Financing**

Source: IDB staff calculations based on data from IJ Global.

Notes: The shares are calculated using data from 2014 to 2018. Official sources of financing from Latin America and the Caribbean (development banks, other national or state banks, public companies, or agencies) are excluded, as is public infrastructure financing. The category “Other” refers to smaller financiers where the categorization was less clear.

The information is revealing in a number of respects. Total infrastructure spending remains low, well below estimates of required amounts. Some countries have been able to increase public infrastructure investment, but for the larger economies it remains low. In some countries, as detailed in Chapter 5, it has actually fallen as a percentage of GDP as it tends to be cut during periods of low growth and fiscal adjustment. The bet-

ter news is that private investment in infrastructure has been increasing. Interestingly, this investment is concentrated in few financiers. Some 59% of nonpublic investment finance is provided by commercial banks. In addition, just 10 global banks account for 55% of the total provided by all commercial banks.<sup>11</sup> Investment funds provide just 1% of financing—and here the denominator excludes domestic public sources of financing.<sup>12</sup> On the other hand, nonregional state agencies (development and state banks of other countries, export credit, and other public agencies) and multilateral development banks are significant providers of financing for infrastructure. Private companies (typically construction and engineering firms or utilities that provide equity and act as the developer and sponsor of the project) account for just 7% of this nonpublic financing. Another feature of the data (not illustrated here) is the concentration of infrastructure investment across countries. Eight countries in the region capture 67% of the nonpublic financing in infrastructure in the region.<sup>13</sup>

excluded that do not result in the completion of a physical asset, but financing may have multiple uses. And while there is detailed data at the tranche level for projects in which financing has been fully assured, some projects may not be completed as planned

<sup>11</sup> See also Serebrisky et al. (2018) and Financial Stability Board (2018). This latter publication calculates similar high concentration indicators across all emerging economies.

<sup>12</sup> Investment funds here include infrastructure funds and other types of funds such as pension funds. The 1% figure is calculated on the basis of the projects included in the IJ Global database. Moreover, commercial banks may sell some of their participation in some projects at a later date. As the database is updated in real time, what is reported here are the recorded transactions at the date the data were accessed.

<sup>13</sup> Nonpublic here means excluding what goes through the fiscal accounts and what is financed by domestic public agencies.



## Infrastructure Quality and Infrastructure Gaps

Latin America and the Caribbean does not fare well according to available measures of infrastructure quality. The perceived quality of infrastructure in the region surpasses that of Sub-Saharan Africa but does not match up to other regions in the world (see Table 6.1, Column 1). The ranking remains the same when controlling for income levels (see Table 6.1, Column 2). Interestingly, the Middle East and North Africa are perceived to have the best quality infrastructure, closely followed by Europe, Central Asia, and South Asia. Latin America and the Caribbean places a fairly distant fifth out of six in this table.

Within Latin America and the Caribbean, however, there is considerable variation across countries. Chile, Mexico, and Ecuador stand out as the better performers (see Figure 6.4). After taking into account income per capita, these three countries actually outperform a group of advanced economies covered by the surveys.

In contrast to these surveys detailing the perceptions of quality, a second technique to consider the depth and quality of infrastructure provision is to collect a set of objective indicators and then calculate so-called “development gaps.” Here, various indicators of infrastructure provision (such as indicators of access, quality, and sustainability) are gathered and then compared across countries, controlling for each country’s level of development as indicated by the level of GDP per capita.

The estimates discussed below are obtained through panel regressions employing country fixed effects, which may also help control for nonobservable fixed country factors (see Appendix E and Acevedo, Borensztein, and Lennon, 2019, for more details of the methodology). The analysis is conducted sector by sector (energy, telecommunications, transport, and water and sanitation) to obtain a more disaggregated and nuanced view of the state of infrastructure in the region compared to other countries in the world. Still, the results of any regression-based method depend on the precise indicators that are available, the assumed weighting of such indicators, as well as the econometric methodology.

**TABLE 6.1** ► **Perceptions of Infrastructure Quality**

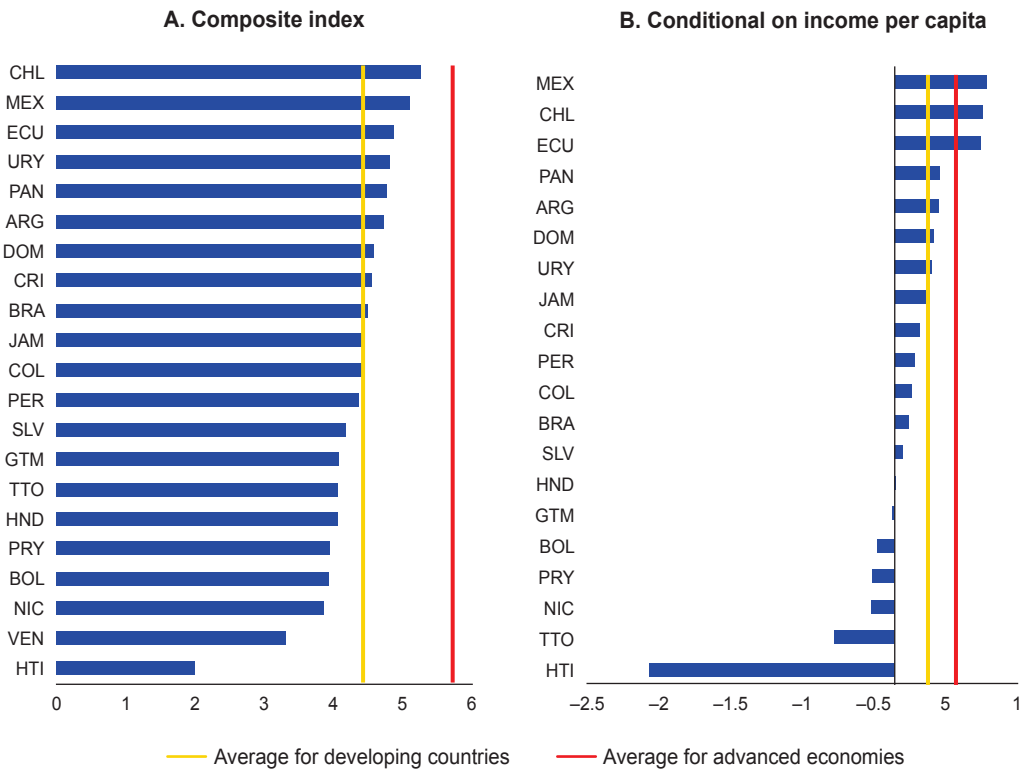
Region	Infrastructure quality	Infrastructure quality conditional on GDP per capita
East Asia and the Pacific	4.5	0.4
Europe and Central Asia	4.8	0.7
Latin America and the Caribbean	3.8	−0.2
Middle East and North Africa	4.9	0.8
South Asia	4.7	0.6
Sub-Saharan Africa	3.1	−1

Source: IDB staff estimates based on World Economic Forum’s Global Competitiveness Report dataset. See also Castellani et al. (2018).

Notes: The second column reports the coefficient stemming from a regression of infrastructure quality on a dummy variable for each region and including GDP per capita.



**FIGURE 6.4** ► **Perceptions of Infrastructure Quality in 2017**

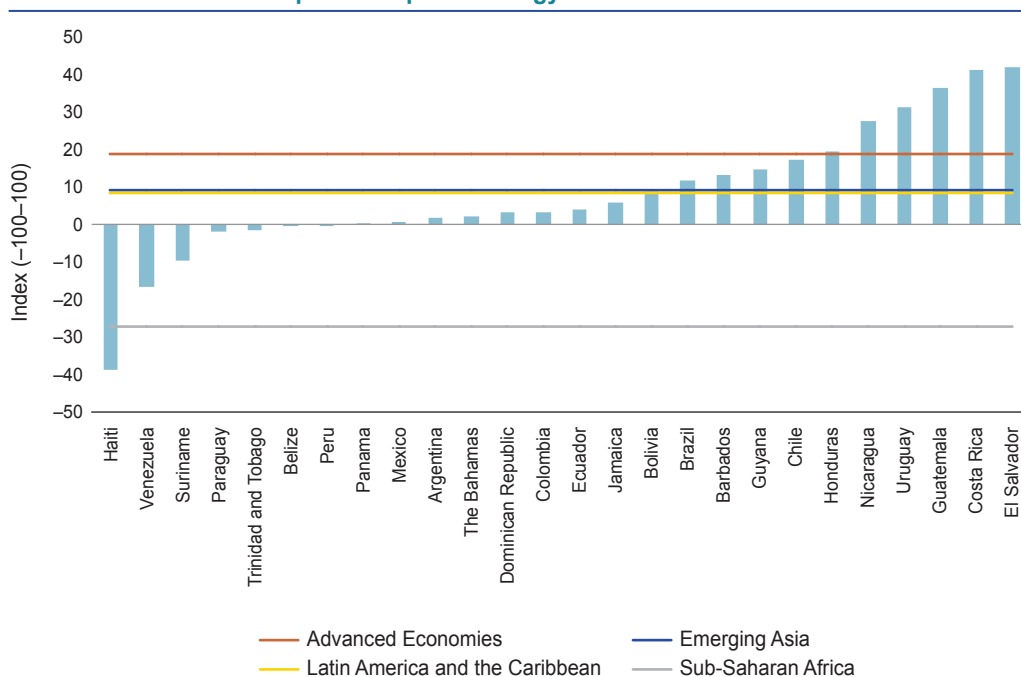


Source: IDB staff estimates based on World Economic Forum's Global Competitiveness Report dataset.  
Note: Panel A reports the composite index of subjective infrastructure quality which runs from 0 to 7. Panel B reports the coefficient stemming from a regression on infrastructure quality on country dummies and including income per capita.

The Infrastructure Country Briefs published with this report discuss the overall challenges and policy priorities in each country case, taking into account the results of such methodologies, as well as more qualitative information.

In the case of the energy sector, Latin America and the Caribbean scores close to Emerging Asia and actually slightly above what might be referred to as the predicted values (represented by the horizontal axis at zero) (see Figure 6.5).<sup>14</sup> In this and other figures, each bar represents the magnitude of the estimated sector development gap (measured between -100 and 100) and the horizontal lines indicate the average estimated gap for the relevant region. A positive gap suggests that the sector indicators employed for the analysis are on average above predictions given the country's income per capita. However, on average Latin America and the Caribbean lags well behind the estimated

<sup>14</sup> The figures illustrate the magnitude of the country-fixed effect plus the error on the last observation in the panel. The predicted value referred to in the text refers to the coefficient on income per capita multiplied by the level of income per capita.

**FIGURE 6.5** ▶ **Development Gaps for Energy**

Source: IDB staff estimates based on Acevedo, Borensztein, and Lennon (2019).

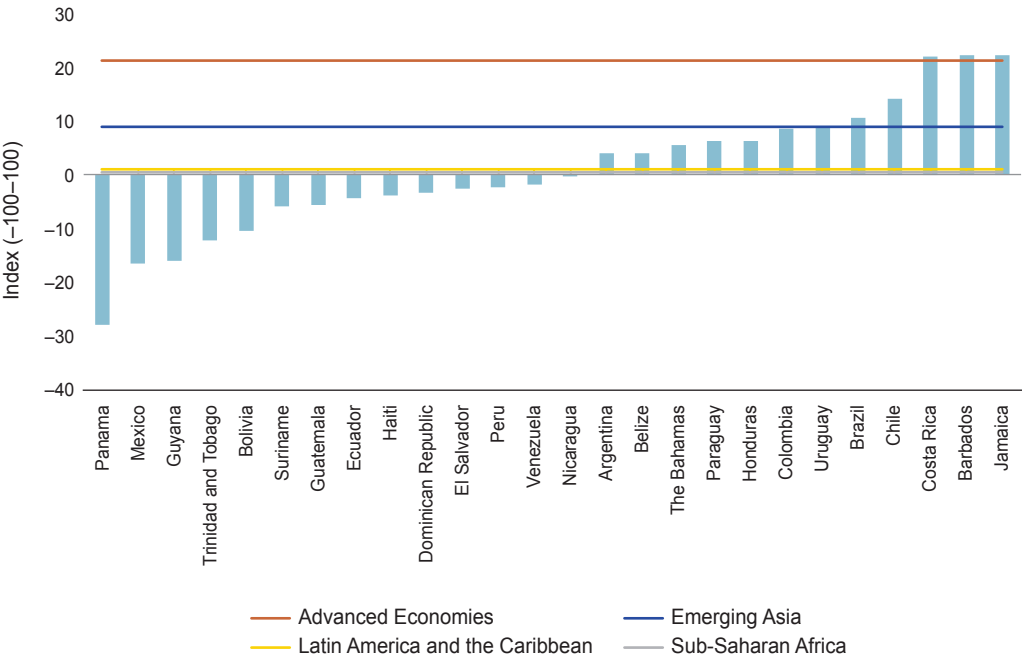
gap for advanced economies even taking into account income per capita. Again, there is considerable variation within the region with several countries at or even above the average gap for advanced economies. However, there is also a tail of countries to the left where the indicator is below predicted values.

In the case of telecommunications, on average the region is close to the predicted value as represented by the horizontal axis. Note, however, that this level is below the positive estimated average gap for Emerging Asia and advanced economies (see Figure 6.6). Again, there is considerable variation with three countries (Barbados, Costa Rica, and Jamaica) close to the positive gaps of advanced economies while a number of countries fall below predicted values.

In the transport sector, on average the region has a negative gap, and well below the gaps of Emerging Asia or advanced economies (see Figure 6.7). Moreover, the regional average includes Panama, whose score is high (above advanced economies) in large part due to its unique geographical position and the advantages the Panama Canal offers to improve connectivity. A left tail of countries has negative estimated gaps given the indicators employed in this sector.

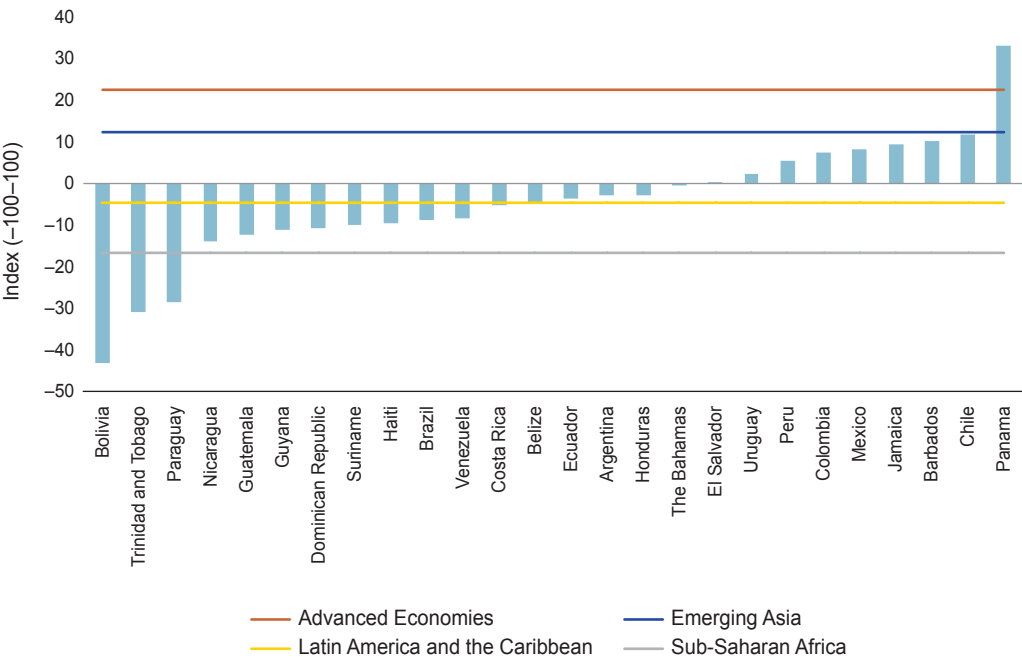
The fourth sector analyzed is water and sanitation, where the estimated average gap for the region is positive but below that of Emerging Asia and advanced economies

FIGURE 6.6 ▶ Development Gaps for Telecommunications

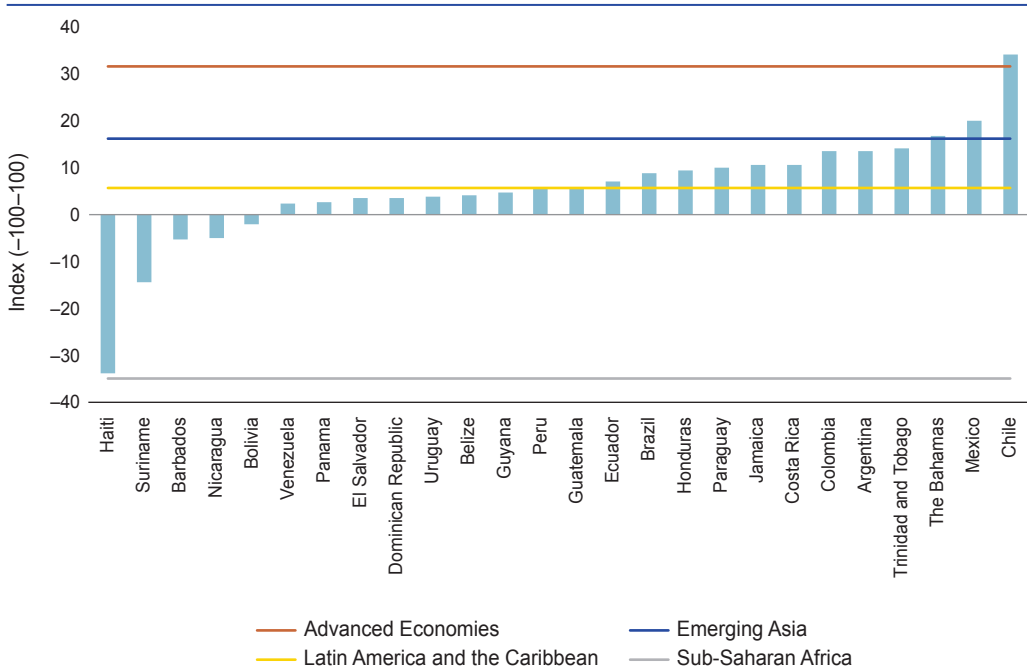


Source: IDB staff estimates based on Acevedo, Borensztein, and Lennon (2019).

FIGURE 6.7 ▶ Development Gaps for Transportation



Source: IDB staff estimates based on Acevedo, Borensztein, and Lennon (2019).

**FIGURE 6.8** ▶ **Development Gaps for Water and Sanitation**

Source: IDB staff estimates based on Acevedo, Borensztein, and Lennon (2019).

(see Figure 6.8). The gaps suggest that Sub-Saharan Africa has very significant challenges in this area. While many countries in the region have positive estimated gaps, only three countries match or have higher gaps than the average for Emerging Asia in this sector: namely Chile, Mexico, and the Bahamas.

These estimates of development gaps by sector give a more nuanced view of the quality of infrastructure services in the region. While in general Latin America and the Caribbean does not have gaps that match those of Emerging Asia or advanced economies, not all countries suffer gaps in all sectors.

Moreover, as discussed in Appendix E, these indicators can be further disaggregated, allowing particular aspects of sectors to be further analyzed. This can then give a reasonable first indication by country, by sector, and within sector of the potential constraints and bottlenecks that may be present and that limit private sector activity and, hence, growth. This type of analysis cannot, however, reveal the benefits of closing such gaps (that is the focus of the next chapter). Here, the focus is on how the critical gaps can be closed.

## Financing More and Better Infrastructure

The first and most obvious way to close infrastructure gaps is through greater and better public investment. The evidence points to significant gains by spending more efficiently

and getting more for each dollar of expenditure on infrastructure (see Izquierdo, Pessino, and Vuletin, 2018). It might also be beneficial to spend more on infrastructure from public sources. However, as reviewed in Chapter 5 of this report, many countries in the region are pursuing fiscal adjustment and while it is argued that government capital spending should be protected, it is difficult to see how infrastructure spending can be boosted in a significant way in many countries at the current time.

If public investment in infrastructure is constrained, an alternative is to turn to private investment. Here, it is important to distinguish between financing and funding. Financing refers to who puts the money upfront to make the required investments to build the actual infrastructure assets. Funding refers to who pays for the infrastructure investment through the life of the project and who repays the financiers. There are various possibilities. Private investors might finance but the government might end up paying over time, which means that general taxpayers eventually pay for (or fund) the asset. An alternative is that the financing is private, and the specific users of the infrastructure services pay through fees of one sort or another. Intermediate solutions can be adopted both for financing (so initial investment is partly public and partly private); funding may also be intermediate, partly general government (meaning taxes and other general revenues) and partly through users.<sup>15</sup>

While gaps in some sectors and countries remain large, a substantial amount of potential private funds appears to be looking for projects to finance that would provide a yield above global interest rates. Infrastructure projects are generally long-term. Therefore, the durations of investments based on those assets should be attractive to long-term investors such as pension funds, insurance companies, sovereign wealth funds and perhaps central banks. Estimates of the total volume of funds in the world in such institutional investors range from over US\$20 trillion to as much as US\$100 trillion.<sup>16</sup> The vast majority of these funds are invested in government bonds, a smaller fraction in equities, while the percentage of the portfolios of such funds allocated to infrastructure is very small (estimates are generally in the 1%–3% range).<sup>17</sup> Reportedly, a growing volume of financing is available in dedicated infrastructure funds; some Euros 102 billion were raised by infrastructure funds

<sup>15</sup> See, in particular, Fay, Martimort, and Straub. (2018) on this distinction. A different question is who owns the project and who exercises control. Frequently, a project Special Purpose Vehicle is set up to organize the financial structure, governance, and cash-flows for infrastructure projects. Total financing normally includes both equity and debt contributions. The equity holders would normally maintain control rights. However, even if such ownership is fully private, the public sector may play a critical role in providing permissions, licenses, concessions, or in regulating the use of the infrastructure asset, which may include investment, quality, price, and environmental targets. Even under fully private ownership, large infrastructure assets are normally regulated in some fashion. The World Bank has advanced the view that private funding should be given priority where it is feasible (see World Bank, 2017). Cordella (2018) develops a model that explores under which conditions this may be optimal. Carter (2018) provides further discussion on this point.

<sup>16</sup> See Arezki et al. (2016).

<sup>17</sup> Australian and Canadian pension funds are exceptional in this area, with some funds having as much as 5%–7% of their portfolios invested in infrastructure (see Cavallo and Serebrisky, 2016).

in 2018.<sup>18</sup> However, the vast majority of those funds appears to be financing projects in advanced economies.

If infrastructure gaps remain large in Latin America and the Caribbean—at least in some countries and in some sectors—and the volume of funds searching for yields above the still low international interest rate is so great, then why don't these gaps get filled? There are several potential explanations.<sup>19</sup> The first is that the problem is not the supply of finance, but rather the supply of projects that would provide suitable returns.<sup>20</sup> This lack of viable projects could reflect insufficient self-funding or a lack of government subsidies (for those projects with high social returns), perhaps again because governments are fiscally constrained. Another reason for the shortage of projects could be insufficient resources for project identification, preparation, and development. For large complex infrastructure projects, such costs can be considerable and would rarely be provided only by the private sector. Again, government budgetary problems or the lack of well-trained personnel could exacerbate the project development bottlenecks.

A further and related explanation might be that countries do not have the necessary legal and institutional capacity to identify, prioritize, and manage complex infrastructure projects that can combine public and private financing. The region led the world in attracting private financing to infrastructure in the 1990s and several countries have excellent frameworks in place. However, some countries lack specific frameworks or have frameworks that do not score highly in dimensions that may be important for private investors. Appendix F presents evidence employing several indices.

A complementary view is that while a large amount of institutional money is seeking yields in excess of the currently low global interest rate, most funds are not well-equipped to invest in (greenfield, emerging economy) infrastructure projects, given the nature of the risks and the current set of instruments commonly used. Notably, only 1% of financing for non-publicly financed infrastructure in Latin America and the Caribbean comes from investment funds of any type.

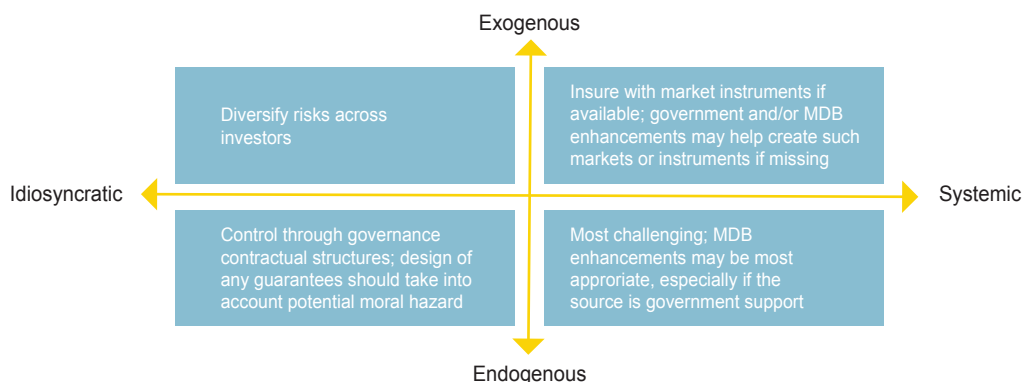
The G20 under the Argentine 2018 presidency has focused on developing infrastructure as an asset class and a newly created working group was tasked with creating a roadmap toward this aim. Discussions included the nature of infrastructure risks, who should bear such risks, and the specific role of multilateral development banks.<sup>21</sup> The work also focused on attempting to improve information. There is a surprising lack of information

<sup>18</sup> Source: IJ Global.

<sup>19</sup> This conundrum has sparked much discussion; see, for example, OECD (2018) which developed high level principles for long-term investment in infrastructure.

<sup>20</sup> The lack of a sufficient pipeline of “bankable projects” was the first explanation provided by the Private Advisory Group to the Infrastructure Working Group of the 2018 Argentine G20 Presidency, see G20 Private Advisory Group (2018).

<sup>21</sup> See Pereira dos Santos and Kearney (2018) for a description of MDB instruments to manage risks.

**FIGURE 6.9** ► **Typology of Risks in Infrastructure Projects**

Source: Ketterer and Powell (2018).

on the performance of infrastructure projects and on assets backed by those projects. Finally, a significant workstream related to various dimensions of standardization, including standardizing elements of project development and contracts.<sup>22</sup>

Ketterer and Powell (2018) suggest that risks in infrastructure projects can be categorized into four quadrants created by two axes labeled i) Exogenous versus Endogenous and ii) Idiosyncratic versus Systemic respectively (see Figure 6.9). Individual projects may face idiosyncratic, exogenous risks such as local risks to demand or perhaps the rainfall pattern in a particular area of a large country for a hydro project. Such risks do not, in general, need to be insured and investors should be able to diversify within a portfolio of assets.

Many types of projects face significant idiosyncratic risks such as construction risks, which are endogenous; in other words, they do not depend on an outside independent variable but rather on factors such as the quality of the selected construction company and its motivation and ability to complete the job on time and at reasonable cost. These risks are often opaque in nature and need to be monitored and managed carefully through the governance structure of the project and the various contractual relationships, taking care that they do not create any perverse incentives—often known as *moral hazard*. Moreover, it is generally a bad idea for a government or any other outside agency to extend guarantees against such risks as the mere existence of the guarantee could create or exacerbate these perverse incentives.<sup>23</sup> Still, the existence of these risks may make investment in junior assets such as equity (or even non-senior debt) particularly challenging for a large outside investor whose economic model consists of managing many billions of dollars with relatively low administrative costs and very few people.

<sup>22</sup> See, for example, Government of Argentina (2018), OECD (2017, 2018b) and OECD/World Bank (2018).

<sup>23</sup> See Ehlers (2014) who stresses this point.



A third type of risk is exogenous but systemic. Such risks might include exchange rates, interest rates, and inflation risks that may impact costs or risks to overall demand likely related to economic growth. In some cases, markets may hedge such risks, although for long-term projects this may be a challenge. Governments and international agencies may play an important role in helping to develop such markets. For large global investors that are able to diversify across countries, truly systemic risks may not be at the country level but rather for a group of emerging economies.

The most challenging category is likely to be the systemic endogenous risks. Perhaps the most relevant for a large infrastructure project relates to the relationship with the government of the country. This includes the risks that contracts might be renegotiated, regulations might be changed or currency convertibility might be suspended. These are risks that once again outside investors may have a hard time evaluating. Here, MDBs may have a comparative advantage in extending guarantees; thanks to their overall lending relationships, they may be able to monitor and to some extent control such risks.<sup>24</sup> This taxonomy suggests that these different types of risks should be managed in different ways. Some can be left for investors to diversify, others can be insured or hedged. The appropriate management of these risks requires careful thought depending on project specifics and on the available instruments and their pricing.

One particular approach to attempt to crowd in more private finance, in particular from larger institutional funds, is to set up country-level infrastructure funds as described in Ketterer and Powell (2018). Multilateral development banks could set up ancillary infrastructure facilities to assist in project identification and development. Individual project Special Purpose Vehicles (SPV) could be set up to manage each project with both equity and debt finance, likely supplied largely by sponsors and commercial banks as today. MDBs would be particularly suited to providing guarantees to these individual project SPVs. Ideally, these would be at the individual project level and aimed principally at protecting the project from risks stemming from the relationship with the public sector.

One possibility is that after the construction phase, commercial banks may wish to refinance to be able to invest more in the pipeline of new projects. This refinancing could be achieved by new debt supplied by the general fund and financed by the general fund issuing infrastructure bonds backed by the individual infrastructure projects. After the construction phase, the risks decrease and the nature of the risks change. The idiosyncratic endogenous construction risks dissipate, and the remaining risks tend to be exogenous demand-related risks and the continuing endogenous risks associated with contracts with government agencies and regulation, which could remain covered by MDB guarantees. Infrastructure bonds backed by high quality projects that had passed their construction

<sup>24</sup> See Pereira dos Santos and Kearney (2018) for a discussion.

phase could then be attractive to large global institutional funds.<sup>25</sup> The bonds could be issued in foreign or local currency. Dollar bonds would likely be more attractive to global investors today but would imply currency risks for the project. Ideally, the bonds would be in local currency and international investors could hedge where currency swap markets exist or diversify by holding a portfolio of such bonds in different currencies. Further consideration to expanding international efforts to develop such hedging markets would be extremely useful in this regard.<sup>26</sup>

## Conclusions

Private infrastructure investment has grown in Latin America and the Caribbean but public investment if anything has been on the decline. Total investment in infrastructure remains well below estimates of that required to maintain healthy economic growth rates, serve growing populations, and address sustainability challenges. Subjective measures of the quality of infrastructure services as revealed by surveys as well as by econometric estimates employing objective measures of access, quality and sustainability all point to significant average gaps relative to Advanced and other Emerging Economies. However, there is considerable variation across countries and sectors. Individual national challenges are detailed in a set of Infrastructure Briefs produced by IDB country economists.

The financing of infrastructure investment in Latin America and the Caribbean, like some other emerging economies, remains extremely concentrated. Public investment is the largest component including investment from public entities as well as through the fiscal accounts. Considering other sources, commercial banks are very important financiers (well over 50% of total nonpublic financing from the region and just 10 global banks supply more than 50% of the financing from all commercial banks) as well as other public entities from outside the region including MDBs. Private firms, such as the sponsors of projects, supply less than 10% of financing but are important providers of equity. Investment funds of all types, including infrastructure funds, supply just 1% of total nonpublic financing.

Understanding the nature of the risks of infrastructure projects is critical to understanding this structure of financiers and then to consider how greater private financing might be attracted especially given the current fiscal constraints in the region. A dual approach may be required that on the one hand seeks to provide greater support for identifying and developing projects as well as techniques to create instruments that large, outside institutional investors may then find attractive.

<sup>25</sup> See Ehlers, Packer, and Remolona (2014) for an interesting description of the market for infrastructure bonds in Asia.

<sup>26</sup> One interesting initiative has been the development of TCX that offers hedging products in frontier markets. TCX was founded in 2007 and is supported by 22 multilateral and bilateral development finance institutions (DFIs), the Dutch and German governments, and microfinance investment vehicles (MIVs). (See [www.textfund.com](http://www.textfund.com)).

## CHAPTER 7

# Boosting Growth through More and Better Infrastructure Investment

Infrastructure investment is unique amongst the elements of gross fixed capital formation. Investing in infrastructure builds up or improves a country's transport, energy, water and sanitation, and telecommunication assets. Those assets are key enablers of the production of other goods and services. They are vital inputs for the basic services that firms require to function, and that consumers demand to live healthy and productive lives.

Infrastructure investment impacts economic growth directly as an element of gross fixed capital formation, and indirectly as a means to increase productivity (i.e., enabling factors of production to become more productive, facilitating human capital accumulation, providing basic services that allow the economy to function, and complementing private investment). The previous chapter shows that investment in Latin America and the Caribbean is low in relation to the region's need to close the infrastructure gap. This chapter explores the macroeconomic costs of not investing more to enlarge a country's infrastructure assets, and sheds new light on the growth-boosting potential of increasing investment in key infrastructure sectors. It also explores the growth opportunities generated by efficiency gains in infrastructure services provision.

### The Macroeconomic Costs of Not Investing in Infrastructure

As discussed in Chapter 6, Latin American and Caribbean countries need to invest more in infrastructure to close the existing infrastructure gap. At the very least, countries should preserve investment levels during periods of fiscal adjustment in order to reverse the bias against investment that has been built into expenditure policies. Unfortunately, the region's track record in protecting productive public investments—for example, investment in infrastructure—during economic downturns and during fiscal consolidation episodes is not good (see Chapter 5). There is a bias against public investment in expenditure policies that has led to a 9.7 percentage point decline in the share of capital spending (including infrastructure) in total public expenditure between 1980 and 2016. This bias against capital

spending is stronger in Latin America and the Caribbean than in other regions and negatively impacted complementary private investments (see Izquierdo, Pessino, and Vuletin, 2018).

This section explores the magnitude of the costs of not investing to expand existing capital stocks in infrastructure sectors in Latin America and the Caribbean. To assess this, a computable general equilibrium model (CGE) is employed. The model is calibrated for Argentina, Bolivia, Costa Rica, Chile, Jamaica, and Peru, countries with different growth experiences and economic structures and for which the necessary data to perform the analysis were available.<sup>1</sup>

There are four infrastructure sectors among the approximately 30 productive sectors in each economy: production and distribution of energy; water and sanitation; transport, and; telecommunications.<sup>2</sup> Using each country's Social Accounting Matrix (SAM), an initial path (or equilibrium) is obtained for the variables, providing a benchmark for growth on a ten-year horizon. In this solution to the model, investment (which determines how capital grows over time in the infrastructure-related sectors) is consistent with the long-run (potential) rate of economic growth in each country—i.e., countries that grow faster invest more than countries that grow slower, and vice-versa. In the counterfactual exercises, a new equilibrium is simulated assuming that the stocks of capital in the infrastructure sectors are kept constant (i.e., the growth rate of the capital stocks is zero over the ten-year horizon in the four infrastructure sectors).<sup>3</sup> Therefore, investment in those sectors is enough to cover annual capital depreciation, but no new capital is added to the existing stocks. The counterfactual scenario is an example of how the bias against public investment that is prevalent in Latin America and the Caribbean results in the stagnation of capital stocks in the infrastructure sectors.<sup>4</sup>

Figure 7.1, Panel A shows the results. The estimated costs of not investing to expand capital stocks in infrastructure sectors are large and increase over time. On average, failure to add new capital to existing stocks is estimated to cost the selected Latin American and Caribbean countries approximately 1 percentage point of forgone GDP growth in the first year. The cost could go up to 15 percentage points of forgone growth if the policy persists over 10 years (see Figure 7.1, Panel B).<sup>5</sup>

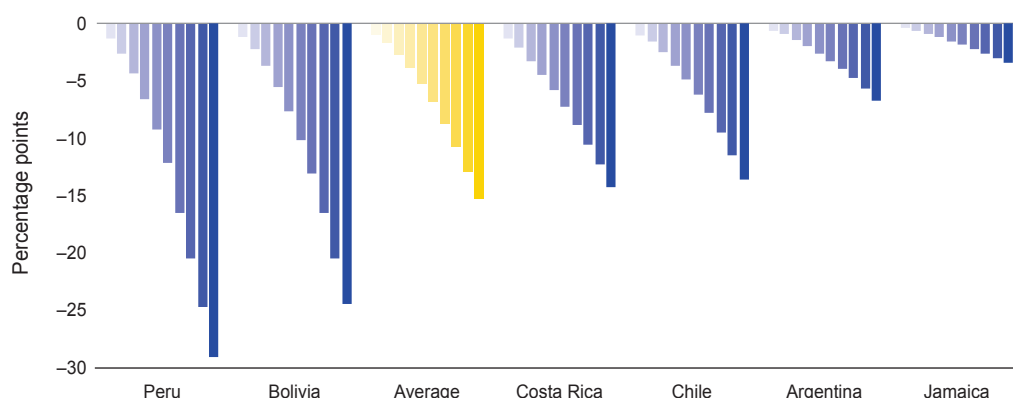
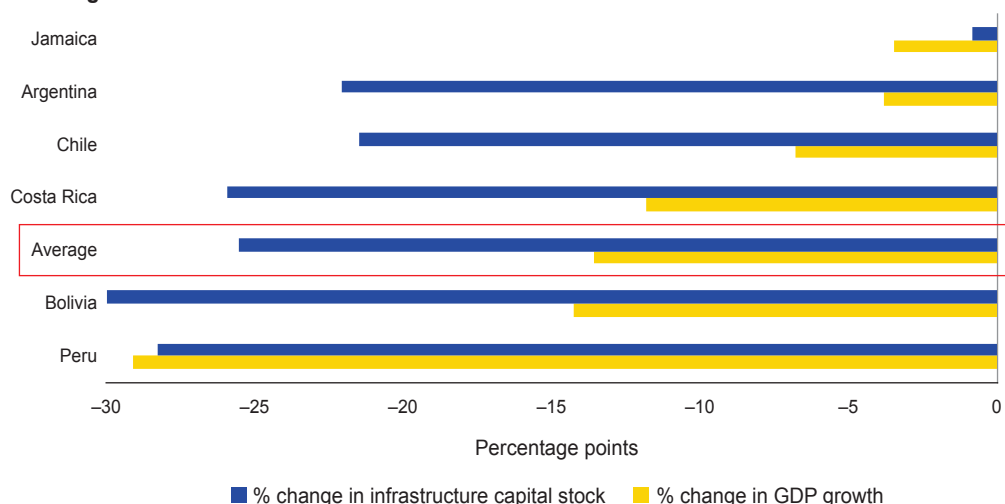
<sup>1</sup> For a comprehensive analysis of the CGE models used in this chapter, see Chisari, Maquieyra, and Miller (2012). The exercises presented in this chapter are discussed in greater detail in Chisari, Mastronardi, and Vila Martínez (2018). Appendix G provides details on the basic structure and the calibration of the exercises illustrated in the chapter.

<sup>2</sup> In some cases, the sectors are split into subsector according to the individual country SAM.

<sup>3</sup> There is no distinction between public and private investment in the model.

<sup>4</sup> The capital stocks of each sector are the aggregate (i.e., public and private) stocks.

<sup>5</sup> These costs are probably lower bound estimates. These exercises assume that infrastructure sectors do not invest in new capital, but other sectors do not face restrictions. As an example, this exercise assumes that no new routes and ports are built, but nothing prevents a mining company from building a new railway to self-provide transportation services. Estimates from Coremberg (2018) indicate that the production of self-supplied infrastructure services is approximately 5% of GDP on average in Latin America.

**FIGURE 7.1** ► **Estimated Impact of Disinvestment in Infrastructure Sectors**
**A. Cumulative effect on GDP (t to t + 10)**

**B. GDP growth and disinvestment in infrastructure**


Source: IDB staff calculations based on Chisari, Mastronardi, and Vila Martínez (2018).

Notes: Units in the figure are the difference in percentage points between the benchmark and the counterfactual scenarios. Panel A illustrates the cumulative effect for every year between t and t+10. Panel B illustrates the cumulative effect on year t+10.

The impacts vary across countries depending on various factors: their economic structures; the weight of infrastructure services in consumption baskets and intermediate input requirements for other economic sectors; the extent to which reallocation of resources is feasible among different productive sectors; how efficient investment is, and; the growth rates of each economy.

Peru is an interesting case because costs are estimated to be the largest in the countries in the sample. In the initial equilibrium, Peru is expected to grow at approximately 3.6% per



year over the 10-year horizon, on average.<sup>6</sup> In other words, 10 years from now, GDP in Peru would be 42% higher than it is today. To achieve that growth, capital stocks in the infrastructure sectors would have to increase by approximately 30% on average across the four infrastructure sectors over 10 years. In the counterfactual scenario, with less investment in infrastructure (such that the growth rate of capital stocks in the infrastructure sectors was zero), average GDP growth would fall to 1.2% per year on average. This, in turn, implies that after 10 years, GDP would be only about 13% higher than it is today. The estimated cost of cutting infrastructure investment is the 29-percentage-point gap between the benchmark and the counterfactual cumulative GDP growth (Figure 7.1, Panels A and B). The large estimated costs for Peru suggest that not investing in infrastructure in the case of fast-growing economies may create costly bottlenecks that can hamper the growth process.

Jamaica is at the other end of the spectrum. In the initial equilibrium, Jamaica is expected to grow at approximately 1.1% per year over the 10-year horizon, on average. If that were to materialize, then 10 years from now, GDP in Jamaica would be 11.5% higher than it is today. To achieve that growth, capital stocks in the infrastructure sectors would have to increase by only 1% over 10 years. In the counterfactual scenario, without even that small amount of investment, GDP 10 years later would be about 8% higher than today. The smaller estimated cost for Jamaica is consistent with an economy that has been growing at a slower rate. After all, less new infrastructure would be needed to support an economy that is expected to grow at low rates.

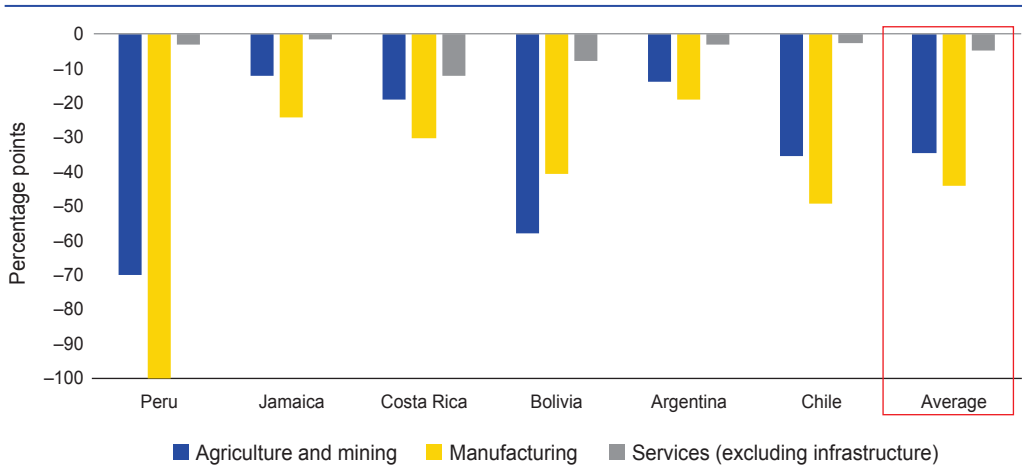
The four other cases fall in between Peru (high estimated impact of disinvestment) and Jamaica (low estimated impact of disinvestment) (see Figure 7.1, Panel B). On average, a 25-percentage point decline in investment between the benchmark and the counterfactual scenarios is estimated to cost 15 percentage points of forgone GDP growth to these economies over 10 years.

The estimated impacts of the lack of new investment in infrastructure vary by economic sector. On average, they are largest in manufacturing (industrial sectors)—except for Bolivia where mining predominates—and are lowest in services (Figure 7.2). These estimated impacts are consistent with the weights of infrastructure sectors' output, which are intermediate inputs in other productive sectors, over the value of production of the three aggregate sectors.<sup>7</sup> In other words, the manufacturing sector has the highest use of infrastructure services in the production process, according to the countries' SAMs, and accordingly it is the sector that suffers the most in terms of forgone growth in the disinvestment scenario. This is especially problematic for growth because the manufacturing sector is a high productivity growth sector, worldwide.

<sup>6</sup> This is the second highest among the countries included in the exercise. The highest growth rate in the baseline is in Bolivia with 3.9%.

<sup>7</sup> The weights of infrastructure sectors' output on other sectors' value added are: 5.5% in agriculture and mining; 6.5% in manufacturing, and; 4.3% in services.

**FIGURE 7.2** ▶ **Estimated Impact of Disinvestment in Infrastructure Sectors on Sector-Level GDP**

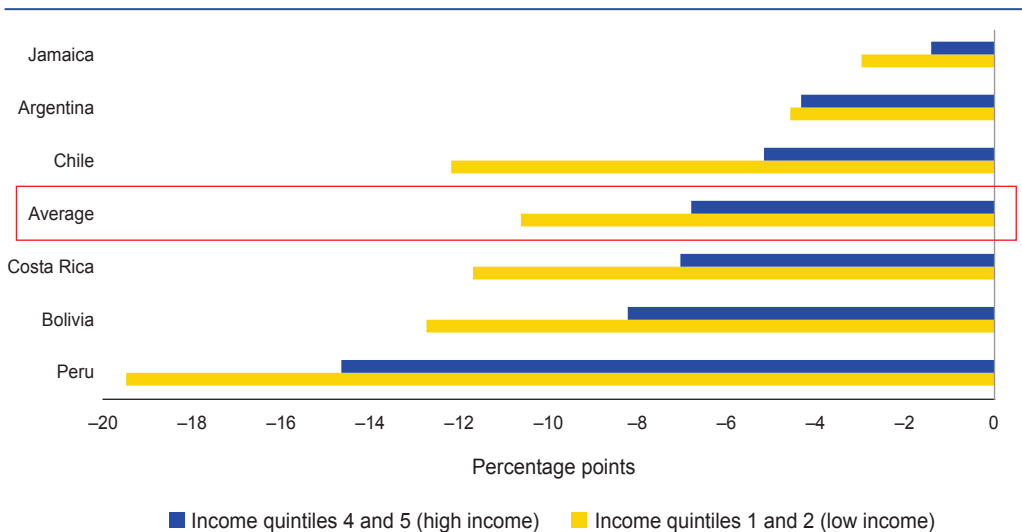


Source: IDB staff calculations based on Chisari, Mastronardi, and Vila Martínez (2018).

Notes: Units in the figure are the cumulative differences in percentage points of sector-level GDP growth between the benchmark and the counterfactual scenarios in year  $t+10$ .

In addition to the impacts on GDP and sector level outputs, the model allows tracing the expected impacts on inequality. Figure 7.3 shows that not investing in infrastructure is regressive. On average, households in the poorest two quintiles of the income distribution

**FIGURE 7.3** ▶ **Estimated Impact of Disinvestment in Infrastructure Sectors on Household Income**



Source: Authors' calculations based on Chisari, Mastronardi, and Vila Martínez (2018).

Notes: Units in the figure are the cumulative differences in percentage points of real household income growth between the benchmark and the counterfactual scenarios in year  $t+10$ .



lose 11 percentage points of real income over a 10-year period. Instead, households in the richest two quintiles of the income distribution lose 7 percentage points. These results are similar across countries. The intuition is that the supply of infrastructure services would be unable to keep up with demand without higher investment. Consequently, prices of infrastructure services would rise. Those price increases, in turn, would be regressive because poor households devote a higher share of income to paying for infrastructure services (16% of real income, on average) than richer households (13.5% of real income, on average).

In addition to investing too little, Latin America and the Caribbean does not always allocate resources to the *best* infrastructure projects. A limitation is the lack of evidence on which types of infrastructure investments can have the greatest impacts on aggregate and sector-level productivity growth (see Izquierdo, Navajas, and Steiner, 2018). The next section provides evidence from recent efforts to bridge that knowledge gap.

### *Infrastructure for Growth*

Previous research at the IDB has identified infrastructure as the most significant priority when it comes to increasing the likelihood of reaching higher income per capita levels for many countries in the region.<sup>8</sup> But which investments in which infrastructure sectors would help increase aggregate productivity and growth the most? To answer this question a recent study explores how shocks to productivity in infrastructure-related sectors impact productivity in other sectors of the economy, particularly in sectors with high productivity growth potential.<sup>9</sup> The study focuses on labor productivity (i.e., value-added of the sector over total employment in that sector) due to lack of sector-level data on total factor productivity.<sup>10</sup> Infrastructure sectors are defined as: utilities (electricity, gas and water); transport, storage and communications—transport—; and construction. The rest of the economy is divided into 7 sectors: agriculture; mining; manufacturing; commerce;<sup>11</sup> finance;<sup>12</sup> government services; and community services.<sup>13</sup>

Economic sectors are classified in terms of their average productivity performance based on the sector-level productivity growth between the beginning and the end of the sample. In Figure 7.4, the “best performer” country in each sector is identified as the country with the highest productivity growth. The average productivity growth rates for the world

<sup>8</sup> See Izquierdo, et al. (2016) and Cavallo and Powell (2018). In the latter publication, considering a meta-analysis of different methodologies, infrastructure was a priority sector in no less than 15 countries.

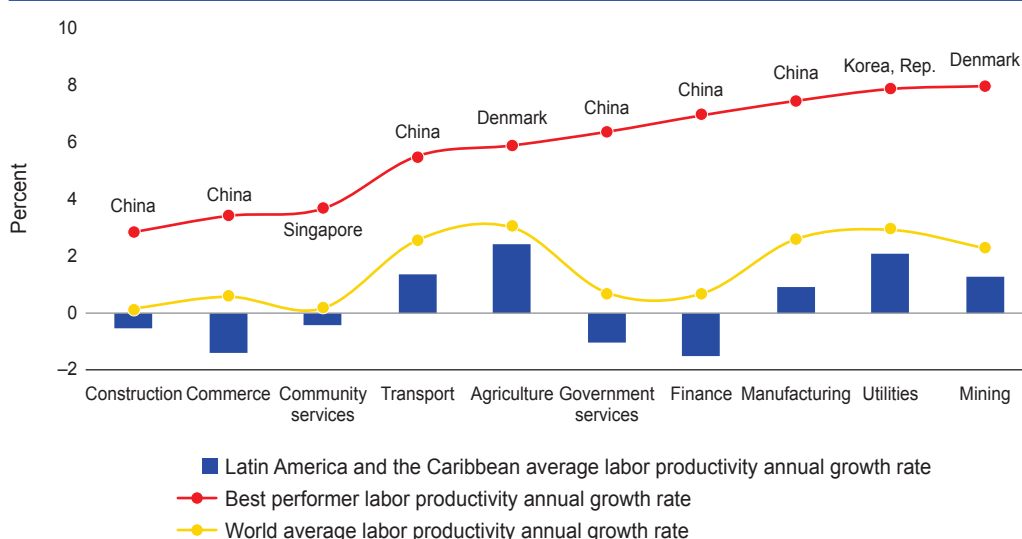
<sup>9</sup> See Ahumada and Navajas (2019).

<sup>10</sup> The sample comprises 25 countries (including 8 from Latin America and the Caribbean) over the period 1970 to 2014. The main source of data is the Groningen Growth and Development Center database (Timmer and de Vries, 2007; Timmer, de Vries, and de Vries, 2016).

<sup>11</sup> Trade, restaurants, and hotels.

<sup>12</sup> Finance, insurance, and real estate sector.

<sup>13</sup> Community, social, and personal services.

**FIGURE 7.4** ► Annual Sectoral Labor Productivity Growth Rates (1971–2014)


Source: IDB staff calculations based on Ahumada and Navajas (2019).

and for Latin American and Caribbean countries are also included. Construction, commerce and community services sectors are low productivity sectors: sector-level labor productivity growth in these sectors was lowest for the “best performers”, the world, and for Latin American and Caribbean countries. Government and financial services sectors were underperformers (vis-à-vis the “best performers”) in the world and, especially, in Latin America and the Caribbean. Utilities together with mining and manufacturing appear as the most dynamic sectors everywhere. All sectors in Latin American and Caribbean countries display negative productivity growth gaps vis-à-vis the world averages, and the best performers in the sample, suggesting that there is ample room for improvement in the region.

The world averages, however, hide a significant degree of heterogeneity at the country and regional levels which raises the question, what are the interrelationships between the sectors? In particular: how do productivity shocks to the infrastructure-related sectors affect the productivity performance of the other sectors?

The methodology consists of running separate panel regressions, one for each of the noninfrastructure related sectors, using an automatic selection procedure to choose the relevant variables while at the same time considering a variety of econometric issues.<sup>14</sup> For each of the regressions, labor productivity of the sector of interest is regressed on the labor

<sup>14</sup> The study uses an automatic algorithm Autometrics (see Doornik, 2009). The algorithm conducts a search across many possible paths to reduce an initial unrestricted model to a parsimonious representation of the data. Alternative reduction paths are rejected based on a set of statistics to capture the quality of each specification and tolerance limits on those statistics provided by the researcher. The methodology also considers econometric issues such as cointegration of variables, cross-dependence of residuals, and exogeneity of

productivity of the three infrastructure-related sectors and controls variables, including proxies for capital to labor ratios in infrastructure-related sectors. Assuming that investment in a sector raises its own labor productivity, then the estimated elasticities can be used to shed light on which infrastructure investments would help increase aggregate productivity the most.

The study finds that labor productivity in agriculture, for example, would benefit from investments in the three infrastructure-related sectors: a 1% increase in the productivity of transport is estimated to increase agricultural productivity by 1.2%;<sup>15</sup> a 1% increase in the productivity of utilities is estimated to increase agricultural productivity by 0.5%;<sup>16</sup> and a 1% increase in the productivity of construction is estimated to increase agricultural productivity by 1%. In the case of manufacturing, which is a high productivity growth sector in the world, a 1% increase in the productivity of construction is estimated to increase productivity by 0.42% (the other infrastructure-related sectors do not appear to affect the productivity of manufacturing). Summing up the results across all sectors, investments in the utility sector enhance productivity growth in agriculture, mining, and manufacturing. Investments in transport are particularly relevant for productivity growth in agriculture and service sectors. And investments in construction are relevant for productivity growth in all economic sectors.

The sector-level evidence based on a sample of world economies provides a roadmap to guide efficient public investment allocation. It provides evidence on which infrastructure-sector investments can yield the largest impact in terms of productivity growth in other sectors of the economy, and therefore economy-wide. For example, the study finds that if countries in Latin America and the Caribbean could increase productivity levels in infrastructure-related sectors to the levels of OECD countries, then economy wide productivity growth could increase by 0.6 percentage points per year—i.e., a 75% increase with respect to the historical average—just through the estimated impact on the low productivity sectors in the region. The study also provides a set of priors—in terms of which infrastructure investments for which economic sectors—that can be contrasted with the country-specific evidence in order to improve investment outcomes (see FIEL, 2019; CSIS, 2019).

## Economic Spillovers from Efficiency Gains in Infrastructure Services

Investing in infrastructure can support economic growth by raising productivity. Increasing the *efficiency* of providing infrastructure services—for example, by using a water treatment technology that demands less electricity—can complement those efforts without

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the variables. The unrestricted models of labor productivity are formulated for their log differences and the explanatory variables expressed in log levels and log differences (as in Westerlund, 2007 for time series and Smith and Fuertes, 2016, for panel data).

<sup>15</sup> This effect is estimated in the OECD sample.

<sup>16</sup> This effect is estimated in the non-OECD sample.

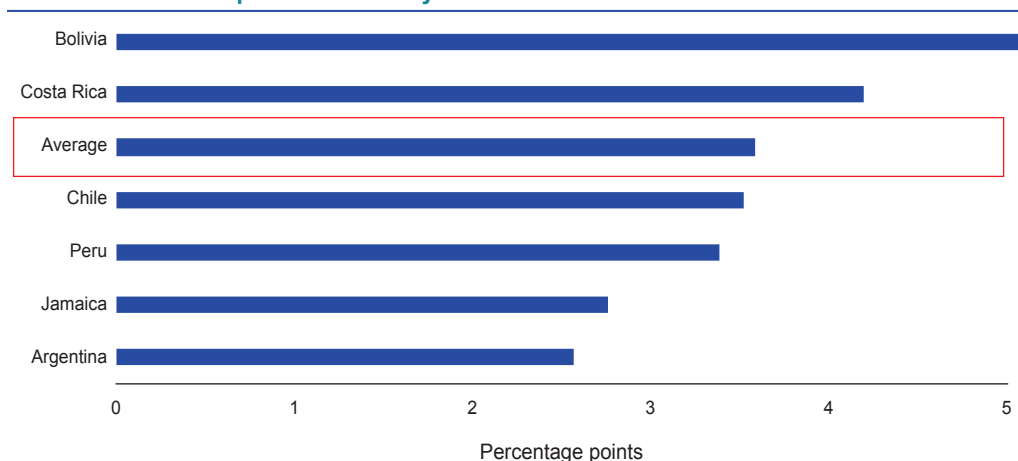
large fiscal outlays. GDP gains produced with additional investment require generating (or borrowing) the resources to invest, with the consequent impacts on fiscal accounts, debt levels, and the risks associated with borrowing. Instead, GDP gains produced by efficiency gains do not require significant fiscal outlays, or carry the risks of increasing debts.

The CGE models provide a means to quantify the potential GDP gains from greater efficiency in infrastructure. The production process in each sector uses a combination of productive factors (labor, physical and financial capital, land) and intermediate inputs (goods produced by other sectors). The exercise considers three types of efficiency gains in the infrastructure-related sectors (i.e., production and distribution of energy, water and sanitation, transportation, and telecommunications) simultaneously. The first is *cost-saving efficiency improvements* within infrastructure sectors that reduce the intermediate input requirements of those sectors per unit of output. An example from the energy sector is an electricity thermal generation plant that obtains natural gas at a lower price. The second type is *productive efficiency gains* within infrastructure sectors that reduce the productive factor requirements of those sectors per unit of output. An example is a thermal generation plant that improves production processes and, as a result, uses less gas to produce the same amount of electricity. The third is in the form of positive spillovers from infrastructure to the other sectors: given *increased quality of services*, other economic sectors require fewer intermediate inputs from infrastructure-related sectors to produce a unit of output. The gains can be interpreted in two ways: i) the manufacturing sector receives better quality electricity (i.e., less interruptions/black-outs) and therefore, can produce the same amount of output using fewer inputs, or in less time; or ii) the manufacturing sector improves the production process, for example by adopting energy efficient equipment, and as a result demands less electricity.<sup>17</sup>

For each of the six countries for which the model was calibrated, an initial equilibrium was obtained providing a benchmark for GDP growth over a 10-year horizon, assuming a business-as-usual scenario. This scenario implies that the calibrated parameters governing the production functions of each sector are determined by the country's input-output tables and national accounts as per the corresponding SAM. In the counterfactual exercises, a new equilibrium was simulated assuming efficiency gains in infrastructure sectors equivalent to 5% improvements in the technological coefficients of the relevant production functions. Those gains accrue simultaneously on the three dimensions: cost-saving efficiency improvements; productive efficiency gains, and; quality gains.

Figure 7.5 shows the results. Relatively small (5%) increases in efficiency can yield significant growth benefits. On average, the selected countries would experience a 3.6

<sup>17</sup> There are different ways to achieve these efficiency gains, including technological improvements, upgrading production processes, and changing behaviors/social norms. See Fay et al. (2017) for a useful discussion on Latin America and the Caribbean. See also Ferraro and Price (2013), Fielding et al. (2012), Habyarimana and Jack (2011), Schultz et al. (2007), and Datta et al. (2015) for insights from behavioral interventions to increase efficiency or lower demand in infrastructure.

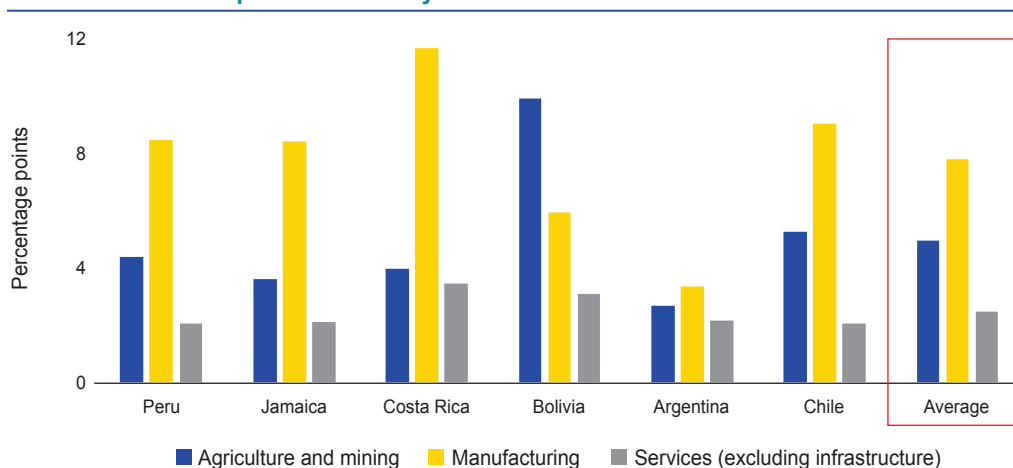
**FIGURE 7.5** ► **Impact of Efficiency Gains in Infrastructure on GDP Growth**

Source: IDB staff calculations based on Chisari, Mastronardi, and Vila Martínez (2018).

Notes: Units in the figure are the cumulative differences in percentage points of GDP growth between the benchmark and the counterfactual scenarios in year  $t+10$ .

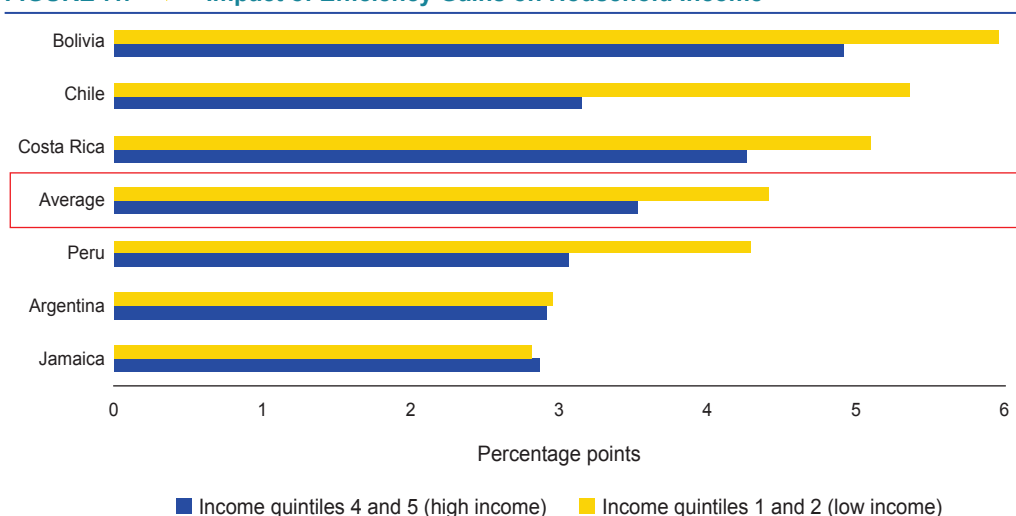
percentage point increase in growth rates over a 10-year horizon. These benefits may be as high as 4 and 5 percentage points of incremental growth in Costa Rica and Bolivia.

The estimated positive impacts of higher efficiency in infrastructure would be largest in the manufacturing sectors in all countries except in Bolivia (see Figure 7.6), where the mining sector predominates. In addition, improving efficiency in infrastructure benefits low-income households more than high-income households (see Figure 7.7). Therefore,

**FIGURE 7.6** ► **Impact of Efficiency Gains on Sector-level GDP**

Source: IDB staff calculations based on Chisari, Mastronardi, and Vila Martínez (2018).

Notes: Units in the figure are the cumulative differences in percentage points of sector-level GDP growth between the benchmark and the counterfactual scenarios in year  $t+10$ .

**FIGURE 7.7** ► **Impact of Efficiency Gains on Household Income**


Source: IDB staff calculations based on Chisari, Mastronardi, and Vila Martínez (2018).

Notes: Units in the figure are the cumulative differences in percentage points of real household income growth between the benchmark and the counterfactual scenarios in year  $t+10$ .

increasing efficiency in infrastructure would likely raise aggregate output and reduce income inequality.

## Improving Infrastructure in Latin America and the Caribbean

In-depth country-specific analyses in IDB Country Development Challenges documents isolate overall priority actions to improve the quantity and quality of infrastructure in Latin America and the Caribbean. This macroeconomic report is complemented by individual Country Infrastructure Briefs that are available online. This section provides a brief overview of the main recommendations that emerge from the country briefings. Common challenges in many countries are deficient long-term planning processes that create major obstacles for sound investment decisions. Institutional weakness also impairs the ability of governments to mobilize resources and attract investment to the infrastructure sectors. Inadequate skills to assess project quality and design, and a weak execution capacity contribute to poor project management over the life-cycle of infrastructure projects. These limitations, which reduce transparency, compound with fiscal constraints (see Chapter 5) and with deficient Public Private Partnership (PPP) frameworks (see Chapter 6) limiting the capacity to raise public and private investment in infrastructure.

Reliable long-term planning and strategic prioritization of interventions are key to improving the current state of infrastructure. In many countries, allocation of public investment in infrastructure is carried out without clear criteria to evaluate needs (i.e., regions

and/or sectors with lower coverage and quality) and demand. Fostering this capacity at each level of government would help generate a portfolio of projects with high socio-economic impact that are viable and bankable. These efforts should be complemented by upgrading the management model of public companies, and by strengthening the regulatory frameworks that supervise the private companies that handle the provision of services in energy, water and sanitation, and telecommunications. Sound corporate governance structures, investment planning, operational capacity, and maintenance protocols would guarantee appropriate and efficient delivery of services. Eliminating poorly targeted subsidies can pave the way for higher efficiency by providing incentives for better management to reduce technical losses and move toward cost recovery.

Another common theme across the region is the decentralized nature of infrastructure services. As a result, closer collaboration between central and subnational governments is critical for enhancing institutional capacity at the local level. Greater participation of regional authorities in defining and executing long-term investment plans can support strategic investment decisions and enable better execution. The role and competencies of ministries and regional entities in infrastructure planning should be clarified and coordination should be strengthened.

The Country Infrastructure Briefings also provide sector-specific insights. In transportation sectors across the region, public policies should promote reforms to define key institutional responsibilities for planning, construction, execution, operation, regulation, and maintenance. Planning tools should consider the potentially adverse effects of climate change on infrastructure assets. In addition, the sector should establish efficient maintenance systems to preserve past and future investments.

The energy sectors should also strengthen institutional capacity and regulatory frameworks. The region has a cleaner energy matrix than other regions on average; however, some countries lag and, therefore, those countries must still adopt policies to promote renewable and low carbon sources of energy. There is also a growing need to generate a public dialogue with the private sector to achieve greater efficiency and introduce modern technologies for energy provision.

The water and sanitation sectors in the region are held back by institutional weakness at the subnational level, which is the unit of government that usually has jurisdiction over service delivery. This, together with low performance standards and low regulatory enforcement capacity, affect the quality of services; high water intermittency and the small share of potable water provided to households are clear indicators of low quality service in the region. A common challenge is to mobilize the resources needed to secure universal access to water and sanitation services. In many cases, doing so requires increasing service fees charged to final consumers.

In telecommunications, countries should incorporate Information Communication Technologies (ICT) in different sectors to stimulate and boost the digital market. Achieving



this objective involves expanding the coverage and connectivity of telecommunications infrastructure and creating incentives and mechanisms (including through public-private partnerships) to expand broadband geographic coverage.

## Conclusion

Infrastructure is the component of gross fixed capital formation that most accurately reflects Latin America and the Caribbean's dual need to invest more and to target investments better. The region's bias to cut public investments during recessions or during fiscal consolidations reduces investment in critical productive inputs and deprives the economy of the infrastructure assets that can complement private assets in the production process. It also hurts the poorest workers in the economy who rely on public infrastructure for their daily lives and end up paying more for lower quality services. Countries that can break the low investment–low growth cycle and achieve higher growth rates risk derailing the growth process by cutting back on infrastructure investment during recessions or during fiscal consolidations.

A context of tight budget constraints, high indebtedness in many countries, and an uncertain global environment restrict countries' ability to increase investment. Targeting investment in infrastructure sectors to increase productivity growth in the most dynamic sectors of the economy—or in the sector with the highest productivity growth potential—can help countries build opportunities for growth with less investment. In addition, significant efficiency gains can be achieved in the provision of infrastructure services in the region that bring with them the potential of increasing GDP growth without significant fiscal outlays.



## CHAPTER 8

# Conclusions and Policy Suggestions

**G**rowth in Latin America and the Caribbean is expected to remain below potential in 2019. The external context facing the region is becoming more challenging as global growth rates weaken. The economies of Europe, China and the United States are all slowing down. In addition, at the time of writing uncertainty surrounds whether trade disputes will escalate, dissipate, or whether delays in seeking a resolution will provoke continuing uncertainty. It is also unclear how BREXIT will unfold; will it proceed according to the established timetable, with or without an agreement, or will the process be delayed and the uncertainty prolonged? Monetary policy normalization in the United States has advanced but the Federal Reserve is now adopting a wait-and-see attitude. New data will be analyzed to decide if further rate increases will be needed or not. The market appears to expect no hikes in the policy rate this calendar year; therefore, if higher inflation does provoke a reassessment towards a more restrictive policy, then markets would likely react adversely.

This report analyzes the potential consequences for the region of selected negative external shocks. It considers how countries can strengthen macroeconomic policy frameworks to mitigate these events. And it discusses the possible monetary, fiscal, and debt management policy choices available to respond. But there are also opportunities. The report identifies ways in which countries can enhance growth in the current context. Enter infrastructure. More and better-targeted infrastructure investments can enhance growth prospects. And while public investment is constrained by tight budgets, the window of opportunity to pursue private financing to increase investments remains open as interest rates in the world are still relatively low. In addition, improving the efficiency of infrastructure services can complement investment efforts to help boost growth without burdening fiscal accounts.

The report stresses the continued risks from global financial markets. If the pace of monetary policy normalization in the United States is faster than anticipated (see Chapter 2), then interest rates in Latin America and the Caribbean would rise, exchange rates would likely depreciate, and inflation targeting countries may need to tighten monetary policy to avoid inflationary pressures (see Chapter 3). Countries that peg their exchange

rates to the U.S. dollar or seek stable exchange rates through active management may face mounting pressures on their foreign currency reserves. Favorable global fundamentals, while interest rates are still low and commodity prices at profitable levels, provide time for countries to build up buffers and to trim fiscal and external deficits. Insurance mechanisms such as the IMF's precautionary facilities or swap lines with other central banks may also play a useful role.

This is also a good time to take a cautious approach to public debt management to preserve financial stability in case global financial conditions deteriorate (see Chapter 4). For governments requiring financing to increase investment or cover deficits, developing local markets for long-term, fixed-rate, domestic-currency denominated debt underpinned by a stable local investor base, rather than relying on more fickle foreign investors, may pay dividends. Without a stable domestic investor base, the region will remain vulnerable to swings in global financial markets despite the improvements in debt management. Resident investors in Latin America and the Caribbean can also play a stabilizing role when external volatility is high if they are willing to repatriate foreign assets if foreigners flee. As discussed in this report, this repatriation is more likely to happen if macroeconomic and financial conditions are stable (see Chapter 2). On the corporate side, balance sheet indicators have deteriorated and bond issuance, which had been very strong, has now fallen back. Still, nonfinancial firms appear to be issuing a larger share of debt both at longer maturities and in local currency. This changing debt profile suggests a cautious approach to debt management and a demand for financing that may have fallen at least as much as supply (see Chapter 4). Macroprudential policies can contribute by protecting financial systems from the risks of firms borrowing excessively in international markets, especially while volatility in those markets remains elevated in the midst of an uncertain global outlook.

Many countries have chosen to pursue fiscal adjustment to attempt to stabilize debt ratios given persistent deficits (see Chapter 5). In good news, those countries with explicit consolidation plans are now to some degree attempting to protect public investment, which has usually borne the brunt of adjustment efforts in the past. This is a step in the right direction to correct the costly bias against public investment that has been built into the region's fiscal policies. Continuing to correct this bias would not only help improve fiscal outcomes, it would also improve growth prospects. The cost of cutting public investments in infrastructure, for example, are disproportionately large for the fastest growing economies, as maintaining high growth rates requires reliable infrastructure services (see Chapter 7). A way in which countries can institutionalize their commitment to protecting public investment during fiscal consolidations is to introduce flexibility provisions to accommodate shocks into their fiscal rules (see chapter 5). Pioneer fiscal rules lacked flexibility mechanisms and, therefore, unintentionally encouraged procyclicality and cuts in public investment during fiscal consolidations in order to comply with strict numerical targets.

Effective ways of protecting public investment levels from budget cuts include 1) cyclically adjusted fiscal targets; 2) well-defined escape clauses in the case of unanticipated shocks such as natural disasters, and; 3) rules that exclude capital expenditures from the numerical targets. These provisions can add a growth enhancing dimension to the fiscal sustainability concerns that have been the focus of fiscal rules in the past.

Turning to the possible opportunities, Latin America and the Caribbean invests too little in infrastructure. Investment is low not only in comparison to other regions, it is also low in relation to the region's need to close large infrastructure gaps. Low investment, in turn, has taken a toll on the quality of the region's infrastructure services (see Chapter 6). But, how can countries raise infrastructure investment in these challenging times? To lift infrastructure investment, countries must secure financing. But public finances are already stretched.

An alternative is to turn to private investment. The evidence presented in Chapter 6 suggests that the volume of private funds searching for yields above the still low international interest rate in the world is large, and that infrastructure projects can be a useful outlet for those funds considering the risk/return profile. What is missing is ways of connecting the available supply of global financing with local demand. For example, many countries in the region do not have suitable frameworks to advance and manage complex infrastructure projects that combine public and private financing and/or funding. And there is not yet an asset class that would help to provide financing for infrastructure at different stages of the project's life cycle. A step in this direction is to attract institutional investors like pension funds and insurance companies that have available resources and match them to projects that meet their need for long-term returns for their investments. A complementary proposal discussed in Chapter 6 is to set up country-level infrastructure funds, that might issue infrastructure bonds to attract institutional investors. The proceeds would be invested in project level Special Purpose Vehicles (SPVs) where the different types of risks associated with such projects were carefully analyzed and controlled. This financing would supplement that provided by project sponsors and commercial banks. One possibility is that projects could refinance after the construction phase, thereby allowing commercial banks to see their stakes and alleviating a possible bottleneck in the current pattern for financing infrastructure.

Countries can also build opportunities for growth by investing better. In addition to investing too little, Latin America and the Caribbean does not always allocate resources to the best infrastructure projects. Development gaps by sector—where the gaps are calculated considering each country's level of development—provide a nuanced view of the quality of infrastructure service provision in the region (see Chapter 6). Not all countries suffer gaps in all sectors. Some countries are better off in energy or water and sanitation for example, but have larger negative gaps in transport or telecommunications. The analysis in Chapter 6 gives a first indication by country, by sector, and within sector of

the potential constraints and bottlenecks that may be present and that limit private sector activity and, hence, growth. Yet the question remains as to how to target investments better to maximize the growth payoffs. Targeting (or prioritizing) investments may be particularly important in times when budget constraints bind, and the cost of financing is rising like at present. Chapter 7 presents new evidence based on a framework to assess which investments (in which infrastructure sectors) would help increase growth the most. The answer hinges on how shocks to productivity in infrastructure-related sectors impact productivity in other sectors of the economy, particularly in sectors with high productivity growth potential. Combining the information about the gaps in the different sectors with the estimated payoffs of closing the gaps, countries may be able to prioritize investments in order to maximize the growth payoffs. For the region on average, the estimates are that if countries can increase investment levels in infrastructure sectors enough to close the gaps with OECD countries for example, then the economy-wide productivity growth could increase by 75% with respect to the historical average.

Investing in infrastructure can support economic growth by raising productivity. Increasing the efficiency of providing infrastructure services can complement those efforts without large fiscal outlays. Chapter 7 considers three types of efficiency gains: *cost-saving efficiency improvements* that reduce costs of production within infrastructure sectors; *productive efficiency gains* that increase productivity within infrastructure sectors; and *increased quality service in infrastructure sectors* that reduce production costs in other (non-infrastructure related) sectors. Using detailed models for a set of representative Latin American and Caribbean countries, it is found that relatively small efficiency gains in infrastructure-related sectors can yield significant growth benefits to the region. On average, a 5% increase in efficiency indicators could increase growth rates by 3.6 percentage points over a 10-year horizon. These benefits may be as high as 4 and 5 percentage points of incremental growth in countries where the starting point is lower. Increasing efficiency in infrastructure-related sectors, in turn, requires reducing the high transaction costs, political and governance risks, and policy and regulatory barriers found in many countries in the region that result in low investment, low technological adoptions, and low service quality. The pipeline of well-prepared infrastructure projects is small; there are daunting inconsistencies in service contracts, concessions, and bidding documents. To increase efficiency, it is also imperative to strengthen institutional capacity in the public sector at the national and especially subnational levels, and along the entire infrastructure project cycle. Better technical capacity in the public sector, coupled with increased transparency, would reduce uncertainty and cement the basis for more investment and more efficient service provision. The payoffs of doing so can be twofold: supporting a more vibrant economy and, at the same time, helping the poor who devote a larger share of their incomes than the rich to paying for infrastructure services.



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