



PAVING THE WAY TO SUSTAINED GROWTH AND PROSPERITY

in Central America, Panama,
and the Dominican Republic

EDITORS

Kimberly Beaton, Lorenzo Figliuoli, and Roberto Garcia-Saltos

Paving the Way to Sustained Growth and Prosperity in Central America, Panama, and the Dominican Republic

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*Kimberly Beaton, Lorenzo Figliuoli, and
Roberto Garcia-Saltos*

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Contents

FOREWORD

CONTRIBUTORS

- 1 | Building a Foundation for Sustained Growth..... [1](#)
Kimberly Beaton, Lorenzo Figliuoli, Roberto Garcia-Saltos, and Iulia Teodoru

PART I: THE FOUNDATIONS OF GROWTH

- 2 | Policy Imperatives for Raising Potential Output Growth..... [13](#)
Roberto Garcia-Saltos, Iulia Teodoru, and Fan Zhang
- 3 | Female Labor Force participation..... [29](#)
Anna Ivanova, Jaume Puig-Forne, Victoria Valente, and Joyce Wong
- 4 | Migration and Remittances..... [43](#)
Kimberly Beaton, Metodij Hadzi-Vaskov, and Bogdan Lissovolik
- 5 | Trade Integration: Taking Stock..... [61](#)
Kimberly Beaton, Xiaodan Ding, Metodij Hadzi-Vaskov, and Rosalind Mowatt
- 6 | Crime and Punishment in Central America..... [85](#)
Ana Lariau, Dmitry Plotnikov, and Joyce Wong

PART II: FISCAL POLICY CHALLENGES TO GROWTH

- 7 | Benchmarking Social Spending in Central America..... [111](#)
Javier Kapsoli and Iulia Teodoru
- 8 | The Long-Term Fiscal Costs of Population Aging..... [133](#)
Jaume Puig-Forne
- 9 | Fiscal Policy Reforms and Inequality: The Cases of Honduras, Guatemala and Dominican Republic..... [153](#)
Aliona Cebotari, Valentina Flamini, Roberto Garcia-Saltos, and Adrian Peralta
- 10 | Recent Experiences with Fiscal Responsibility Frameworks..... [165](#)
Metodij Hadzi-Vaskov, Javier Kapsoli, and Bogdan Lissovolik

PART III: MONETARY AND FINANCIAL SECTOR POLICIES TO SUPPORT GROWTH

- 11 | Monetary Transmission: Effectiveness and Policy Implications..... [189](#)
Cristhian Vera, Prachi Mishra, and Rogelio Morales

12 | Financial Development and Inclusion [217](#)
Joyce Wong

13 | Safeguarding Financial Stability: The Role of Macroprudential Policy ... [233](#)
Kimberly Beaton, Mario Dehesa, Fernando Delgado, and Xiaodan Ding

14 | The Credit Cycle..... [257](#)
Valentina Flamini, Pierluigi Bologna, Fabio Di Vittorio, and Rasool Zandvakil

NOTE

The research in this volume was drafted in 2017–18 and based on ongoing work at that time.

Foreword

Over the past three decades, countries in Central America, Panama, and the Dominican Republic have experienced sustained economic transformation. The region has moved away from its rural and agricultural societies of the past to modern urban ones and has made significant progress integrating its economies regionally and with the rest of the world. Yet, relative to other regions, growth performance overall has been subpar, with much of the weakness concentrated in the Northern Triangle countries—El Salvador, Guatemala, and Honduras—as well as in Nicaragua, while Costa Rica, the Dominican Republic, and Panama have outperformed their CAPDR peers. In part, the divergent growth performances may be attributed to differences in the structural challenges faced across the region. To varying degrees, the region broadly shares structural impediments from infrastructure and education gaps and large informal sectors as well as limited fiscal space and low financial intermediation and inclusion. Nevertheless, disproportionately high crime in the Northern Triangle countries has contributed to outward migration and undermined these countries' growth prospects relative to the rest of the region.

It is my pleasure to be part of this effort to disseminate the analytical work on Central America, Panama, and the Dominican Republic conducted by the IMF's Western Hemisphere Department to assess how the region can overcome its obstacles and achieve higher and more inclusive growth. This book is timely and important in many respects. With a primary focus on how to achieve higher and more inclusive growth, it provides a rich analysis of key structural, fiscal, and financial impediments to growth. The chapters synthesize a substantial amount of analytical work on highly topical issues, with the conclusions providing important insight into the divergent growth outcomes of countries in the region and informing their respective priorities to strengthen the foundations of growth and improve social outcomes.

This book is an important platform to further our close engagement and policy dialogue with our members in the region. I hope that it will foster a productive policy dialogue on the region's unique economic challenges and stimulate further research to pave the way to sustained growth and prosperity.

Mitsuhiro Furusawa
Deputy Managing Director
International Monetary Fund

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Building a Foundation for Sustained Growth

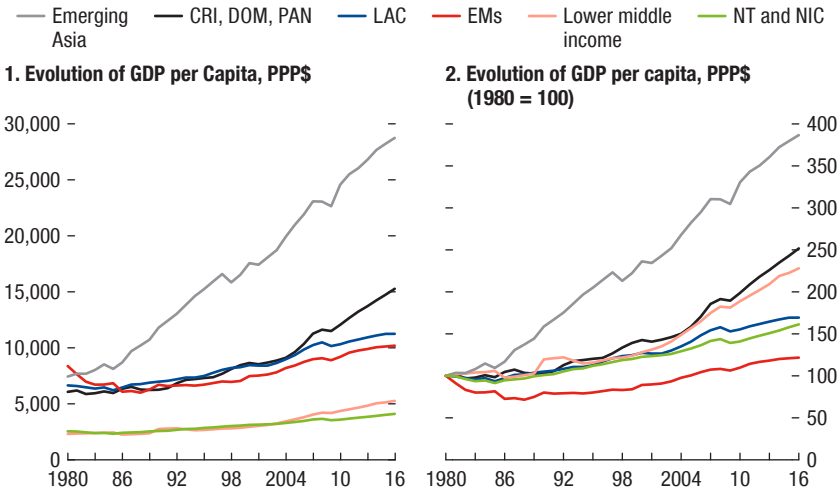
**KIMBERLY BEATON, LORENZO FIGLIUOLI, ROBERTO GARCIA-SALTOS,
AND IULIA TEODORU**

Over the past three decades, the countries of Central America along with Panama and the Dominican Republic—collectively referred to as CAPDR—have undergone a sustained economic transformation. These countries have moved away from the rural and agricultural economic base of the past toward a modern and urban economic structure characterized by significant regional and global integration. Overall growth in CAPDR has been subpar (Figure 1.1): since 2000, annual real GDP growth has averaged 4.1 percent, compared with 4.5 percent in other emerging market and developing economies. The gap between income per capita in CAPDR and in the United States has been quite large and only recently diminished to levels that prevailed during the 1960s and 1970s (Figure 1.2). Weak growth has been concentrated in Nicaragua and the so-called Northern Triangle countries—El Salvador, Guatemala, Honduras—where income per capita has been stagnant over the past 35 years and has yet to recover to 1960s and 1970s levels. These countries experienced civil wars during the 1980s, the Latin American financial crisis during the 1990s, and, in some, natural disasters during the late 1990s and early 2000s. During this same period, Costa Rica, the Dominican Republic, and Panama outperformed their CAPDR peers, even though they experienced lower growth during the 1980s than Nicaragua and the Northern Triangle countries. Starting in the 1990s and particularly during the 2000s, they narrowed the gap in income per capita with the United States and surpassed the progress of other emerging market and developing economies on this measure.

The divergent growth paths of these countries reflect differences in their economic structures and in their ability to innovate and adapt. For example, Costa Rica, Panama, and the Dominican Republic have been able to diversify from agriculture to manufacturing and high-value-added services. Costa Rica shifted resources to higher-productivity sectors such as circuitry, mechanical parts, accounting and financial services, and medical equipment; Panama shifted to logistics and transportation services, financial intermediation, communications, and trade; and the Dominican Republic shifted to electrical equipment and

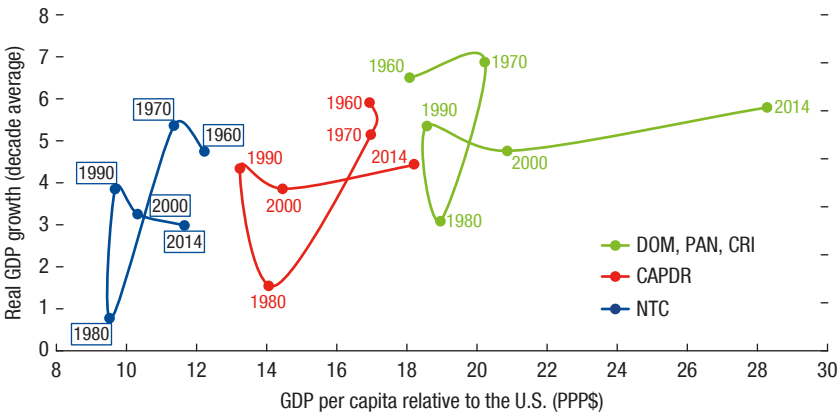
Cristhian Vera provided superb research assistance.

Figure 1.1. Evolution of GDP

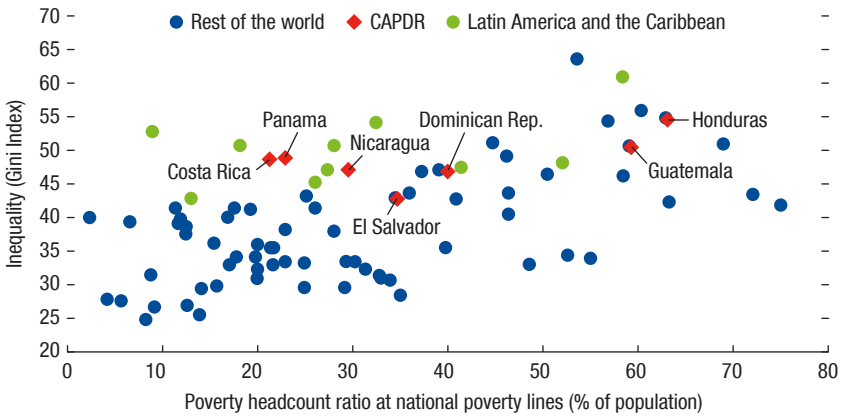


Sources: World Bank, World Development Indicators; and IMF staff estimates.
 Notes: NT = Northern Triangle refers to El Salvador, Guatemala, and Honduras; Emerging Asia = China, Hong Kong SAR, Indonesia, India, South Korea, Malaysia, Philippines, Singapore, Thailand. Figure reports country-group averages. Data labels in figure use International Organization for Standardization (ISO) country codes.

Figure 1.2. Convergence



Sources: Penn World Tables 9.0; World bank; and IMF staff calculations.

Figure 1.3. Poverty and Inequality

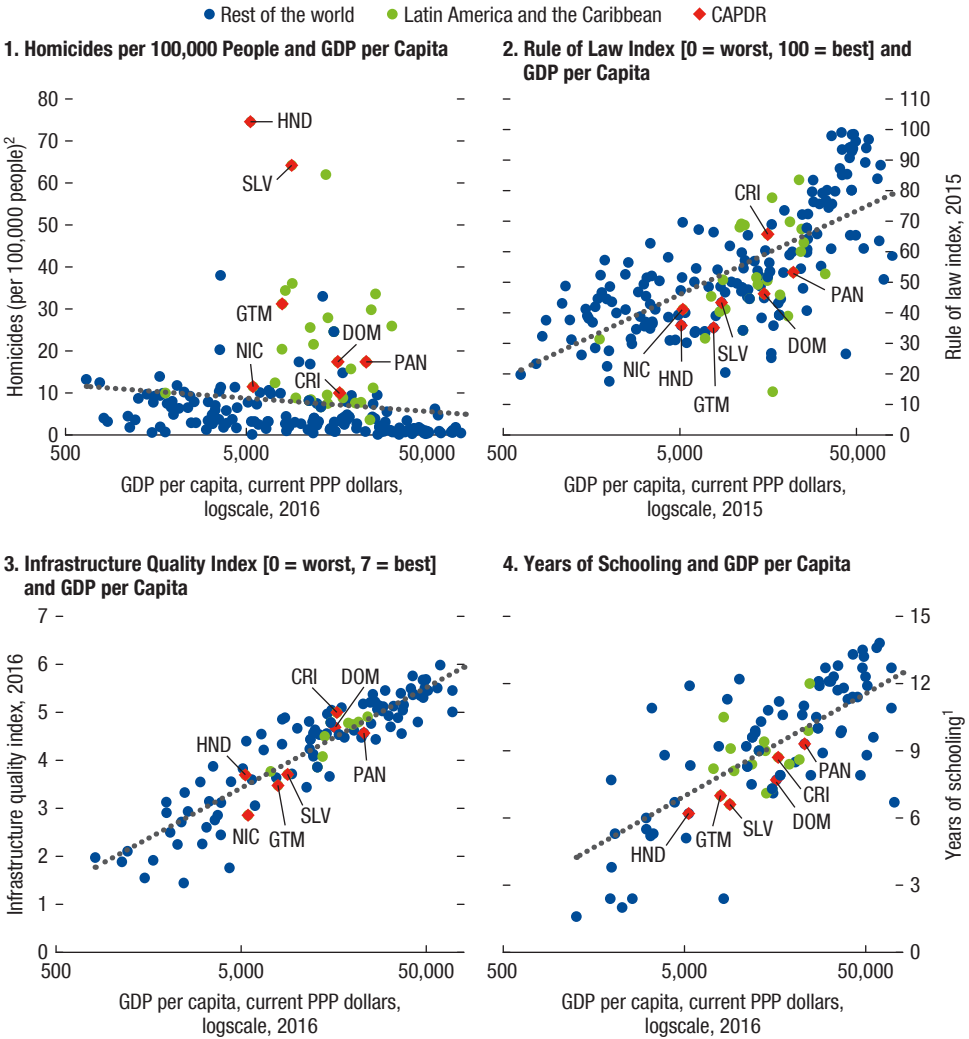
Sources: World Bank Development Indicators; and IMF staff calculations.

Note: The numbers for poverty and inequality represent the average from 2010 to 2015, with the available data for country and year.

medical instruments. Panama and the Dominican Republic rank highest in Latin America and the Caribbean in economic complexity—the amount of productive knowledge embodied in their export content. That complexity, along with higher human and physical capital and greater export diversity, have likely contributed to rapid growth in their total factor productivity and, in turn, to greater economic growth in the longer term. In contrast, in the Northern Triangle countries the process of diversifying away from agriculture and into higher-value-added and more complex products and sectors is still underway.

Differences in growth performance have contributed to differences in social development—that is, the overall well-being of individuals that allows them to reach their potential. Social development can be gauged by rates of poverty and inequality and by human opportunity indicators such as life expectancy, maternal mortality, access to water and/or electricity, and education. Poverty in Guatemala and Honduras is very high—60 percent of the population—and has not fallen during the past decade. It is lower in the Dominican Republic and El Salvador at 40 percent, but because of the large size of the informal sector in these economies, much of this poverty is structural. Inequality is high in all the CAPDR countries. Human opportunity indicators point to scant access to basic services (education, running water, electricity), especially in El Salvador, Guatemala, Honduras, and Nicaragua. Malnutrition rates are among the highest in the world, and in Nicaragua, Honduras, El Salvador, and Panama it is double the level in South America. Life expectancy in the region is about 75 years, but maternal mortality is above the overall rate in Latin America. Entrenched poverty and inequality in the Northern Triangle, coupled with a lack of job opportunities, pushes many people to emigrate.

Figure 1.4. Structural Factors Affecting Growth



Sources: IMF, World Economic Outlook database; World Bank, Worldwide Governance Indicators; World Economic Forum; Transparency International, Global Corruption Barometer database; UNESCO Institute for Statistics (UIS) database; and IMF staff calculations.

¹Mean years of schooling; Percentage of population (age 25+).

Structural and macroeconomic impediments underlie these countries' uneven economic performance (Figure 1.4). The structural impediments include infrastructure and education gaps, a large informal sector, high crime, aging populations, and weaknesses in the rule of law. Large infrastructure gaps in most countries, though to a lesser extent in Costa Rica and Panama, constrain potential

growth and living standards and have a particularly outsized effect on the poorest households. Access to education, as measured by average years of schooling and net enrollment, especially in secondary education, is low, particularly in the Northern Triangle; this limits the contribution of human capital to growth. Disproportionately high crime and extortion in the Northern Triangle and widespread gang violence drive outward migration and constrain small business operations. Weak institutions also pose significant constraints to doing business. Anti-corruption measures in the region fall short of those in place in other emerging market and developing economies, although there has been good progress and some high-profile cases in some CAPDR countries.

Macroeconomic weaknesses compound these structural weaknesses. There is limited fiscal space, with the exception of Panama, and as a result, pro-growth spending has been insufficient to ensure support for infrastructure development, education, and security. Tax revenues have been low in many of these countries, which also limits social spending because they cannot afford large deficits given low growth and high borrowing costs. At the same time, low financial intermediation and inclusion constrain investment and growth.

This book explores how CAPDR countries can overcome these obstacles and achieve higher and more inclusive growth. The book aims to foster policy dialogue and contribute to the efforts to address the region's unique challenges. The first part examines the region's growth with a view to understanding how structural determinants—capital formation, employment, demographic factors, including immigration, productivity, and violence—contribute to the region's uneven gains and how best to strengthen the pillars of growth. The second part of the book highlights the importance of addressing the region's fiscal challenges to create the fiscal space required to support growth and improve social outcomes. Fine-tuning public spending can help ease emerging spending pressures, including from an aging population. At the same time, fiscal consolidation can include more progressive taxation and enhanced redistributive policies to lower income inequality, along with strengthened fiscal anchors to support the adjustment through enhanced accountability. Finally, the third part of the book emphasizes the importance to growth of a supportive financial sector, including through broader access to financial services and further development and deepening of the financial sector.

THE PILLARS OF GROWTH

Economic growth in Central America, Panama, and the Dominican Republic has been robust, as noted, albeit with substantial country-specific differences that are expected to persist. Growth dynamics are projected to remain positive in the near term, reflecting strong US and global growth. However, there are important downside risks to growth. These include tighter US immigration policy, which could mean more deportations and lower remittances, particularly for the Northern Triangle countries. Tighter global financial conditions could limit access or raise the cost of external financing given weak budgetary situations (for

example, in Costa Rica, Dominican Republic, El Salvador), and slower global growth could lead to a retreat from cross-border integration in the region.

The first part of the book identifies the structural factors that shape the region's recent economic performance and contribute to its potential growth, specifically by addressing the following questions:

- What is the region's potential growth, and which reforms will help overcome its structural challenges and boost its medium-term prospects?
- How will demographics and the role of women in the workforce shape the future of the region's labor force?
- To what extent do migration and remittances contribute to the region's economic performance, and what risks are posed by the region's reliance on remittances?
- How is the region integrated into global markets, and what role does trade play in shaping its economic prospects?
- How do crime and corruption affect the region's economic development?

Chapter 2, Roberto Garcia-Saltos, Iulia Teodoru, and Fan Zhang explore the factors that contribute to movements in potential output. In the aftermath of the global financial crisis, potential output growth declined in most of these economies, a decline the authors largely attribute to lower capital accumulation and stagnant productivity growth. However, these factors were offset in Costa Rica, the Dominican Republic, and Panama by a demographic dividend and in other countries (for example, Costa Rica) by improvements in education, which contributed to faster growth than in the Northern Triangle and in Nicaragua. On average, the potential growth rate for the region overall is expected to remain above 4 percent during the medium term but to be lower in the Northern Triangle and in Nicaragua, at 3.5 percent, and to be higher (at 5 percent) in faster-growing Costa Rica, the Dominican Republic, and Panama. The challenge throughout the region will be to address structural constraints to capital and employment growth to improve medium-term growth prospects.

Chapter 3 explores how, despite favorable demographic conditions, the contribution of human capital to potential growth has remained elusive given the low participation of women in the labor force. Authors Anna Ivanova, Jaume Puig-Forne, Victoria Valente, and Joyce Wong explore why CAPDR has some of the world's largest gaps between male and female labor force participation (exceeding 25 percent) and highlight the importance of tapping women to boost potential growth. In fact, at close to 40 percent, the gender gaps in two of the Northern Triangle countries (Guatemala, Honduras) are the largest in the world. Their analysis suggests that low female labor force participation is driven not only by the region's middle-income status (given the U-shaped relationship between the level of economic development and female labor force participation), but also by gender gaps in education, high fertility, infrastructure gaps, and other factors that affect access to the job market. To enhance the role of women and improve their economic and social well-being, countries in the region will need to broaden access to education, increase investment in infrastructure and information

technology, and undertake measures to support working mothers with children. Enhanced female labor force participation can also boost the region's growth potential, especially in countries where the population is aging more rapidly.

In Chapter 4, Kimberly Beaton, Metodij Hadzi-Vaskov, and Bogdan Lissovolik explore outward migration, a very important CAPDR demographic phenomenon, particularly for the Northern Triangle countries. There has been a wave of emigration from the region since the 1980s, driven by civil wars, political instability, and natural disasters, as well as family reunification and the search for better economic opportunities abroad. Emigrants account for nearly 10 percent of the region's population, compared with about 2 percent for emerging market and developing economies as a whole. Emigrant remittances account for about 8 percent of the region's GDP. Northern Triangle countries, with the largest numbers of migrants abroad, receive considerably more remittances than other countries in the region. Do the population losses associated with emigration hurt economic growth? Do remittances compensate for this loss? Do remittances spur growth? The analysis in Chapter 4 suggests that the negative effects of emigration on economic growth stemming from the reduction in labor supply are largely offset by the positive effects from remittances on investment, education, and trade links. Nevertheless, the authors caution that the region's extensive reliance on remittances, especially when most migrants from the region reside in a single country, can be risky and can amplify negative spillovers from changes in US economic conditions and policies. The authors advocate policies that can tilt the effects of emigration and remittances in a favorable direction. For example, the effects of remittances can be made more stable by reducing the transaction costs, facilitating their formal intermediation, and enacting measures to enhance the financial sector's resilience to the volatility of remittance flows, including potential sudden stops. Improving the overall business environment and strengthening institutions can help raise productivity and limit incentives for outward migration. For the Northern Triangle, effective policies to improve security will be critical.

Chapter 5 examines how enhancing trade can promote and sustain higher growth. The region liberalized trade in the 1990s and is well integrated into global markets: trade openness represented about 74 percent of regional GDP in 2016. Honduras, Nicaragua, and Panama are the most integrated economies; Costa Rica, the Dominican Republic, El Salvador, and Guatemala are relatively less integrated. Given this considerable heterogeneity, Kimberly Beaton, Xiaodan Ding, Metodij Hadzi-Vaskov, and Rosalind Mowatt conclude that there is ample scope for further trade integration in the region, primarily by tackling its structural challenges. Strengthening the region's infrastructure and human capital development would be useful not only as part of a broad growth strategy, doing so will also enhance trade integration, by opening new opportunities for technology transfer and allowing the region's exports to become more diverse and complex. With the region's exports largely targeted toward the United States, diversification could also promote external stability and improve productivity and economic growth. Opportunities for regional cooperation on trade should also be exploited. There may be limited scope to expand intraregional trade given the

similarity of the region's production structures and export bases, but countries in the region should continue their efforts to negotiate joint trade agreements and seek to expand regional cooperation on regulatory issues, trade facilitation, and connectivity, including infrastructure, to promote economies of scale and lower administrative and compliance costs.

Crime and corruption have emerged as key obstacles to increasing investment, building physical capital, and as a result promoting growth. In Chapter 6, Ana Lariau, Dmitry Plotnikov, and Joyce Wong argue that persistent crime is one of the biggest challenges to economic development for the Northern Triangle countries, which account for 4½ percent of the world's nonwar homicides but only ½ percent of the world's population. Violent crime rates in the remainder of the region are broadly comparable with those in other emerging market countries and in Latin America as a whole. Persistent crime in the Northern Triangle is closely intertwined with these countries' relatively poor growth rates. In the face of high poverty (especially in the Northern Triangle), the authors advocate that CAPDR countries tackle crime through a combination of policies to spur growth, promote labor market activity, increase the expected benefits from legal and nonviolent activities, strengthen policies to curb gang activity, and improve the criminal justice system.

FISCAL POLICY CHALLENGES TO GROWTH

Promoting inclusive growth will require many CAPDR countries to maintain or bring public finances to sustainable levels. High fiscal deficits and rising debt levels are serious concerns for Costa Rica and El Salvador. Public debt is also expected to rise in the Dominican Republic and Nicaragua, though to a lesser extent. Honduras has relatively high debt but has recently regained fiscal discipline. Guatemala and Panama are projected to experience sustainable debt dynamics. Setting a clear, consistent, and disciplined fiscal path could reduce the cost of capital and open up fiscal space to support social development programs and to foster private investment, including for infrastructure. There are a number of fiscal policy measures that can influence the region's growth prospects, including by improving the quality of spending, creating fiscal space to deal with population aging, reducing income inequality, and institutionalizing fiscal discipline by introducing fiscal responsibility frameworks. The second section of the book explores these issues by tackling the following questions:

- How can countries in the region maintain or restore fiscal buffers while simultaneously increasing social spending?
- What are the fiscal policy challenges related to population aging?
- How can fiscal instruments reduce income inequality?
- What has been the result of recent measures to institutionalize fiscal discipline through fiscal responsibility frameworks and fiscal rules?

In Chapter 7, Javier Kapsoli and Iulia Teodoru advocate more efficient public expenditure as a means to rebuild fiscal buffers while increasing public spending

to close social gaps and develop human capital. The potential long-term savings could be significant—in the range of 0.25 to 3 percent of GDP. More efficient public spending, however, must rest on a foundation of deep structural reforms. The authors discuss policy options for each country and find that reducing the wage bill is the main challenge across the region, except in Guatemala, where social spending lags regional averages. The specific reforms most appropriate for each country differ, but the broad basket of reforms includes reducing large public-private wage premiums, tackling the disconnection between compensation rules and productivity, and reallocating teacher resources to match enrollment trends.

In Chapter 8, Jaume Puig-Forne highlights the major fiscal challenges presented by population aging for the CAPDR region. Although the region continues to benefit from a demographic dividend, the old-age dependency ratio (the ratio of the retirement population to the working-age population)—as in the rest of the world—is projected to rise. Most of these countries have pay-as-you-go defined-benefit pension systems (except Dominican Republic, El Salvador, Panama) and high public health expenditures (except Dominican Republic and Guatemala). Puig-Forne advocates supporting fiscal sustainability through carefully designed pension and health care reforms. For defined-benefit pension systems, parametric pension reforms—including increasing contribution rates and raising retirement ages to reflect longer life expectancies—can help slow the growth of age-related public spending and enhance the scope for extended coverage, which is particularly low in the Northern Triangle and Nicaragua. For defined-contribution systems, gradually raising the retirement age and increasing early contribution rates can help contain contingent fiscal risks from inadequate projected benefits (especially Dominican Republic and Panama). Gradual adjustments can help mitigate the potentially negative social effects of reforms. To help people adjust, reforms should be introduced while countries still have the fiscal space for such gradual change. Health care reform should aim to manage the growth of spending while preserving health outcomes and ensuring equitable access to basic services. A combination of tight budget controls and efficiency-enhancing measures will be key to reforming health care in all countries.

Another challenge is how best to design fiscal consolidation to enhance the redistributive power of fiscal policy and help reduce income inequality. While there is no one-size-fits-all strategy, in Chapter 9, Aliona Cebotari, Valentina Flamini, Roberto Garcia-Saltos, and Adrian Peralta offer some suggestions. First, well-designed social programs are essential to consider at the outset of any consolidation strategy. Second, focusing revenue mobilization efforts on greater tax *progressivity*—by scaling back exemptions, removing preferential treatment, and combating tax evasion and avoidance, especially by higher-income households—can enhance the redistributive power of fiscal policies. Third, greater reliance on direct taxes, which are progressive—in some cases through lower thresholds to capture more high-income households in the tax net—would help broaden the tax base with few distributional costs. Fourth, a successful consolidation that reduces (or stabilizes) the debt and lowers the risk premium could generate savings in terms of lower interest payments not only to the public sector but also to

the private sector. Using these savings to reduce social and infrastructure gaps could offset the demand drag from fiscal consolidation and reduce inequality.

CAPDR countries are increasingly seeking to institutionalize fiscal discipline through fiscal responsibility frameworks and fiscal rules. In Chapter 10, Hadzi-Vaskov, Kapsoli, and Lissovolik explore the initial experience with fiscal responsibility frameworks, which have been adopted by three countries in the region. Panama originally enacted its fiscal rule in 2002, and El Salvador and Honduras adopted theirs in 2016. Other countries in the region are in earlier stages of exploring the applicability of such frameworks. The authors conclude that the design of the region's existing fiscal rules, particularly those focused on expenditures, is appropriately geared toward local conditions and in line with best practice. The region's track record on compliance with existing fiscal rules has been positive, albeit limited: two of the existing frameworks were adopted only recently. To support compliance, the authors recommend accelerating institutional reforms to strengthen public financial management, introducing medium-term fiscal frameworks consistent with fiscal responsibility frameworks, and strengthening fiscal institutions. To raise public accountability for fiscal responsibility frameworks, the authors also advocate enhanced transparency and communication with the public, to promote greater public scrutiny and support achievement of the frameworks' main objectives.

MONETARY AND FINANCIAL SECTOR POLICIES TO SUPPORT GROWTH

Although the region's financial systems were left mostly unscathed by the global financial crisis, that episode underscores that a weak financial sector can quickly undermine economic growth. Such weakness can translate into financial instability, itself inflicting considerable harm on an economy, and can hamper inclusive growth by failing to allocate resources efficiently. Deciding which activities to finance—that is, which yield the best risk-adjusted return—can have a crucial long-term impact on economic prospects, both on the overall level and on the distribution of outcomes. The central role of the financial sector in fostering inclusive growth and maintaining financial stability argues for proper and effective regulation and for a strong and credible monetary policy framework. The third section of the book addresses these questions:

- How do monetary policy frameworks contribute to financial stability?
- What is the state of financial development and financial inclusion in the CAPDR region?
- What is the experience with macroprudential regulation in the region?

CAPDR countries—except El Salvador and Panama, whose economies are officially dollarized—have been enhancing the effectiveness of monetary policy to control inflation and blunt the impact of short-term fluctuations. In Chapter 11, Cristhian Vera, Prachi Mishra, and Rogelio Morales discuss priorities to further strengthen monetary policy frameworks and deepen financial systems. They track

how the nondollarized economies have strengthened their monetary policy transmission channels, but point out how additional measures to discourage financial dollarization and foster the development of secondary securities markets can facilitate further improvement. These countries can also benefit from boosting the flexibility of their exchange rates to enhance adjustment to changing external conditions, making foreign exchange interventions more transparent, and clarifying central bank communication on the primacy of inflation objectives. Concerted efforts to discourage financial dollarization and foster the development of secondary securities markets are needed to further improve monetary policy transmission. Promoting bank competition and strengthening the monetary and financial market infrastructure would expand the credit and capital base.

The region has made significant strides in financial deepening and inclusion, but in Chapter 12 Joyce Wong identifies areas for further improvement. She finds that the region's financial development is generally on par with that of other emerging markets, with financial institutions more developed than financial markets. However, in general financial inclusion of households and small and medium enterprises lags that in other emerging markets. Advances have not been uniform. For example, Panama stands out in terms of financial development and Costa Rica in terms of household inclusion. At the same time, there is low financial inclusion of households in Panama and high spreads and collateral requirements in Costa Rica. To promote financial development, the author proposes stronger institutional and legal frameworks related to property rights and collateral. She also advocates policies to support credit to small and medium enterprises—for example, reducing information costs by strengthening credit bureaus and lowering operational costs through the expansion of mobile networks. To safeguard the benefits of expanded financial inclusion without jeopardizing financial stability, the author advocates strong financial regulation and consumer protection.

In Chapter 13, Kimberly Beaton, Mario Dehesa, Fernando Delgado, and Xiaodan Ding assess the region's uneven progress in safeguarding financial stability by exploring institutional frameworks for macroprudential policy, documenting the use of macroprudential policy, and evaluating its effectiveness. Although there have been important inroads in strengthening microprudential regulation and supervision, macroprudential oversight over systemic risks and related policies is still at a nascent stage. To better prepare the region for systemic risks to financial stability, they advocate reinforcing institutional frameworks for macroprudential policy by clarifying the policy mandates and enhancing coordination between central banks and financial sector supervisors. Macroprudential policies have yet to be used extensively by the region to address systemic risk, but the authors find that tools to reduce the buildup of credit risk, particularly related to foreign currency credit, have helped. The authors conclude that the region should continue to develop its macroprudential policy toolkit to prepare for emerging risks to financial stability.

To enhance the resilience of the banking system the region could consider adopting a countercyclical capital buffer, a time-varying broad-based capital instrument. In Chapter 14, Valentina Flamini, Pierluigi Bologna, Fabio Di Vittorio, and Rasool Zandvakil study the credit cycle in the region and find the credit-to-GDP gap to be

a powerful early warning of future financial stress. They recommend that countries consider introducing such a buffer to protect the banking sector from excessive aggregate credit growth by limiting the procyclicality of lending. The decision to activate the buffer should be anchored in movements in the credit-to-GDP gap complemented by more granular analysis on credit developments. The authors echo the recommendations in Chapter 13 for strong coordination between central banks and financial sector supervisors in assessing systemic risks to financial stability and the mobilization of the countercyclical capital buffer.

CONCLUSION

The experiences of economic transformation during the past three decades in Central America, Panama, and the Dominican Republic present bright opportunities, but significant challenges remain. All CAPDR countries have made significant progress toward integrating their economies regionally and globally. The payoffs in terms of higher economic growth from reducing gaps in infrastructure and education in Costa Rica, the Dominican Republic, and Panama are self-evident. The toll of emigration on economic growth in the Northern Triangle countries, the Dominican Republic, and Nicaragua through the reduction in labor supply has been offset by gains from remittances through investment, education, and other trade links.

Region-wide, it is essential to address structural constraints to capital and employment growth to support medium-term growth. Improvements in the business environment and strong institutions can help raise productivity and limit incentives for outward migration. For the Northern Triangle countries, effective policies to improve security are critical. Better access to education and investment in infrastructure and information technology—and support for working mothers—will enhance the role of women and their economic and social well-being.

With respect to fiscal policy, mobilizing additional resources to provide an adequate level of public goods such as security, education, and infrastructure will require action in all CAPDR countries. These include (1) raise revenue, including through tax reform, revamping tax and customs administrations, and reducing tax exemptions and (2) boosting the benefit of public spending by prioritizing pro-growth and pro-social expenditures, enhance budget transparency, and accountability reforms to pension and health care systems to support fiscal sustainability while improving pension coverage.

Although the financial systems in the region remained largely unscathed by the global financial crisis, that episode underscored the potential danger of a weak financial sector for sustained economic growth. The region has made significant strides in financial deepening and inclusion, but there is scope for further improvement. An important challenge is to integrate the analysis of systemic risk into supervisory and regulatory frameworks, including through the development of macroprudential policy frameworks to support financial stability and provide more flexibility to manage macro-financial risks.

Policy Imperatives for Raising Potential Output Growth

ROBERTO GARCIA-SALTOS, IULIA RUXANDRA
TEODORU, AND FAN ZHANG

INTRODUCTION

The global financial crisis (GFC) of 2008 shocked most countries in Central America, Panama, and the Dominican Republic (CAPDR)—much as it did emerging markets and advanced economies. Indeed, the low-growth conditions have hindered efforts to rebuild fiscal buffers and bring down high debt ratios that have hit some of the region's economies since the financial crisis. With an expected slowdown in productivity, this chapter's findings suggest that policy-makers in most CAPDR economies should make raising potential output growth a policy priority. Structural reforms in particular must be directed at improving the investment climate, including institutional setups, and fostering more competitive and efficient product and labor markets. This will support innovation and reduce the cost of finance, both of which can bolster the medium-term prospects for economic growth.

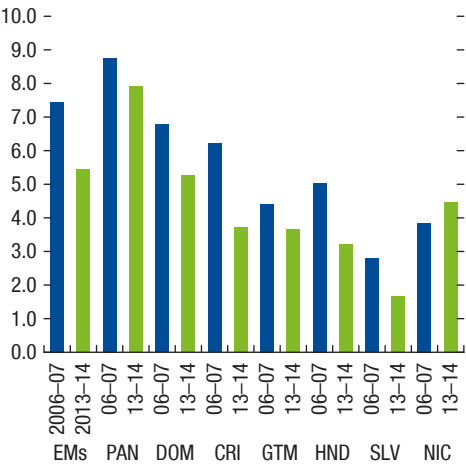
Estimates of potential output for CAPDR countries are a particular focus of this chapter. In this context, it seeks to explain how potential output and its components—capital, labor, and their efficiency in the production process, also known as total factor productivity (TFP)—have evolved in the region since the early 2000s, and, given the likely trajectory of potential growth over the medium term, to set out the policy implications.

Before the GFC, growth in potential output was accelerating in all Central American economies (Figure 2.1). This was attributable mostly to expansion of the labor supply, increased capital accumulation, and growth in TFP, particularly in Costa Rica, the Dominican Republic, Honduras, and Panama.

In the crisis aftermath, potential output growth declined in most Central American economies. Growth in potential output for the medium term is expected to continue to be slower than it was before the global financial crisis for most of the countries. This weakness appears to result from structural constraints to

This chapter uses information available until 2015 and is based on the authors' IMF Working Paper 16/250.

Figure 2.1. Potential Output Growth
(Percent)



Source: Garcia-Saltos and others 2016.
 Note: EMs = emerging market economies; PAN = Panama;
 DOM = Dominican Republic; CRI = Costa Rica;
 GTM = Guatemala; HND = Honduras; SLV = El Salvador;
 NIC = Nicaragua.

capital and employment growth, and the productivity slowdown. It may also reflect slow technological progress and the difficulties of developing more stable institutional, regulatory, and legal environments across the region.

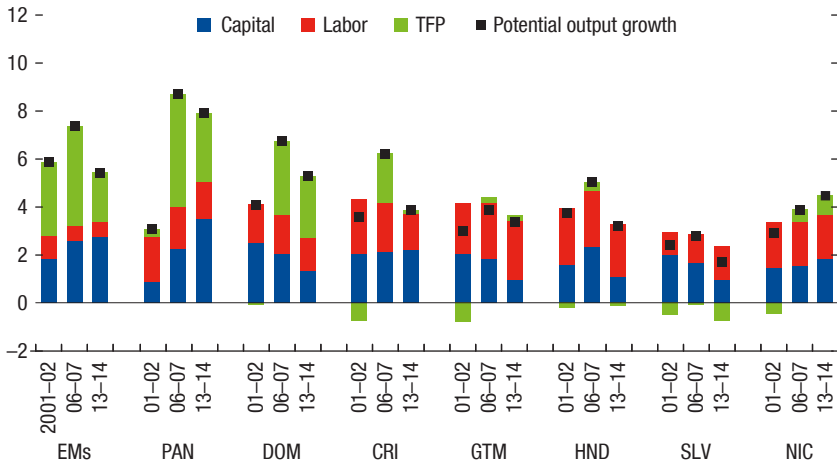
BEFORE THE CRISIS: HOW POTENTIAL OUTPUT GROWTH EVOLVED

During 2001–07, potential growth in Central American economies increased from 3.2 percent to 5.4 percent. This was exceptional. While this is partially driven by the strong performance of Panama, potential growth increased in all other economies, with the smallest improvement being in El Salvador. An acceleration in TFP can explain the bulk of the increase in Costa Rica, the Dominican Republic, Nicaragua, and Panama. In Honduras, the increase in potential growth came in response to faster capital accumulation and a small improvement in TFP, and in El Salvador and Guatemala it was employment creation and less of a drag from TFP (Figure 2.2).

Total Factor Productivity Growth

TFP growth depends on technological progress and the institutional, regulatory, and legal environment in which businesses operate. TFP captures the

Figure 2.2. Determinants of Potential Output Growth, 2001–14
(Percent, average for the period)



Source: Garcia-Saltos and others 2016.

Note: EMs = emerging market economies; PAN = Panama; DOM = Dominican Republic; CRI = Costa Rica; GTM = Guatemala; HND = Honduras; SLV = El Salvador; NIC = Nicaragua.

efficiency with which labor and capital are combined to generate output, which, in turn, depends on firms' ability to innovate, and whether the environment in which they operate fosters competition, removes unnecessary administrative burdens, provides modern and efficient infrastructure, and allows easy access to finance.

Before the crisis, most CAPDR countries experienced a significant rebound in TFP growth. TFP growth in 2006–07 increased in the years before the crisis to almost 2 percent in Costa Rica, over 3 percent in the Dominican Republic, and close to 5 percent in Panama (from close to 1 percent in 2001–03). Honduras and Nicaragua also saw some improvements in productivity growth. Possible explanations for the increase in TFP could include: shifts of resources to higher-productivity sectors, such as circuitry and mechanical parts in Costa Rica, reparation and maintenance services and high-tech equipment in Panama, and electrical equipment and medical instruments in the Dominican Republic.

Greater export diversification and economic complexity (the amount of productive knowledge that is embodied in the export content) likely contributed to the high TFP growth and long-term growth. For example, Costa Rica diversified exports to sectors characterized by technology spillovers and the upgrading of quality of products (from agricultural products and garments in the late 1980s to circuitry and mechanical parts since the mid-2000s). The Dominican Republic shifted from garments, tobacco, and mining to electrical machinery, medical instruments, and metal products. Panama and the Dominican Republic rank highest in Latin America and the Caribbean in economic complexity, and their complexity has been increasing. Indeed, the Western Hemisphere REO found that

more complex and diversified economies tend to have higher GDP per capita growth (Hausmann and others 2013, IMF 2015b).

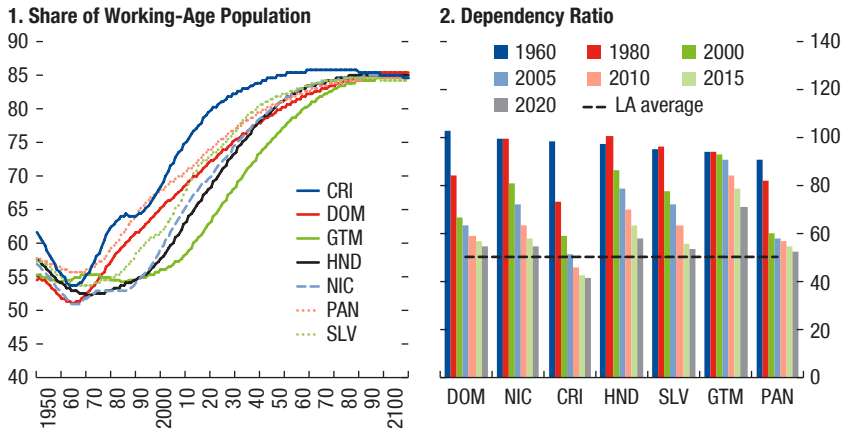
TFP growth has been absent in El Salvador and Guatemala, with some improvements in Guatemala in the years before the crisis. Productivity shortfalls in El Salvador and Guatemala, and to a lesser extent in Honduras and Nicaragua, may reflect among other factors, lags in investment in R&D and in the adoption of new technologies. Lower human capital growth (El Salvador and Honduras saw a significant decline in human capital growth from 2001 to 2007) and migration of high-skilled workers also seem to have hampered TFP growth. Productivity gains were also hindered by a lack of competition and high market concentration in various economic sectors in Central America, including agriculture. The weak business environment, including political and economic uncertainty, criminality, corruption, and poor infrastructure conditions were other factors hindering TFP growth.

Potential Employment Growth

Some Central American economies benefited from demographic dividends (further described in Chapters 2 and 8). At an early stage of the demographic transition from high fertility/mortality rates to low fertility/mortality rates, the first dividend occurs when fertility rates fall, leading to fewer young mouths to feed, and a labor force that temporarily grows faster than the population dependent on it. Other things equal, per capita income grows more rapidly too. Such a dividend is captured by a declining dependency ratio, with the largest dividend reaped by countries that experience a fall in the dependency ratio to below two-thirds. This dividend period can last five decades or more, but eventually lower fertility reduces growth of the labor force, while continuing improvements in old-age mortality increase the size of the elderly population. Other things equal, per capita income grows more slowly and the first dividend turns negative. But a second dividend is possible when a population concentrated at older working ages and skewed toward extended retirement acts to accumulate and invest assets.

Costa Rica, Panama, and the Dominican Republic benefited from demographic dividends in the 2000s (Figure 2.3). Dependency ratios in both countries had fallen below two-thirds by the 2000s, which was faster than in other economies in the region, and the working-age population share was increasing at a rapid pace. On the other hand, in El Salvador, Honduras, or Nicaragua, the dependency ratio (though steadily declining) was still above two-thirds in the early 2000s and these countries were not yet fully benefiting from demographic dividends. In Guatemala, the dependency ratio remained above two-thirds in the early 2000s. The trends in these countries highlight the need to reduce the dependency ratio to reap full benefits of demographic transition.

The increase in potential growth in some countries in the 2000s mostly reflected higher labor. In El Salvador, potential employment growth increased from 1.5 percent to 1.9 percent and in Guatemala from 3.3 percent to 3.5 percent during 2001–07, mainly attributable to higher working-age population growth.

Figure 2.3. Demographic Indicators

Sources: UN Economic Commission for Latin America and the Caribbean (ECLAC); and WDI.

Note: CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras; NIC = Nicaragua; PAN = Panama; SLV = El Salvador.

In El Salvador, fertility rates were falling steeply in the 2000s, which could explain the steady increase in the working-age population and the steady decline in the dependency ratio (from 1 to 0.72 by 2005, and further below two-thirds in the late 2000s). In Guatemala too, fertility rates in the 2000s were falling while population growth was increasing due to higher life expectancy, which in part would explain the high working-age population growth at that time. Employment growth in the Dominican Republic, Honduras, and Nicaragua continued at the same rates over 2001–07 (that is, at lower rates in the Dominican Republic, where growth in the working-age population came to a halt in the 2000s, and at higher rates in Honduras and Nicaragua, where significant reductions in fertility rates were more recent, and therefore benefits from demographic dividends and increases in working-age populations took place in the 2000s).

Capital Growth

The evolution of capital deepening has been diverse across CAPDR countries. Capital growth increased most in Panama, from 3 percent to 6.8 percent, and in Honduras, from over 4.7 percent to 6.8 percent, during 2001–07, and to an important extent in Costa Rica, the Dominican Republic, and Guatemala from the mid-2000s, while it declined in Nicaragua and El Salvador (by almost 1 percentage point in El Salvador). The acceleration in capital accumulation was driven by a strong increase in the investment-to-capital ratio over 2001–07: from 7.5 percent to 11.5 percent in Panama, and from 9.2 percent to 11.5 percent in Honduras. The declines in Nicaragua and El Salvador were driven by falling investment-to-capital ratios. Capital goods imports were booming in most of

these economies in the mid-2000s and in consequence physical capital was overhauled, which supported an increase in potential growth in most economies (although this was not the case in Nicaragua and El Salvador).

AFTER THE CRISIS: HOW POTENTIAL OUTPUT GROWTH DECLINED

Significant declines in potential output growth after the global financial crisis in most Central American economies were due to declines in capital and TFP growth, and to a lesser extent potential employment growth. Potential growth declined by about 2 percentage points in Costa Rica (from 6.2 to 3.9 percent), the Dominican Republic (from 6.8 to 5.2 percent), and Honduras (from 5 to 3.2 percent) from 2006–07 to 2013–14, slightly more than 1 percentage point in El Salvador, and less than 1 percentage point in Guatemala and Panama, while it increased slightly in Nicaragua.

TFP Growth

A decline in TFP growth in many Central American economies accounted for another part of the decline in potential growth. TFP growth fell by up to 1.9 percentage points between 2006–07 and 2013–14. Lower TFP may reflect reduced investment in innovation through research and development as one of the effects of the crisis, along with continued weaknesses in the institutional, regulatory, and legal environment. Lower TFP may also reflect lower human capital growth. In the Dominican Republic, Nicaragua, and Guatemala, however, TFP growth recovered to rates achieved before the global financial crisis, and its contribution to potential growth remained over 2.5 percent in the Dominican Republic and Panama. These two countries had the highest TFP growth in the region in 2014.

Potential Employment Growth

Substantial declines in potential employment growth also contributed to the postcrisis decline in potential growth. In Costa Rica, potential employment growth fell by 0.8 percentage point between 2006–07 and 2013–14, due to a significant drop in working-age population growth, and by 0.3 percentage point in the Dominican Republic and Panama. Potential employment growth remained broadly stable in Honduras and Nicaragua, while it continued increasing after the crisis in El Salvador and Guatemala (by about 0.2 percentage point).

Capital Growth

Slower capital growth accounted for a large part of the decline in potential growth between 2006–07 and 2013–14. The slowdown in capital growth was over 2 percentage points in the Dominican Republic, Guatemala, and El Salvador, and over 3.5 percentage points in Honduras. In Panama, the expansion of the canal and other important investment projects brought about an expansion in capital

growth (of 4 percentage points), and Nicaragua also experienced an increase in capital growth due to new energy projects, while capital growth in Costa Rica did not seem to have been affected by the crisis.

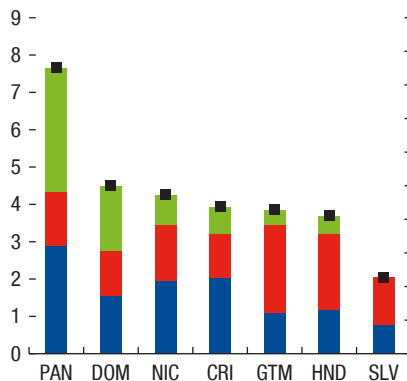
The collapse in aggregate demand after the global financial crisis can explain much of the decline in investment, and financial factors were an important transmission channel. For example, as credit flows start to dry up, firms may face less advantageous financing terms and tighter lending standards over an extended period. Financial crises can have a long-lasting effect on potential growth if investment-to-capital ratios are depressed for an extended time.

WHAT IS THE LIKELY TRAJECTORY OF POTENTIAL GROWTH IN THE MEDIUM TERM?

Scenario analysis implies that potential growth in Central American economies is likely to remain below precrisis rates. Prospects for the components of potential growth—labor, capital, and TFP—are considered over the medium term (Figure 2.4). The analysis extends the historical analysis based on projected demographic patterns, and assumptions on investment-to-capital ratios that account for the long-lasting effect of financial crises on investment-to-capital ratios, which means capital growth remaining 1–3 percentage points below rates before the global financial crisis. Overall, average potential output growth is likely to remain

Figure 2.4. Determinants of Potential Output Growth, 2015–20

(Percent, average for the medium term)



Source: Garcia-Saltos and others 2016.

Note: PAN = Panama; DOM = Dominican Republic; CRI = Costa Rica; GTM = Guatemala; HND = Honduras; SLV = El Salvador; NIC = Nicaragua.

at about 4 percent over the medium term, as shown in the figure. These scenarios are subject to significant uncertainty, as several country-specific factors could influence growth in potential output and the evolution of TFP in the medium term. Finally, these scenarios do not assume policy changes that could boost potential growth in the medium term.

TFP Growth

Strong TFP growth is pivotal to sustain high GDP growth rates, but most likely the legacies of the GFC—e.g., more sluggish potential growth in advanced economies as reported in Chapter 3 of the April 2015 WEO, would make TFP growth for CAPDR countries below the levels reached before the global financial crisis. All in all, in the scenario TFP growth is projected to grow at the 2002–14 average growth rates.

Potential Employment Growth

Potential employment growth is expected to decline further in the medium term, with the biggest declines in Costa Rica, Honduras, and Nicaragua. This reflects demographic factors that are a drag on both the working-age population and trend labor force participation rates. Population growth is likely to slow in almost all Central American economies. Aging is expected to accelerate (but levels are still low in Guatemala, El Salvador, Honduras, and Nicaragua compared to the rest of Central America), lowering trend labor force participation rates, and together with slower population growth, reducing potential employment growth in the medium term.

In Costa Rica, declines in the growth of the working-age population (from an average of 2.1 percent for 2008–14 to 1.6 percent over 2015–20) and labor force participation are expected to result in a large decline in potential employment growth—the highest in the region (from 2.6 to 1.9 percent). Potential employment growth is expected to fall by 0.3–0.4 percentage point in Honduras, Nicaragua, and the Dominican Republic, due to declines in working-age population growth and labor force participation growth. In Panama, potential employment growth is expected to fall by 0.2 percentage point due to declining growth in working-age population and labor force participation. In El Salvador, the working-age population growth is expected to slow, while labor force participation growth should increase, resulting in slightly lower potential employment growth. Guatemala's potential employment growth is not expected to change much in the medium term.

Capital Growth

Capital growth is expected to slow further from current rates. Investment-to-capital ratios have rebounded somewhat in Costa Rica and Nicaragua since 2011, while they have fallen slightly in the Dominican Republic, Honduras, and El Salvador, and have not changed much in Guatemala and Panama. However,

overall, investment-to-capital ratios are likely to remain below rates reached before the global financial crisis. This is because of less favorable external financing conditions, constraints to local finance, and low returns to economic activity. If investment-to-capital ratios stay at the rates observed in 2014, capital growth will remain 1 to 3 percentage points below precrisis rates in all.

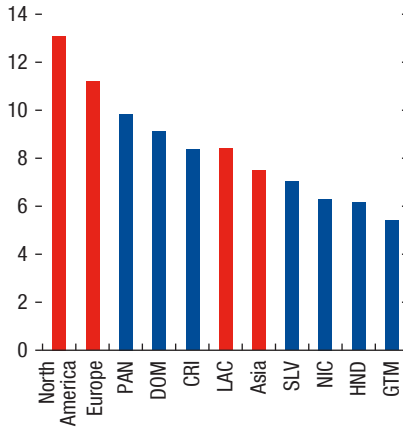
POLICY RECOMMENDATIONS

Support innovation. Relative to emerging market economies, most Central American economies perform poorly across various facets of innovation. This includes spending on R&D, tertiary enrollment rates, number of patent applications, foreign direct investment inflows, ease of protecting investors, knowledge-intensive employment, and creative services exports. Strengthening R&D/technological diffusion will require strengthening institutions, human capital and research, and achieving higher business and market sophistication, and competition in product and labor markets. In Costa Rica, measures to increase competition include giving the Competition Commission more independence, eliminating antitrust exemptions, improving corporate governance of state-owned enterprises, and reducing barriers to entrepreneurship. In El Salvador, enhancing the capacity and clout of the Competition Authority and eliminating legal and logistical obstacles to promptly resolve the backlog of pending court cases on anticompetitive practices would help detect and punish monopolistic behavior. Adoption of the new Competition Law and the establishment of the competition agency is critical in Guatemala to reduce anticompetitive business practices and support the entry of innovative firms.

Raise the quality of human capital. Important advances in human capital are key to improving productivity. Central America lags other regions on various indicators such as mean years of schooling and students' performance on tests (Figure 2.5), underscoring the need to improve the quality of schooling (as discussed in Chapter 7). With respect to enhancing the quality of teachers, it is critical to define teaching standards that guide the stages of teacher professionalization, establish more demanding criteria to select and retain the most talented teachers, and review the salary structure and establish incentives for professional development.

Transform labor markets. Addressing labor market rigidities will support creation of jobs and ultimately a higher contribution of labor to output growth. World Economic Forum-based surveys suggest certain labor market rigidities in the Dominican Republic, El Salvador, Honduras, and Nicaragua. These include inefficiencies in wage determination, the alignment of pay with productivity, the capacity to retain talent, mismatches between skills and jobs, and high informality in almost all CAPDR economies. Removing these rigidities will improve labor productivity. Facilitating access to social security systems, reducing tax distortions, and simplifying tax filing and business licensing procedures are reforms that would help reduce informality. In the Dominican Republic, reducing nonwage payroll expenses, addressing hindrances to more flexible

Figure 2.5. Human Capital
(Mean years of schooling, 2015)



Source: Wittgenstein Center, Human Capital Data Explorer, accessible at <http://dataexplorer.wittgensteincentre.org/wcde-v2/>.

Note: PAN = Panama; DOM = Dominican Republic; CRI = Costa Rica; GTM = Guatemala; HND, Honduras; SLV = El Salvador; NIC = Nicaragua.

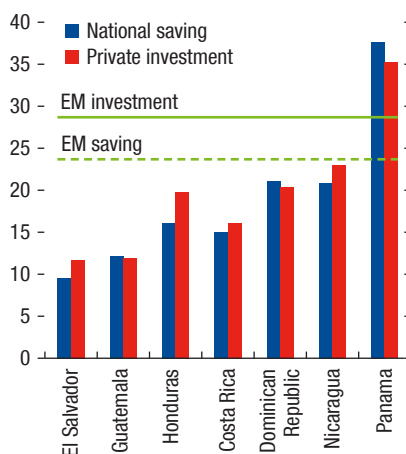
work and conflict resolution arrangements, fostering shifts from receiving welfare to work, and promoting labor market programs would remove barriers to employment creation. In El Salvador, consideration should be given to the reform of wage bargaining by sequencing negotiations starting from tradables sectors, given that recent hikes in minimum wages disproportionately affected firms involved in tradables sectors and further increases are likely to make such firms uncompetitive.

Policies to foster higher labor force participation rates for women and to absorb returning migrants productively into the labor force would also raise employment growth. Most countries in Central America have high gender gaps and incentives for women to work—including free or subsidized childcare programs or increased children’s hours in school, providing additional time available for mothers to work—would boost female participation (as discussed in Chapter 3). The contribution of the demographic dividend to employment growth would increase if many of the young productive population decided not to migrate. Several countries suffer from weak political and socioeconomic conditions, including some of the world’s highest homicide rates and widespread gang violence, which drive ongoing migration (as discussed in Chapter 4).

Support investment. Policies should also prioritize mobilizing domestic savings to invest and build a higher capital stock. Investment-to-capital ratios are lowest in El Salvador, Guatemala, and Nicaragua, and even in Costa Rica, the

Figure 2.6. Gross National Savings and Private Investment

(Percent of GDP, 2013–16 average)



Source: Garcia-Saltos and others 2016.

Note: EM = emerging market economies.

Dominican Republic, and Honduras, they are lower compared to emerging markets (Figure 2.6). In addition, constraints to local finance, including entry (access to credit), borrowing (collateral requirements), or intermediation costs (such as high rate spreads resulting from information asymmetries and limited bank competition) can become bindings constraints to private investment and entrepreneurship. Countries wishing to improve returns to investment should reduce policy uncertainties and macro risks, strengthen institutions to secure property rights, and reduce red tape and corruption. Simplified entry regulations and improved security are also important. Increased public investment, and raising its efficiency, is critical to tackling infrastructure deficiencies.

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ANNEX 2.1. POTENTIAL OUTPUT: A THEORETICAL PRIMER¹

Potential output is generally thought of as the level of output that can be achieved without giving rise to inflation (Okun 1962). In the short term, actual output can deviate temporarily from the potential as shocks hit an economy. Deviations reflect the slow adjustment in wages and prices to shocks such as the global financial crisis, which make the reversion of output to its potential a gradual process. Slow adjustment due to “sticky” wages and prices is a key tenet of the New Keynesian macroeconomic framework used in this chapter.

The economic definition of potential output differs from the widely used concept of trend output, because it relies on an explicit framework based on economic theory. Central banks and other policy institutions typically rely on the economic definition of potential output because the underlying economic framework allows policymakers to gauge short-term trade-offs between output, inflation, and slack in the labor market.

Trend output is derived from filtering simple statistical data using various forms of moving averages or deterministic trends. This is equivalent to smoothing actual GDP over time, based on the implicit assumption that an economy is, on average, in a state of full capacity, without incorporating information from variables such as inflation or unemployment.

The definition of potential output used in this chapter is implemented empirically using multivariate filtering techniques. This approach adds economic structure to estimates by conditioning them on some basic theoretical relationships—the relationship between cyclical unemployment² and inflation (Phillips curve) on one hand, and between cyclical unemployment and the output gap—the difference between observed and potential output—on the other (Okun’s law). One strength of this approach is that estimates of the output gap and potential are consistent with the Okun concept of potential. An example helps illustrate how the multivariate filtering framework uses the information from economic data to estimate potential. Suppose that, if at some time, actual inflation is below expectations and unemployment is above the estimated equilibrium rate, the framework will identify a situation of excess supply (a negative output gap), all else equal.

¹For an in-depth discussion of the methodological aspects see, Garcia-Saltos and others 2016 and IMF 2015a.

²Defined as the deviation of the unemployment rate from the structural unemployment rate or, more specifically, the nonaccelerating inflation rate of unemployment (NAIRU).

The stochastic process for output (real GDP) consists of three equations, and subject to three types of shocks:³

$$\bar{Y}_t = \bar{Y}_{t-1} + G_t + \varepsilon_t^Y \quad (1)$$

$$G_t = \theta G^{SS} + (1 - \theta) G_{t-1} + \varepsilon_t^G \quad (2)$$

$$y_t = \phi y_{t-1} + \varepsilon_t^y \quad (3)$$

In the model, the output gap is defined as the deviation of real GDP, in log terms (Y), from its potential level (\bar{Y}):

$$y = Y - \bar{Y} \quad (4)$$

The level of potential output (\bar{Y}_t) evolves according to potential growth (G_t) and a level-shock term (ε_t^Y). Potential growth is also subject to shocks (ε_t^G), with their impact fading gradually according to the parameter θ (with lower values entailing a slower adjustment back to the steady-state growth rate following a shock). Finally, the output-gap is also subject to shocks (ε_t^y), which are effectively demand shocks.

To help identify the three output shock terms, a Phillips curve equation for inflation and equations describing the evolution of unemployment (an Okun's law) are added. This links the evolution of the output gap (an unobservable variable) to observable data on inflation and unemployment:

$$\pi_t = \lambda \pi_{t+1} + (1 - \lambda) \pi_{t-1} + \beta y_t + \varepsilon_t^\pi \quad (5)$$

$$\bar{U}_t = (\tau_4 \bar{U}^s + (1 - \tau_4) \bar{U}_{t-1}) + g \bar{U}_t + \varepsilon_t^{\bar{U}} \quad (6)$$

$$g \bar{U}_t = (1 - \tau_3) g \bar{U}_{t-1} + \varepsilon_t^{g \bar{U}} \quad (7)$$

$$u_t = \tau_2 u_{t-1} + \tau_1 y_t + \varepsilon_t^u \quad (8)$$

$$u_t = \bar{U}_t - U_t \quad (9)$$

Here, \bar{U}_t is the equilibrium value of the unemployment rate (the NAIRU), which is time varying, and subject to shocks ($\varepsilon_t^{\bar{U}}$) and also variation in the trend ($g \bar{U}_t$), which is itself also subject to shocks ($\varepsilon_t^{g \bar{U}}$)—this specification allows for persistent deviations of the NAIRU from its steady-state value. Most importantly, we specify an Okun's law relationship wherein the gap between actual unemployment (U_t) and its equilibrium process (given by u_t) is a function of the amount of

³Parameter values and the variances of shock terms for these equations are estimated using Bayesian estimation techniques. More specifically, we use regularized maximum likelihood techniques (Ljung 1999). Also, Hamilton (1994) presents a general discussion of the Kalman filter, which is used to obtain estimates of the unobservable variables as part of the estimation process.

slack in the economy (y_t). Equations 1–9 comprise the core of the model for potential output. In addition, data on growth and inflation expectations are added, in part to help identify shocks, but mostly to improve the accuracy of estimates at the end of the sample period.

After obtaining estimates of potential output and NAIRU from the multivariate Kalman filter, the analysis investigates the drivers of potential growth using a growth-accounting framework based on a standard Cobb-Douglas production function.

In sum, the multivariate filtering framework specified in this chapter strikes a balance between statistical filters, which are easily applicable to a wide range of countries, and structural models of potential output, which offer greater theoretical rigor but are difficult to construct and apply broadly. As a caveat, it should be noted that potential output is not directly observable. Therefore, the estimates are subject to statistical and model uncertainty. The latter implies that the estimates tend to vary depending on the underlying methodology.

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Female Labor Force Participation

ANNA IVANOVA, JAUME PUIG-FORNE, VICTORIA
VALENTE, AND JOYCE WONG

INTRODUCTION

Central America has one of the world's largest gender gaps in labor force participation, which highlights the importance of this untapped resource to boost economic growth. The relationship between women's participation in the labor market and economic growth is well documented (IMF 2013). Low female labor force participation in traditional societies has been found an important restriction on growth potential. Education gaps between men and women, besides explaining the lower participation of women in the labor force that are described in this chapter, give rise to women in work having a lower human capital capacity than men, which directly dampens growth potential.

Global gender gaps in labor participation vary strongly by region, with the largest gaps in Middle Eastern and North African countries, followed by South Asia and by Central America, where gaps are well above those seen in advanced economies. Within Central America, Panama, and the Dominican Republic (CAPDR), gaps in Guatemala and Honduras are the largest, with labor force participation (LFP) rates for men being close to 40 percentage points higher than for women (Figure 3.1).¹ With male LFP broadly in line—though in some cases higher—than in more advanced Latin American economies, low female LFP is the main driver of these large gender gaps in the CAPDR labor force.

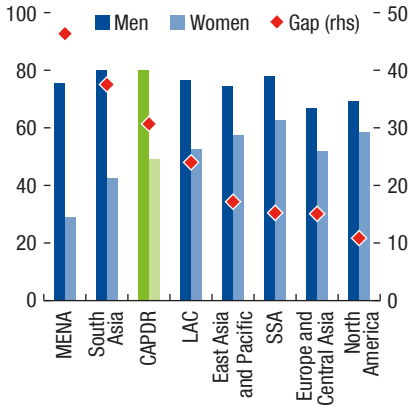
Another channel for the impact of female LFP on growth is through its effect on income inequality (IMF 2015). Adding to that, the unequal status of female workers in CAPDR countries puts them in a more vulnerable economic and social position than male workers. Higher female unemployment rates and a higher share of informal employment among working women exacerbate income inequality and raise the risk that women who do not have family support may fall into poverty. Raising female LFP should therefore be an important policy objective in CAPDR.

Based on analytical work by the same authors presented in IMF 2016a and IMF 2016b.

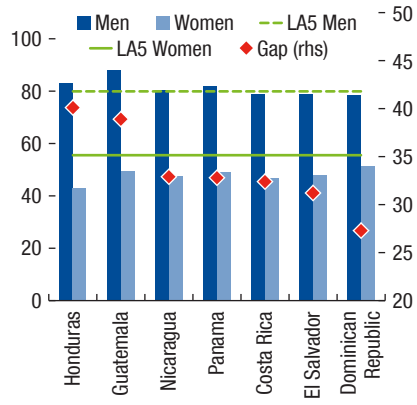
¹The female labor force participation rate is the proportion of the female population ages 15 and older that is economically active (i.e. that supplies labor for the production of goods and services) during a specified period.

Figure 3.1. Labor Force Participation, Unemployment, and Informal Employment Rates

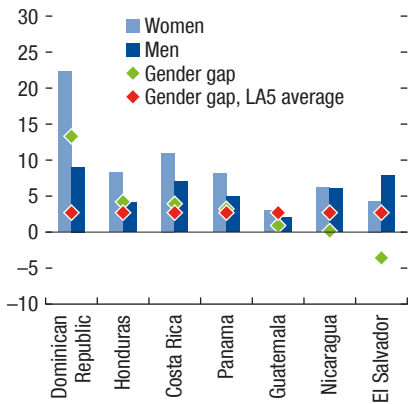
1. World Labor Force Participation Rates
(Percent of 15+ population, 2016)



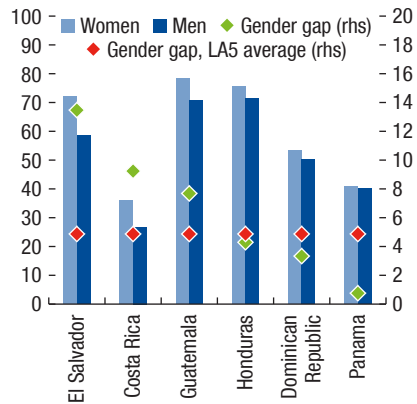
2. Central America Labor Force Participation Rates
(Percent of 15+ population, 2013)



3. Unemployment Rates¹
(Percent of 15+ population, 2017)



4. Informal Employment²
(Percent of total nonagricultural employment, 2013)



Source: World Bank.

Note: LA5 = Latin America 5; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SSA = sub-Saharan Africa.

For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

¹Modeled ILO estimates.

²Average share of informal employment in LA5 countries excludes Chile due to data availability.

Increased female participation in the labor force will be critical for improving growth potential and generating the inclusive growth needed to reduce entrenched poverty in many countries in the region. Higher female LFP will also be vital in helping to mitigate the impact of a shrinking workforce expected to result from demographic pressures in many countries (Chapter 8). A country's potential output is determined by the availability of physical and human capital, and by the state of technology supporting productive use of these resources. Availability of human capital in turn depends on demographic trends, the size of the labor market, and educational attainment.

To better understand the drivers of female participation in the labor forces of CAPDR and actions that could be taken to raise it, this chapter extracts the main determinants of low female LFP in CAPDR from analysis of household surveys and cross-country data. It also draws on lessons from other countries to identify policies needed to raise female LFP and potential growth in the region.

Main Drivers of Female LFP

Differences in income levels appear to be a primary factor in the female participation in the labor force in many countries. However, income does not explain everything. Large variations in female LFP rates exist even among upper-middle-income countries. Several countries in the world with similar GDP per capita as CAPDR countries have female LFP rates ranging from 20 percent to 80 percent. This suggests other drivers of female LFP are important too, such as fertility rates and education attainment. The economy's production structure is also relevant—for example, service-dominated structures are associated with higher female LFP (Bloom and others 2007, Klasen and Pieters 2015, Gaddis and Klasen 2014).

Income

Female LFP varies with per capita income. Low female LFP ratios in CAPDR are consistent with the region's middle-income status, according to the U-shaped relationship between the level of economic development (for example, GDP per capita) and female LFP rates found in the literature (Figure 3.2).² Women tend to work out of necessity in poor countries, mainly in subsistence agriculture or home-based production, and without social protection programs. With income growth, activity tends to shift from agriculture to industry, with jobs away from the home making it more difficult to juggle childcare and employment—especially with public childcare services typically limited at intermediate levels of economic development. Within households, as the husband's wage rises, there is a negative income effect on the supply of women's labor. With increasing social protection, women also find it easier to leave employment in favor of household work and childcare. Once wages for women start to rise, however, the substitution

²Goldin (1994).

effect increases incentives for women to increase their labor supply, until this effect tends to cancel out the negative effect of an increase in the husband's wages. At advanced economy income levels, LFP rebounds because of changes in other correlated factors, such as better education, lower fertility rates, access to labor-saving household technology, and the availability of market-based household services (IMF 2013).

Fertility

Significant differences between female LFP rates of women with and without children point to the importance of fertility rates in explaining female LFP. The difference tends to be particularly large for women of ages 20 to 40, which is also a prime age for the accumulation of employment experience. There is a similar difference between participation rates of married and unmarried women (Figure 3.2). Both of these trends have been extensively documented in the United States (for example, Attanasio and others 2008).

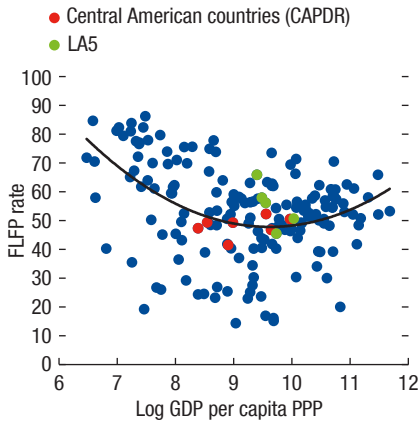
Education and Other Accessibility Factors

Educational gaps and other factors affecting accessibility to jobs are also key determinants of female LFP. Gender gaps in education can drive inequality of opportunity to access labor markets in emerging markets and low-income countries (Klasen and Lamanna 2009). Enrollment in secondary and tertiary education is much lower in CAPDR than in Latin America, with the sole exception of Costa Rica (Figure 3.2). Investments in infrastructure are also important as they reduce the costs and increase accessibility for working outside the home. For example, poor transport infrastructure dampens female LFP, as women living in areas with limited access to roads are less likely to be in the labor force. Access to electricity and water sources closer to home also frees up time for work outside the house and allows women to integrate into the formal economy (IMF 2015). Other factors identified in the literature as encouraging market access include the ease of internet access and efficiency and flexibility of labor market rules to allow matching of workers with jobs most suited to their skill sets. All of these factors are accounted for in the following analysis of female LFP based on cross-country data and microdata.

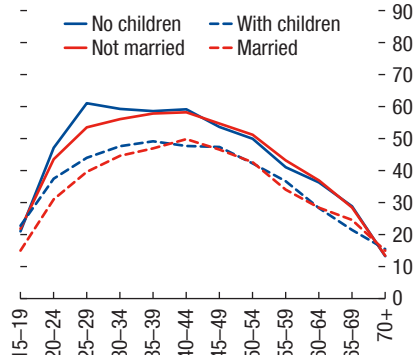
Cross-Country Evidence from Regression Analysis

Cross-country data help explain differences between the main drivers of female LFP in CAPDR and other countries. A panel is constructed for 184 countries from 1990–2016, mostly using World Development Indicators complemented by labor market efficiency data from the Global Competitiveness Report. The following regression is estimated following Bloom and others (2007):

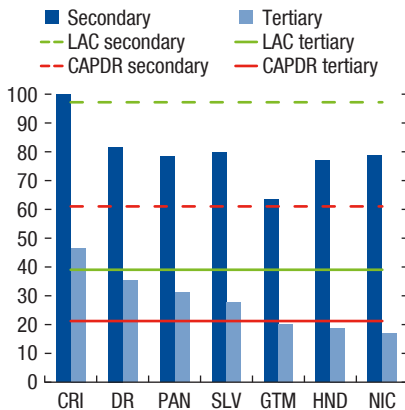
$$\begin{aligned}
 FLFP_{it} = & \alpha + \alpha_1 \log(GDPCapita_t) + \alpha_2 [\log(GDPCapita_t)]^2 + \beta_1 fertility_{it} \\
 & + \beta_2 internet_{it} + \beta_3 share\ female\ secondary\ edu_{it} \\
 & + \beta_4 share\ female\ tertiary\ edu_{it} + \beta_5 share\ male\ tertiary\ edu_{it} \\
 & + \beta_6 urban_{it} + \beta_7 labor\ market\ quality_{it} + \beta_8 investment_{it} + \delta_r \\
 & + \gamma_t + \mu_{it} + \varepsilon_{it}
 \end{aligned}$$

Figure 3.2. Female Labor Force Participation and Main Underlying Factors**1. Female Labor Force Participation, 2016**

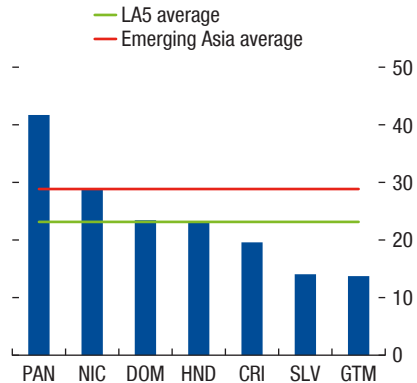
Sources: World Development Indicators and IMF staff calculations.

2. Female labor force participation by age groups, 2014
(Average rates for El Salvador, Guatemala, and Honduras, percent)

Sources: ENCOVI 2014, Encuesta Permanente de Hogares de Propósitos Múltiples 2016, Encuesta de Hogares de Propósitos Múltiples 2016, and IMF staff calculations.

3. School enrollment
(Percent of population in corresponding age group, latest year available)

Sources: World Development Indicators and IMF staff calculations.

4. Total investment, 2012–16
(Percent of GDP)

Sources: World Economic Outlook and IMF staff calculations.

Note: CRI = Costa Rica; DR = Dominican Republic; GTM = Guatemala; HND = Honduras; NIC = Nicaragua; PAN = Panama; SLV = El Salvador. LA5 = Latin America 5; PPP = purchasing power parity.

where $\log(GDPCapita_i)$ and $\log(GDPCapita_i)^2$ control for the countries' GDP per capita levels, $FLFP_{irt}$ is the female LFP rate for country i in region r at year t , $fertility_{it}$ is the fertility rate, and $internet_{it}$ is the number of internet users per 100 people. $share\ female\ secondary\ edu_{it}$, $share\ female\ tertiary\ edu_{it}$, and $share\ male\ tertiary\ edu_{it}$ are the ratios of total female (male) enrollment for secondary and tertiary education to the total female population (male population). $urban_{it}$ is the percentage of urban residents in the total population, $labor\ market\ quality_{it}$ is an indicator for labor market efficiency, and $investment_{it}$ is the log of investment in telecommunications and transportation with private participation.³ Dummies include the regional dummy δr , the year dummy δt , and the year-region dummy μrt . Error terms ε_{irt} are clustered at the country level.

Results are consistent with existing literature. Regression results are reported in Table 3.1. The polynomial of the log of GDP per capita is statistically significant and generates the well documented U-shaped relationship between female LFP and the level of economic development (Goldin 1994; Gaddis and Klasen 2014). Investments in transportation and telecommunications have positive and significant coefficients, as do coefficients on internet access, consistent with their expected positive impact on access to the job market. In the latter case, the effect is stronger when LFP of women under the age of 25 is considered, perhaps suggesting the importance of technology for younger cohorts. The share of female tertiary enrollment also has positive and significant coefficients, while that of male tertiary educational attainment is negative and statistically significant, in line with the expected impact of a husband's earning capacity on female LFP. Fertility rates, which serve as a proxy for the effect of children on women's decision to work, also have negative and marginally significant coefficients. Measures of labor market efficiency are positively and significantly related to LFP rates. Lastly, the share of urban residents has negative and marginally significant coefficients. Given the two contradictory intuitive effects of urbanization on female LFP, it appears that the need to commute, which may impair women's availability to work—when compared to rural areas where women work much closer to home—would offset increased access to services jobs markets, which tend to be larger employers of women and be located in urban areas.

Low female education attainment and limited investments in infrastructure appear the main factors behind low female LFP rates in CAPDR. Results from the cross-country panel show that inequality of opportunity driven by limited access to education for women and low investments in infrastructure needed to help access to job markets are the main drivers of the female LFP gap with the

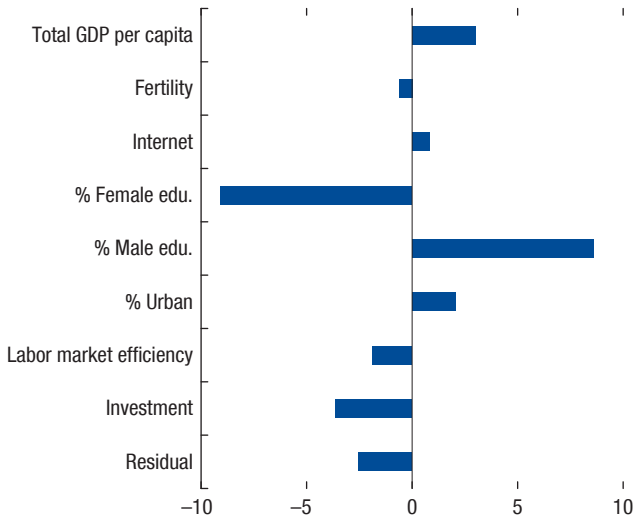
³Investment in telecoms with private participation is the value of telecom projects that have reached financial closure and directly or indirectly serve the public, including operation and management contracts with major capital expenditure, greenfield projects, and divestitures. Investment in transport with private participation is the value of transportation projects that have reached financial closure and directly or indirectly serve the public, including operation and management contracts with major capital expenditure, greenfield projects, and divestitures.

TABLE 3.1.

Cross-Country Regression Results								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variables	Independent variable: FLFP rate (FLFP rate for under age 25 in (6))							
Log GDP per capita	−46.918*** (11.909)	−52.519*** (13.460)	−54.902*** (11.701)	−55.646*** (11.391)	−69.790*** (12.611)	−66.596*** (14.006)	−92.947*** (19.612)	−113.19*** (32.321)
(Log GDP per capita) ²	2.511*** (0.641)	2.757*** (0.719)	2.845*** (0.619)	2.944*** (0.605)	3.638*** (0.672)	3.525*** (0.758)	4.623*** (0.987)	5.963*** (1.857)
Fertility rate per 100		−1.881 (1.282)	−1.949 (1.352)	−2.267* (1.368)	−2.171 (1.506)	−0.831 (1.728)	−0.695 (1.840)	−2.051 (1.955)
Internet users			0.077 (0.052)	0.096* (0.049)	0.110** (0.053)	0.317*** (0.077)	0.049 (0.066)	−0.071 (0.107)
Share of urban residents				−0.102* (0.060)	−0.116 (0.079)	−0.105 (0.090)	−0.135 (0.094)	−0.203 (0.132)
Share of female secondary education					0.023 (0.050)	0.003 (0.064)	0.086 (0.078)	0.039 (0.093)
Share of female tertiary education					0.182*** (0.061)	0.066 (0.101)	0.147** (0.066)	0.342** (0.146)
Share of male tertiary education					−0.228*** (0.071)	−0.127 (0.135)	−0.091 (0.06)	−0.416** (0.204)
Labor market efficiency							9.012*** (2.053)	9.424*** (2.499)
Invest in transportation and telecoms								1.461* (0.776)
Observation	4073	4069	3514	3514	1789	1789	592	303
R square	0.495	0.502	0.507	0.513	0.556	0.458	0.692	0.710

Figure 3.3. Contributions to Female Labor Force Participation between CAPDR and LA5

(Average of CAPDR country estimates, percent, latest year available)



Sources: World Development Indicators and IMF staff calculations.

LA5 shown in Figure 3.3⁴—LA5 comprises Brazil, Chile, Colombia, Mexico, and Peru—the five biggest economies in Latin America. While higher fertility rates and less efficient labor markets are other factors, their contributions to the female LFP gap with the LA5 are less significant, according to the regression results. All these factors offset the impact of men’s lower educational attainment relative to LA5 countries. This would contribute to higher female LFP rates in CAPDR than in LA5, given that families of less-educated husbands would struggle unless wives worked too.

EVIDENCE FROM MICRODATA

We use microdata from household surveys for selected CAPDR countries to estimate a model containing many of the drivers of female LFP identified in the literature. The following regression uses household surveys for Costa Rica, Guatemala, and Honduras:⁵

⁴The model’s estimated coefficients are used to explain the differences between female LFP between each CAPDR country and LA5, according to the model.

⁵Based on Costa Rica’s 2012 *Encuesta Nacional de Hogares* (ENAHOG), Guatemala’s 2014 *Encuesta Nacional de Condiciones de Vida* (ENCOVI), and Honduras’ 2016 *Encuesta Permanente de Hogares de Propósitos Múltiples* (EPHMP).

$$\begin{aligned}
 FLFP_{irt} = & \alpha + \beta_1 \text{prim_second_edu}_i + \beta_2 \text{second_tertiary_edu}_i \\
 & + \beta_3 \text{more_than_tertiary_edu}_i + \beta_4 \text{urban}_i + \beta_5 \text{married}_i + \beta_6 \text{age}_i \\
 & + \beta_7 (\text{age}_i)^2 + \beta_8 \text{cell_phone}_i + \beta_9 \text{computer}_i + \beta_{10} \text{kid_0 to 6}_i \\
 & + \beta_{11} \text{kid_6 to 12}_i + \beta_{12} \text{old_more than 70}_i \\
 & + \beta_{13} \log(\text{head income})_i + \gamma_r + \varepsilon_{ir}
 \end{aligned}$$

Here *prim_second_edu*_{*i*}, *second_tertiary_edu*_{*i*}, and *more_than_tertiary_edu*_{*i*} are dummy variables for the woman *i*'s final educational attainment, and *urban*_{*i*}, *married*_{*i*}, *cell phone*_{*i*}, and *computer*_{*i*} are dummy variables for the location of the household in an urban area, the household being a married couple, and having a cellphone. *kid_0 to 6*_{*i*}, *kid_6 to 12*_{*i*}, and *old_more than 70*_{*i*} are equal to one if a household has a member in these categories, respectively. $\log(\text{head income})_i$ is the log of income of a household head. Regional fixed effects are also included.

Microdata confirm that education, marital status, fertility, and informational and physical accessibility to job markets are important factors. The regression results for the three countries covered are reported in Table 3.2. The results show the usual “hump-shaped” relationship between female LFP rates across the life cycle with the age terms being significant and with the expected signs. Educational attainment is positively related to participation rates. Ownership of cellphones and computers and living in an urban area are positively and significantly associated with higher female LFP—these results signal the importance of having information about job opportunities and an ability to reach workplaces, showing the more positive effect of urbanization relative to results from the cross-country analysis. Being married is shown as having a negative and significant association with female LFP—the differences reach nearly 15 percentage points from ages 20 to 40. The presence of young children and elderly people in the household are also related to lower participation, though insignificantly for the latter. Lastly, attesting to the wealth effect in household labor supply, the higher the income of the household head the lower the female LFP rate—this is consistent with the negative impact of male educational attainment on female LFP found in the cross-country analysis.

POLICY RECOMMENDATIONS

Public policies can support the long-term process of increasing female LFP. Increasing female LFP is likely to take place naturally over the long term as countries develop further and fertility rates fall. At the same time, based on experience in other countries, a range of policies could help accelerate the increase. This will require creating fiscal space to accommodate expenditure in priority areas.

Based on evidence on the drivers of female LFP obtained from the analysis, a range of policy measures would help boost female LFP in Central America, Panama, and the Dominican Republic. Among them, policies are needed to improve access and raise educational attainment. In addition to increases in over-all education spending, policymakers should consider making greater use of cash transfers that are conditional on families sending all children to school.

TABLE 3.2a

Costa Rica: Regression Results using Microdata						
Dependent variable	All women			All married women		
	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables:	Dummy on labor force participation					
Less than secondary	0.202*** (0.019)	0.059*** (0.018)	0.090*** (0.021)	−0.019 (0.030)	−0.027 (0.033)	−0.030 (0.038)
Less than university	0.283*** (0.019)	0.104*** (0.019)	0.140*** (0.022)	0.038 (0.031)	0.025 (0.034)	0.051 (0.040)
University and more	0.509*** (0.020)	0.278*** (0.021)	0.289*** (0.024)	0.271*** (0.034)	0.263*** (0.037)	0.302*** (0.043)
Age		0.036*** (0.001)	0.065*** (0.002)	0.016*** (0.002)	0.025*** (0.003)	0.024*** (0.004)
(Age) ²		−0.0004*** (0.00001)	−0.001*** (0.00002)	−.0002*** (0.00002)	−.0004*** (0.00004)	−.0004*** (0.00005)
Cellphone		0.035** (0.016)	0.050** (0.019)	0.003 (0.027)	0.017 (0.031)	0.036 (0.038)
Computer		0.014 (0.009)	0.006 (0.009)	0.061*** (0.014)	0.049*** (0.014)	0.074*** (0.016)
Urban		0.054*** (0.008)	0.058*** (0.008)	0.057*** (0.013)	0.060*** (0.013)	0.063*** (0.014)
Married		−0.120*** (0.008)	−0.157*** (0.009)			
With children 0–6			−0.005 (0.009)		−0.097*** (0.014)	−0.104*** (0.015)
With children 6–12			−0.055*** (0.009)		−0.058*** (0.013)	−0.061*** (0.014)
With seniors 70+			−0.027* (0.014)		−0.018 (0.026)	−0.051 (0.035)
Log head income						−0.044*** (0.008)
# obs.	15,256	15,251	14,164	6,454	6,162	5,344
Region FEs	Yes	Yes	Yes	Yes	Yes	Yes

Increasing investments in infrastructure and information technology would help reduce the costs of working outside the home and help job-seekers. Boosting the quality of infrastructure in rural areas in particular—for example by making clean water more accessible and improving transportation systems—can reduce the time women spend on domestic tasks and facilitate their access to labor markets (IMF 2013).

Policies to increase women's access to finance can also be important. The availability of microfinance has been found to help reduce the gender productivity gap in many low-income countries. A credit line targeting women in rural areas helped increase women's credit share in rural development financing programs in Brazil in the early 2000s (IMF 2015).

TABLE 3.2b

Guatemala: Regression Results using Microdata						
Variables	All women			All married women		
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy on labor force participation						
Less than Secondary	0.055*** (0.007)	0.033*** (0.008)	0.031*** (0.008)	0.057*** (0.010)	0.038*** (0.011)	0.035*** (0.011)
Less than University	0.164*** (0.011)	0.103*** (0.013)	0.100*** (0.013)	0.170*** (0.019)	0.114*** (0.020)	0.117*** (0.021)
University and more	0.281*** (0.020)	0.174*** (0.021)	0.169*** (0.021)	0.311*** (0.034)	0.237*** (0.034)	0.243*** (0.035)
Age		0.019*** (0.001)	0.019*** (0.001)		0.018*** (0.002)	0.016*** (0.002)
Age ²		−0.000*** (0.000)	−0.000*** (0.000)		−0.000*** (0.000)	−0.000*** (0.000)
Cellphone		0.083*** (0.007)	0.083*** (0.007)		0.058*** (0.010)	0.056*** (0.010)
Urban		0.093*** (0.007)	0.092*** (0.007)		0.095*** (0.011)	0.096*** (0.011)
Married		−0.076*** (0.008)	−0.070*** (0.008)			
With children 0–6			−0.036*** (0.007)			−0.043*** (0.011)
With children 6–12			0.009 (0.007)			0.003 (0.010)
With seniors 70+			0.022** (0.011)			−0.005 (0.018)
Log head income						−0.006* (0.003)
Observations	17,718	17,718	17,718	8,396	8,396	8,128
R-squared	0.041	0.092	0.094	0.035	0.072	0.074

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

Increasing the efficiency of labor markets, including by ensuring that wage-setting procedures reflect the productivity of employees, would help boost access to the job market for women with limited education. Family-friendly policies, such as providing childcare facilities and parental leave, would also help support this process as countries in the region continue to develop.

In more advanced economies, tax credits for low-wage earners, and individual—rather than family—income taxation have also helped boost female LFP by reducing the tax burden for (predominantly female) secondary earners. These policies can also help in Central America, Panama, and the Dominican Republic.

TABLE 3.2c

Honduras: Regression Results using Microdata						
Variables	All women			All married women		
	(1)	(2)	(3)	(4)	(5)	(6)
	Dummy on labor force participation					
Less than Secondary	0.159*** (0.017)	0.049*** (0.017)	0.049*** (0.017)	0.142*** (0.036)	0.057 (0.037)	0.103** (0.044)
Less than University	0.315*** (0.019)	0.171*** (0.021)	0.167*** (0.021)	0.259*** (0.042)	0.136*** (0.045)	0.185*** (0.054)
University and more	0.179*** (0.019)	0.063*** (0.021)	0.049** (0.022)	0.346*** (0.044)	0.220*** (0.047)	0.288*** (0.056)
Age		0.026*** (0.001)	0.026*** (0.001)		0.018*** (0.004)	0.026*** (0.005)
Age ²		−0.000*** (0.000)	−0.000*** (0.000)		−0.000*** (0.000)	−0.000*** (0.000)
Cellphone		0.139*** (0.012)	0.137*** (0.012)		0.143*** (0.025)	0.148*** (0.029)
Urban		0.066*** (0.011)	0.064*** (0.011)		0.000 (0.025)	0.015 (0.028)
Married		−0.079*** (0.013)	−0.077*** (0.013)			
With children 0–6			−0.052*** (0.010)			−0.040 (0.025)
With children 6–12			0.002 (0.010)			−0.041* (0.024)
With seniors 70+			0.014 (0.014)			0.012 (0.044)
Log head income						−0.030*** (0.011)
Observations	9,615	9,615	9,615	2,184	2,184	1,737
R-squared	0.033	0.104	0.106	0.049	0.088	0.090

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

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Migration and Remittances

KIMBERLY BEATON, METODIJ HADZI-VASKOV, AND BOGDAN LISSOVOLIK

INTRODUCTION

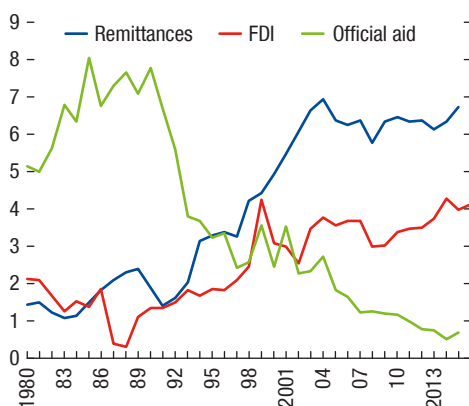
Outward migration has been an important phenomenon for Central American economies. Emigrants account for almost 10 percent of the population for the seven nations in the CAPDR region. That compares with an average of 2 percent for emerging market and developing economies and 5 percent for countries in the wider Latin America and the Caribbean overall. Emigrants remit substantial funds, averaging about 8 percent of CAPDR's GDP, to support family members back home. Remittances are now the most important external flow for Central America. Foreign direct investment and official aid pale in comparison (Figure 4.1).

Given the importance of migration and remittances, this chapter examines their recent trends and costs and benefits to the countries in CAPDR. It focuses on three questions: Does the loss in population associated with emigration hurt economic growth? Do remittances compensate for this and function as engines of growth? Are remittances macroeconomic stabilizers? The analysis, largely based on the work of Beaton and others (2017), offers three key messages:

- CAPDR emigrants are quite different from other Latin American emigrants in that their emigration has been almost exclusively in a South-North direction, primarily to the United States and historically fueled by civil wars and political instability, besides the search for better economic opportunities abroad.
- The negative effect of emigration on CAPDR's economic growth through the reduction in labor supply has been offset by the gains from remittances (through investment, education, and other commercial links).
- Remittances have played an important role in stabilizing CAPDR's macroeconomic development. As the region's most important source of external financing, remittances have provided resources to help adjust to economic shocks (such as natural disasters) and have boosted the fiscal space and financial sector soundness.

This chapter is based on work by K. Beaton, S. Cerovic, M. Gladamez, M. Hadzi-Vaskov, F. Loyola, Z. Koczan, B. Lissovolik, J.K. Martijn, Y. Ustyugova, and J. Wong. For further details, see Beaton and others (2017).

Figure 4.1. Central America: Remittances and Other Inflows
(Percent of GDP)



Sources: World Bank World Development Indicators, IMF Balance of Payments (BOP) Statistics and *World Economic Outlook*.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. FDI = foreign direct investment.

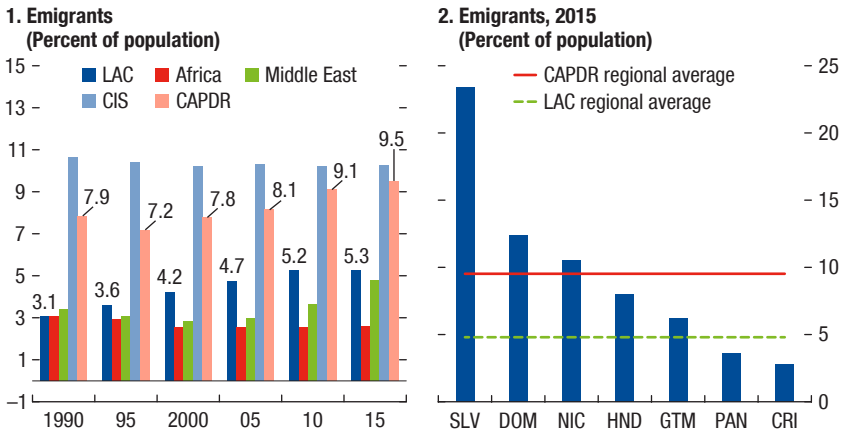
MIGRATION AND REMITTANCES AT A GLANCE

The Emigration Experience

Emigration has been very important for CAPDR countries over the past decades. In the 1980s, civil wars, political instability, and the search for better economic opportunities abroad propelled a wave of emigration, particularly from the Northern Triangle. While conflicts subsided in the early 1990s, the deterioration in the security situation, prolonged political and economic instability, family reunification, and natural disasters drove another emigration wave in the 1990s and early 2000s.¹ When Nicaragua, Honduras, and El Salvador suffered natural disasters in the late 1990s and early 2000s, immigrants from these countries in the United States were granted temporary protected status, contributing substantially to the flow.² By 2005, the stock of CAPDR emigrants was equivalent

¹There is evidence of family reunification for emigrants into the United States from CAPDR. Calculations based on data on LAC immigrants in the United States from the 2008 American Community Survey suggest that the proportion of households in which the head is married but the head's spouse is absent declines with the age of the head of household. See Beaton and others (2017).

²Honduras and Nicaragua first received TPS designation on January 5, 1999 on environmental disaster grounds, while El Salvador was granted TPS on March 9, 2001.

Figure 4.2. Central America Emigrants

Sources: United Nations Population Division; and IMF staff calculations.

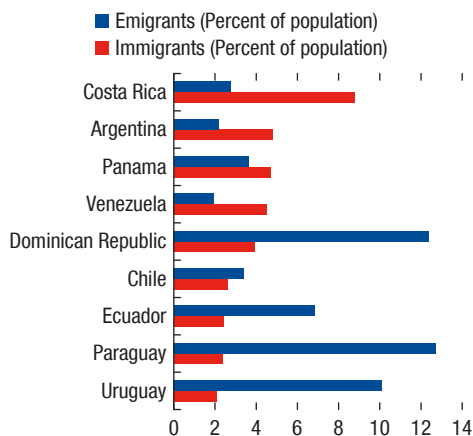
Note: CIS = Commonwealth of Independent States; LAC = Latin America and the Caribbean. Data labels in figure use International Organization for Standardization (ISO) country codes. For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

to about 8 percent of the region's population and had risen to just under 10 percent by 2015. While the stock of emigrants from the whole Latin American and the Caribbean (LAC) region is among the highest of world regions, at about 5 percent of the population, it is still much lower than that for CAPDR (Figure 4.2). Across CAPDR countries, there are important differences in the stock of emigrants: the number of Salvadoran emigrants, estimated at 24 percent of El Salvador's population in 2015, dwarfs that of other CAPDR countries.

Emigration from CAPDR has predominantly featured South-North migration to the United States. For the region as a whole about four-fifths of emigrants settle in the United States (compared to nearly all Mexican and about half of Caribbean emigrants). Intraregional migration is also prominent (Figure 4.3). For example, just under half of emigrants from Nicaragua reside in Costa Rica. Within CAPDR, Panama and the Dominican Republic have also received important inward migrant flows.

Who are these emigrants? Data from the American Community Survey provide a profile of CAPDR emigrants to the United States (Figure 4.4). Immigrants in the United States from CAPDR tend to have had less education than immigrants from the Caribbean and South America: about a quarter of CAPDR immigrants have a college education versus about two-thirds of Caribbean immigrants and one-half of South American immigrants. These differences are reflected in the occupations of CAPDR immigrants. Whereas immigrants from the Caribbean and South America tend to be employed in higher-skilled occupations

Figure 4.3. Latin American Countries with Significant Immigration and Emigration



Sources: United Nations Population Division and IMF staff calculations.

(office and administration, sales, management, and health), those from CAPDR tend to work in lower-skilled jobs (construction, maintenance, transportation, production, and food preparation). CAPDR immigrants also earn less: their hourly wages average about two-thirds of those of immigrants from the Caribbean and South America (Figure 4.4, panel d). Immigrants from CAPDR, like those from Mexico, are also more likely to be undocumented, and much less likely to become US citizens than those from the Caribbean and South America.³

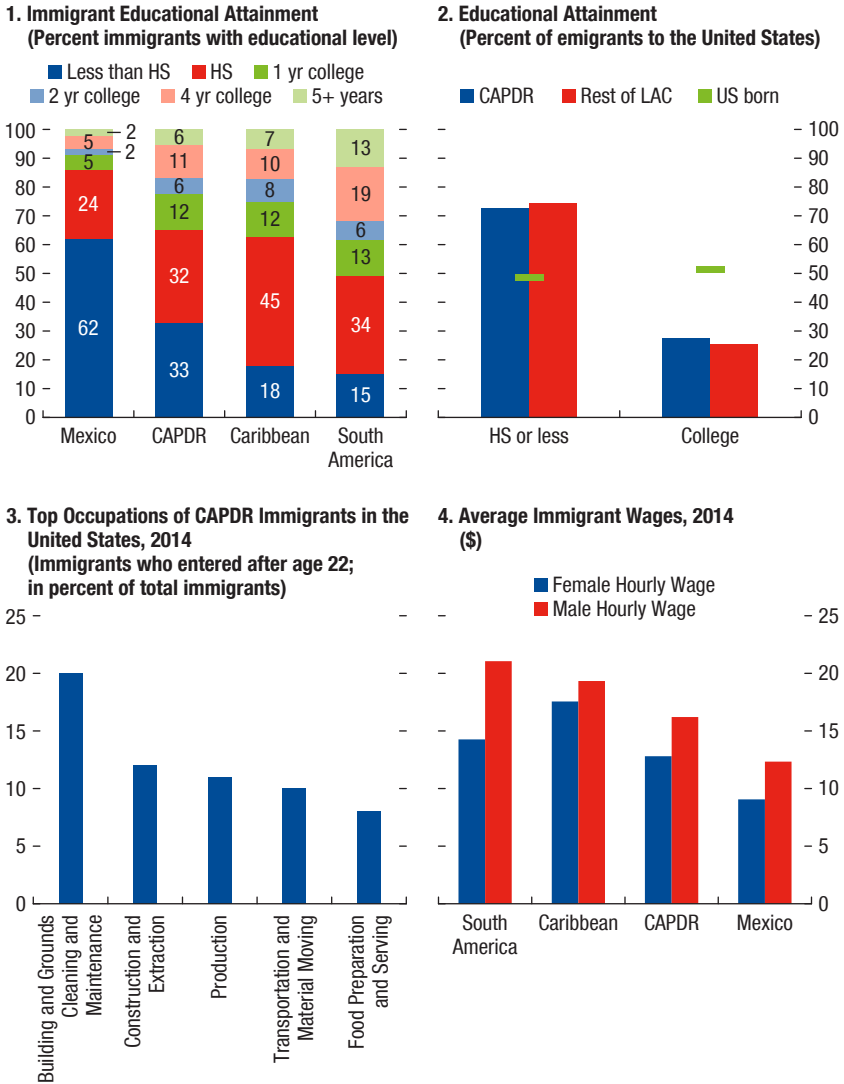
Sizable Remittances

CAPDR emigrants have maintained strong connections with their home countries, sending home sizable remittances. Remittances reached 8 percent of regional output in 2016 (Figure 4.5). As a share of GDP, remittance flows to CAPDR countries are much larger than those to most other regions. In El Salvador and Honduras, remittances exceed 17 percent of GDP.

Remittances to CAPDR grew rapidly from the mid-1990s and peaked at 10 percent of regional output before the 2008 global financial crisis. With CAPDR emigrants primarily in the epicenter of the crisis—the United States—remittances fell dramatically during and in the years after. The slump was more precipitous than in other parts of the world and in other parts of LAC with more diversified emigrant destinations like the Caribbean. Why? It was because the industries in which CAPDR emigrants have traditionally been employed in the United States, such as construction and building maintenance, were those in

³For more detail, see Beaton and others (2017).

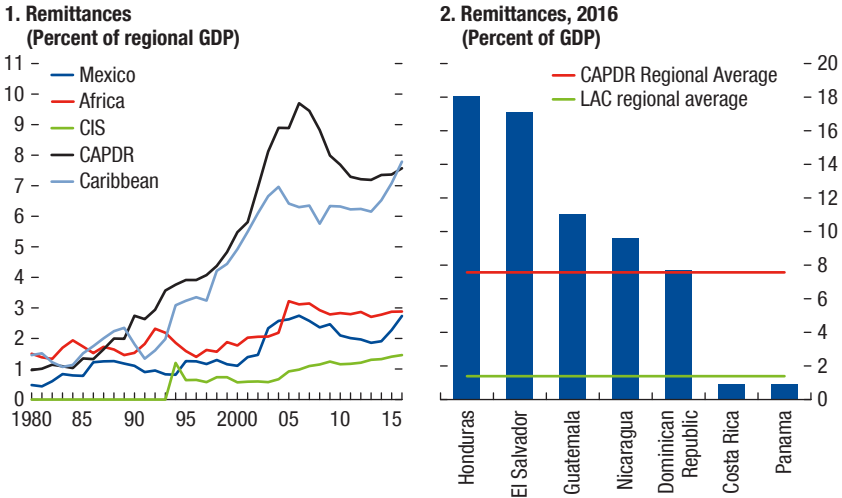
Figure 4.4. Central American Emigrants' Educational Attainment, Occupations, and Wages



Sources: 2008 American Community Survey; Beaton and others (2017).

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. CAPDR = Central America, Panama, and the Dominican Republic; HS = high school.

Figure 4.5. Remittances to Central America



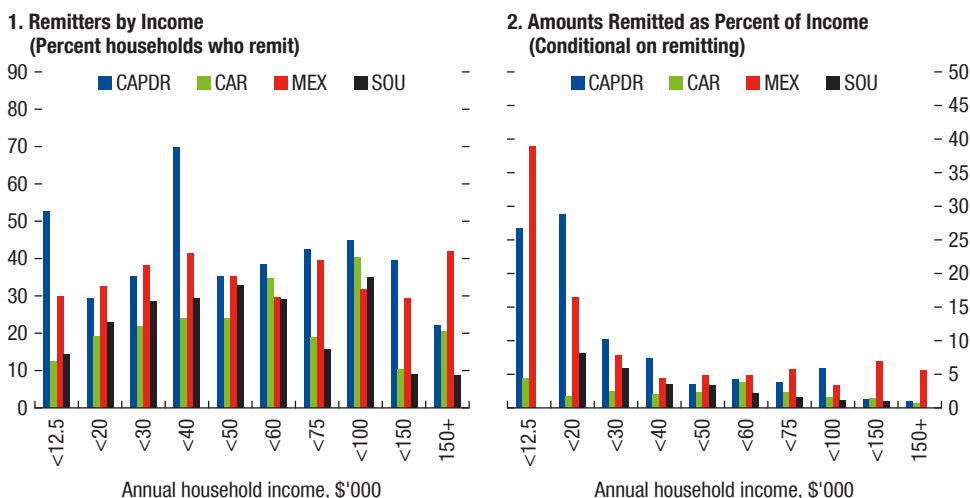
Sources: World Bank and IMF World Economic Outlook.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. CAPDR = Central America, Panama, and the Dominican Republic; CIS = Commonwealth of Independent States; LAC = Latin America and the Caribbean.

which the output loss was concentrated. Emigrants were affected through job loss and lower wages, which limited the funds they were able to send to their families. Remittances have risen gradually in the decade since. However, despite a recent acceleration that may be linked to developments in immigration policy in the United States, they remain below the peak reached before the crisis.

CAPDR emigrants to the United States tend to remit more than other Latin American emigrants (Figure 4.6). More than 40 percent of CAPDR households remit, compared to only one-quarter of Caribbean households. CAPDR immigrants also remit more of their income on average, regardless of the size of their incomes, than Caribbean and South American immigrants. A potential driver for these differences is the fact that CAPDR immigrants tend to leave behind families at home when they emigrate, while Caribbean and South American emigrants tend to migrate with their families. For instance, Honduran emigrants may be sending relatively more remittances than Salvadoran emigrants because, on average, they have spent less time in the host country and maintain stronger connections with families at home.

CAPDR benefits from a lower cost of transferring remittances than the rest of LAC, particularly the Caribbean (Figure 4.7). The cost of sending remittances to CAPDR is, on average, 5 percent, significantly lower than for the LAC region

Figure 4.6. Remittance Senders in the United States

Sources: 2008 American Community Survey and IMF staff estimates.

Note: CAPDR = Central America, Panama and the Dominican Republic; CAR = Caribbean; MEX = Mexico; SOU = South America.

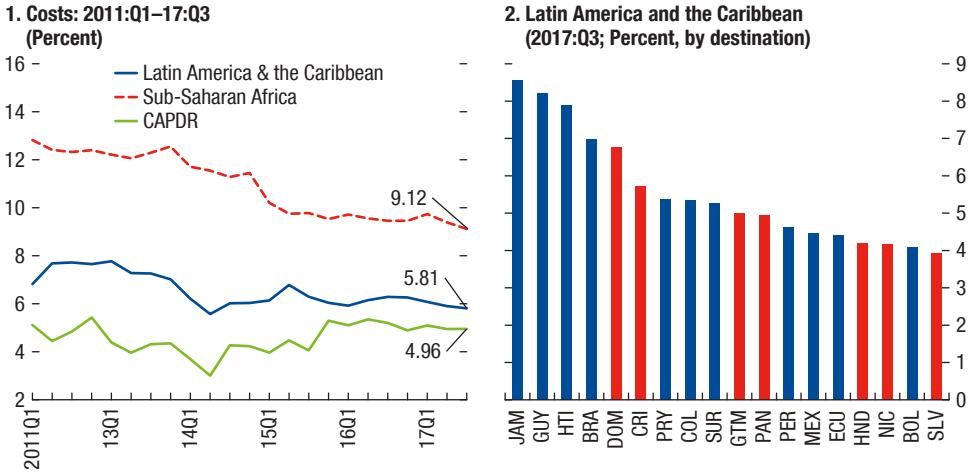
(5.8 percent) and the global average (7.2 percent). Countries within CAPDR that receive the most remittances, like dollarized economies, tend to benefit from a lower cost of remittances.⁴ Costs have declined significantly over the past few decades—for example, by about 40 percent for flows to El Salvador and Guatemala over 2001–15 (Orozco, Porras, and Yansura 2016). However, the decline has been less impressive than in sub-Saharan Africa, where the use of mobile money has lowered the cost dramatically. Banks are the most expensive channel for sending remittances, at 11 percent, followed by money transfer operators at 6.1 percent; mobile remittance service providers are a low-cost option, at about 5.2 percent, although they are not as widely available as traditional channels.

The cost of remitting has recently come under upward pressure from the global withdrawal of correspondent banking relationships, even though some of these effects have been dampened by new technologies in regions such as Africa.⁵ The withdrawal of global banks from correspondent banking has disproportionately affected money transfer operators, given their greater challenges in meeting stringent standards for anti-money laundering and combating the financing of

⁴The cost of sending remittances includes a transaction fee and a currency conversion fee. Dollarization eliminates the currency conversion portion of the cost.

⁵A correspondent banking relationship is a bilateral arrangement between banks with one bank (the correspondent) providing services to another bank (the respondent). These arrangements are normally cross-border in nature involving multiple currencies.

Figure 4.7. Cost of Sending \$200 in Remittances



Source: World Bank, Remittances Prices Worldwide.

Note: CAPDR = Central America, Panama, and the Dominican Republic; JAM = Jamaica; GUY = Guyana; HTI = Haiti; BRA = Brazil; DOM = Dominican Republic; CRI = Costa Rica; PRY = Paraguay; COL = Colombia; SUR = Suriname; GTM = Guatemala; PAN = Panama; PER = Peru; MEX = Mexico; ECU = Ecuador; HND = Honduras; NIC = Nicaragua; BOL = Bolivia; SLV = El Salvador.

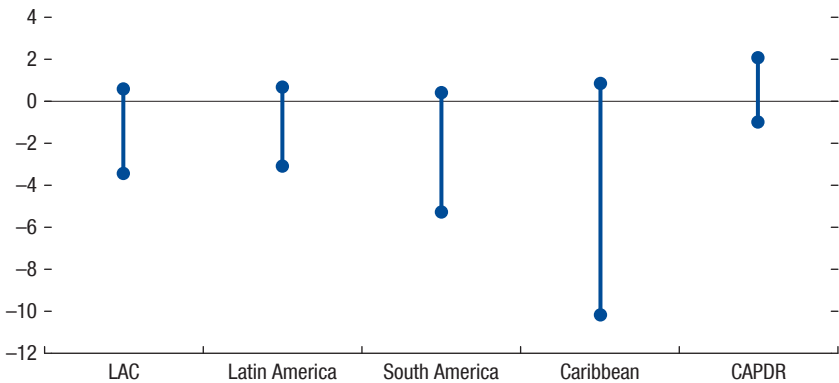
terrorism. According to a World Bank survey, global banks have closed correspondent bank accounts of money transfer operators, particularly smaller ones, on a widespread basis, curtailing their ability to send remittances (World Bank 2015). Local banks in some countries and regions have also faced challenges in maintaining their correspondent banking relationships. To date, these pressures appear to have been contained in CAPDR, with banks in these countries maintaining stable correspondent banking relationships. However, 60 percent of *Asociación de Supervisores Bancarios de las Américas* (Association of Supervisors of Banks in the Americas) members have reported that remittances to LAC have been affected by global trends in correspondent banking relationships.

ESTIMATING IMPACTS ON GROWTH

Given the prevalence of outward migration from and high remittance inflows to CAPDR, a key question is whether the net effects benefit the home country. In theory, emigration and remittances can have opposite effects on growth. On the one hand, outward migration is likely to lower growth in migrants' origin countries as the departure of working-age people reduces the labor force.⁶ This could be amplified if emigration is concentrated in highly skilled workers, leading to

⁶While this is likely to be true on an aggregate level, it is not necessarily true for per capita growth as it depends on the relative productivity of migrants.

Figure 4.8. Net Effect of Migration and Remittances on GDP Growth, 2003–13
(Percent of GDP)



Source: Beaton and others (2017).

Note: CAPDR = Central America, Panama, and the Dominican Republic; LAC = Latin America and the Caribbean.

“brain drain” that reduces average productivity and limits the scope for innovation. Remittances may also restrict economic growth because they generate higher reservation wages as workers substitute labor income with the remittances they receive, leading to a decline in labor supply. On the other hand, remittances could fuel economic activity by providing financing for expenditure not easily funded by alternative sources. For example, remittances could facilitate physical and human capital accumulation by relaxing the tight financing constraints on investment and education that households and firms in emerging and developing countries commonly face.

Empirical analysis confirms the mixed results. Figure 4.8 presents the potential range of the estimated net cumulative joint impact of outward migration and remittances on growth for LAC groups over 2003–13.⁷ In line with the theoretical arguments highlighted above, the empirical analysis implies that the joint impact on growth is highly uncertain. In general, outward migration has a negative effect on growth, which is offset a little by the positive impact of remittances.⁸ While the joint impact for most groups is more likely to be negative, it seems more likely to be positive for the CAPDR region. Two factors likely contribute:

⁷The range of estimates is based on coefficient estimates from country-specific fixed effects and instrumental variables regressions to mitigate estimation challenges posed by two-way causality between migration or remittances and economic performance. See Beaton and others (2017) for a detailed explanation.

⁸Beaton and others (2017) presents detailed results about the impact of both migration and remittances on growth for the various country groups. Joint estimates in Figure 4.8 are based on these results.

(1) the relatively higher level of remittances received in CAPDR (Figure 4.5), and (2) the concentration of CAPDR migrants in low-skilled work compared to other regions (Figure 4.4), which suggests that brain drain is likely to be more limited for CAPDR. In contrast, the more noticeable negative joint effect in the Caribbean likely reflects the deeper brain drain experienced by many Caribbean islands. In sum, the results suggest that the CAPDR region could have gained as much 2 percent of GDP in cumulative growth over a decade because of the joint effect of remittance inflows and outward migration.

THE STABILIZING ROLE OF REMITTANCES

Over and above their stimulus to economic growth, remittances could stabilize macroeconomic conditions given that these flows have been the largest and most reliable source of external financing for CAPDR. Empirical analysis suggests that remittances have helped the region to cushion shocks by increasing fiscal revenues and supporting financial sector stability with little evidence of possible “Dutch disease effects” (Table 4.1). In a region vulnerable to natural disasters, remittances also appear to respond to them, increasing when a natural disaster hits as seen in Figure 4.9.

Remittances can help smooth consumption in the home country as emigrants send more money home to cushion economic shocks. For example, remittances increase when a natural disaster hits the remittance-recipient country, helping cushion the negative impact on its population (Figure 4.9). For CAPDR this effect is more pronounced than for South America or emerging markets in general, though somewhat less important than for the Caribbean, likely reflecting the magnitude of damage such events cause in the islands.

Remittances can also support stabilization through the fiscal accounts by raising revenue. While remittances typically are not taxed directly, remittances-supported consumption is part of the base for indirect taxation.⁹ Furthermore, remittances tend to support short-term output growth (at least in CAPDR) and, therefore, fiscal revenues. The associated increase in fiscal space, in turn, enhances

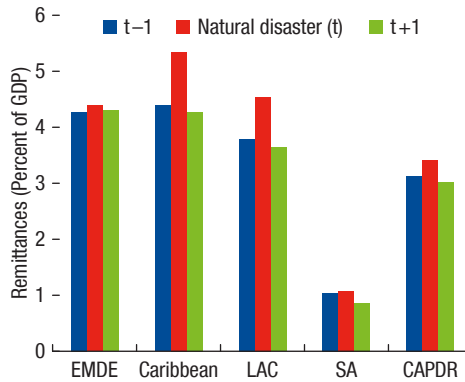
TABLE 4.1.

Macro-stabilizing Effect of Remittances		
Effect on:	Priors	Results
Fiscal revenues	+	Yes. Significant for CAPDR and Caribbean.
Real exchange rate	+ (appreciation)	Results generally insignificant and not strong.
Inflation	+	Yes. Significant for Caribbean and CAPDR.

Source: IMF staff calculations.
 Note: CAPDR = Central America, Panama, and the Dominican Republic.

⁹The few countries that put taxes on remittances directly later repealed them. Examples include Vietnam, Tajikistan, and the Philippines. See Ratha (2017).

Figure 4.9. Remittances and Natural Disasters
(Percent)



Sources: Emergency Events Database and IMF staff calculations.

Note: EMDE = emerging market and developing economies; LAC = Latin America and the Caribbean; SA = South America; CAPDR = Central America, Panama, and the Dominican Republic.

the scope for stabilization through countercyclical fiscal policy. Empirical estimates suggest these effects are particularly relevant for CAPDR countries given their remittance inflows are large in relation to the size of their economies.¹⁰ For CAPDR, a 1 percentage point increase in the remittance-to-GDP ratio is associated with a 0.4 percentage point increase in the revenue-to-GDP ratio. Country-by-country regressions also confirm this positive relationship, with the impact of a 1 percentage point increase in the remittance-to-GDP ratio ranging from 0.2 to 0.8 percentage point.^{11,12} By contrast, remittances are not estimated

¹⁰The main equation estimated with instrumental variables is $y_{it} = \alpha_i + \beta X_{it} + \gamma Z_{it}$ where the dependent variable, y_{it} , is the revenue/GDP ratio, α_i are country fixed effects, X_{it} a vector of exogenous variables that includes the level of real GDP per capita, US real GDP growth, FDI as a share of GDP, the stock of emigrants as a share of the home population, and the share of the rural population, and Z_{it} is a vector of endogenous variables that includes remittances as a share of GDP and real per capita GDP growth, instrumented using regional averages, unemployment in the destination countries, and terms-of-trade changes. See Beaton and others (2017) for further details.

¹¹Country-by-country regressions were estimated with higher-frequency monthly and quarterly data to better pick up the nuances of specific countries, important given the heterogeneity across CAPDR in the extent of remittances received (for example, Panama and Costa Rica receive smaller remittance inflows than other countries of the region). Country-by-country regressions were not estimated for Panama and Costa Rica given data gaps.

¹²Strictly speaking, elasticities are not computed the same way in the regional panel and individual country time series regressions due to the different unit measurement of the two sets of

to have a significant effect on revenue in most other regions of the world (particularly those that receive smaller remittance inflows). These estimates imply that, for example, the increase in the remittance-to-GDP ratio since 2000 in CAPDR accounted for a cumulative increase in fiscal revenue of 1 percent of GDP. Country regressions for CAPDR also suggest that the short-term effect of remittances on fiscal revenue is somewhat larger than the long-term effect, which is consistent with findings in Beaton and others (2017). In CAPDR higher remittances have also been associated with higher expenditures and insignificant effects on fiscal balances. This suggests that the revenue generated by remittances has helped create scope for the region's additional spending.¹³

The robust growth of remittances in recent years has occurred alongside significant financial deepening. In this regard, remittances and financial sector development have interacted in a complex way. On one hand, financial sector advances have helped lower costs and facilitated an increase in remittances, and their transmission through formal channels. On the other hand, remittances have profoundly affected the financial sector, by altering bank business models in many countries and helping boost credit to the private sector.¹⁴

Remittances may also affect credit quality and financial stability. In theory, their impact on credit quality is ambiguous. While they can fuel excessive private credit growth, which can worsen credit quality, remittances can strengthen borrowers' balance sheets and incomes—and hence their capacity to repay loans. Since remittances are relatively stable and can serve as collateral, other things equal, this decreases the riskiness of loans. Remittances can also help banks better know and discriminate among their clients, as banks often observe some of the remittance flows. Empirical estimates indicate that the positive effect of remittances on credit quality dominates, and is significant for CAPDR countries.¹⁵ Higher remittances are associated with lower nonperforming loans (NPLs). Based on the results in this chapter, a 1 percentage point increase in the remittances-to-GDP

regressions (and the different time periods). In this respect, the two measures of elasticities would be equivalent when revenue/GDP ratios are the same as remittance/GDP ratios. Incidentally, these ratios are very similar in El Salvador and Guatemala, indicating that the estimated “time series” coefficients of 0.4–0.5 for these two countries are comparable to the 0.4 elasticity under the panel regression for CAPDR.

¹³See Beaton and others (2017) for further details.

¹⁴For example, securitization of remittance inflows is a common feature of bank business models in countries receiving significant remittances, and in LAC countries was used in practice in Brazil, El Salvador, and Mexico among others (see World Bank 2015).

¹⁵The main equation estimated with instrumental variables is $y_{it} = \alpha_i + \beta X_{it} + \gamma Z_{it}$ where the dependent is the NPL ratio, exogenous determinants, X_{it} , include the level of real GDP per capita, real GDP growth in the United States, foreign direct investment as a share of GDP, the stock of emigrants as a share of the home population, and the share of the rural population, endogenous determinants, Z_{it} , include remittances as a share of GDP, real per capita GDP growth, export growth, and a measure of country risk. Endogenous variables are instrumented using their regional averages, unemployment in the destination countries, and terms-of-trade percentage changes. For additional details see Beaton and others (2017).

ratio for CAPDR would cause the NPL ratio to drop by almost 0.5 percentage point.¹⁶ It follows that the increase in the remittances-to-GDP ratio since 2000 has contributed to the area's NPL ratio falling by 1 percentage point.

Although remittances support stability through the above channels, the benefits may be counteracted by risks to competitiveness. Remittance inflows boost household spending, which in turn puts pressure on nontradables prices and interest rates, leading to real exchange rate appreciation.¹⁷ The existing economic literature typically finds that remittances tend to appreciate the real exchange rate, though some studies do not detect such an effect or find it to be very small (Amuedo-Dorantes and Pozo 2004; Fajnzylber and Lopez 2008; Hassan and Holmes 2013; Izquierdo and Montiel 2006; Barajas and others 2010). The empirical analysis of Beaton and others (2017) points to a small but significant decline in the impact of remittances on the real effective exchange rate (REER) in CAPDR.^{18,19} A 1 percentage point increase in the remittances-to-GDP ratio is associated with a 6 percent appreciation of the REER based on estimates over 1980–2015 and 3.6 percent appreciation over 1995–2015. Incidentally, the effect of remittances on REER is insignificant in other LAC subgroupings. This reflects large leakages of remittance inflows through imports given the small size and relatively high openness of many countries.

An inflationary effect of remittances is one of the theoretical priors in the literature. This conclusion partly derives from the Dutch-disease effects, whereby the remittance-induced appreciation of the real exchange rate occurs by way of rising domestic prices. The extent of the effect would however depend on the exchange rate regime, with inflation effects in the fixed exchange-rate regimes likely to be particularly pronounced, because of an absence of a shock absorber that could adjust the relative prices between tradables and nontradables sectors more quickly.²⁰ Results from Beaton and others (2017) confirm the existence of

¹⁶The magnitude of the latter effect is similar to that found by Ebeke and others (2014) for a larger cross-country grouping.

¹⁷However, Barajas and others (2012) explain how such an effect on the equilibrium REER depends critically on degree of openness, factor mobility between domestic sectors, the cyclicity of remittances, the share of consumption in tradables, and the sensitivity of a country's risk premium to remittance flows.

¹⁸Remittances may affect external competitiveness through their impact on wages in the recipient economies, as noted in IMF (2016). However, the lack of cross-country wage data prevents us from investigating this complementary channel, and limits our analysis of external competitiveness to the CPI-based REER only.

¹⁹The main equation estimated with fixed effects is $y_{it} = \alpha_i + \beta X_{it}$, where the dependent is the REER (in log form). In addition to the remittances-to-GDP ratio, the set of controls includes: the external terms of trade; exports of goods and services (in percent of GDP); foreign direct investments (in percent of GDP); real GDP growth; government spending (in percent of GDP); and the US interest rate. See Beaton and others (2017) for additional details.

²⁰Several other theoretical frameworks (cost-based pressures, consumption-induced excess demand, and monetary expansion) are consistent with the inflationary effects of remittances (Narayan and others 2011).

some remittance-induced inflation pressures for CAPDR countries as the lagged change in the remittances-to-GDP ratio is found to be associated with somewhat higher inflation.²¹ The results may be consistent with the prevalence of fixed or stabilized exchange rate regimes and limited credibility of monetary frameworks in many countries in these regions. That said, Beaton and others (2017) do not find a clear effect of a fixed exchange rate regime influencing the results.

THE PERILS OF DEPENDENCE ON REMITTANCES

Extensive reliance on remittances can be risky, especially when most migrants reside in a single country—like CAPDR's migrants concentrated in the United States. If a negative economic shock hits a host country and propels unemployment among migrant workers, a drop in remittances will amplify the negative spillovers to the home countries. Thus, for CAPDR emigrants, large shifts in the US economic cycle and policies could have far-reaching repercussions for the region.

Such repercussions occurred during the global financial crisis of 2007–09, when a 5½ percentage point rise in Hispanic unemployment in the United States was followed by a decline in remittances, with detrimental effects on incomes, external positions, and fiscal revenues in some CAPDR countries, particularly the Northern Triangle economies (Figure 4.10). CAPDR remittances as a share of GDP declined by more than 1 percentage point over the global financial crisis. Econometric estimates attribute most of this drop to the rise in Hispanic unemployment in the United States (Beaton and others 2017). The ratio of fiscal revenue to GDP also fell by more than 1 percentage point in 2008–10 compared with 2007, with about half of this decline explained by the contraction in remittance flows (Beaton and others 2017).

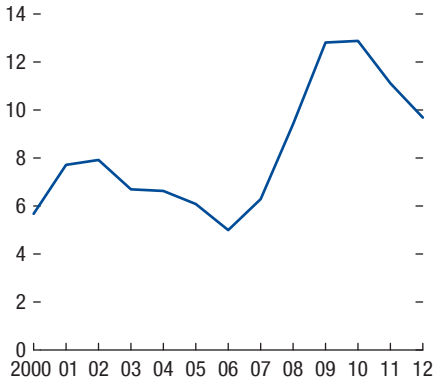
Shocks of a noneconomic nature, including major shifts in immigration, can also have important economic consequences for the recipient countries. There are three main channels through which shifts in US immigration policy affect CAPDR countries. First, a tighter deportation policy may have a particularly important effect on CAPDR, from which about two-thirds of US immigrants were estimated to be unauthorized in 2015.²² Second, the end of temporary protected status (TPS) for Salvadorans, Hondurans, and Nicaraguans will affect

²¹The main equation estimated with instrumental variables is $y_{it} = \alpha_i + \beta X_{it} + \gamma Z_{it}$ where the dependent variable is inflation, measured as the CPI-based inflation rate. The vector of exogenous variables, X_{it} , includes the level of real GDP per capita, US real GDP growth, foreign direct investment as a share of GDP, the stock of emigrants as a share of the home population, and share of the rural population (and the endogenous variables, Z_{it} , include remittances as a share of GDP (or a lagged change in remittance/GDP ratio), real per capita GDP growth, export growth, and a measure of country risk. Endogenous variables are instrumented using their regional averages, unemployment in the destination countries, and terms-of-trade percentage changes. See Beaton and others (2017) for details.

²²The United States has significantly scaled up deportations over the past decade—totaling 3.7 million over 2005–15. Deportations peaked at 434,000 in 2013 and have declined since as prosecutorial guidelines refocused on those deemed to pose threats to national security, border

Figure 4.10. US Hispanic Unemployment and Impact on Remittances, 2007–10
(Percent)

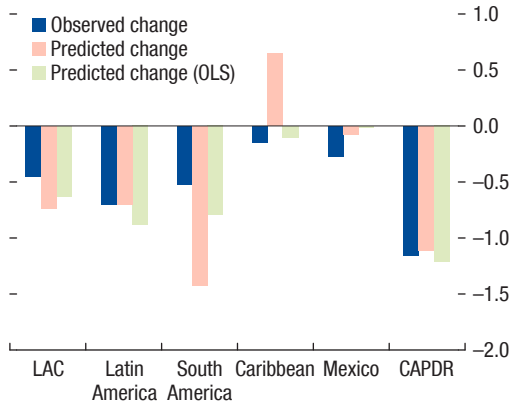
1. Hispanic Unemployment in the United States during the Global Financial Crisis



Source: Bureau of Labor Statistics.

Note: Hispanic unemployment rate in the United States, period average.

2. Effects of the Increase in US Hispanic Unemployment on Remittances in LAC, 2008–10 Relative to 2007



Source: Beaton and others (2017).

Note: Predicted change in remittances based on region-specific coefficients on US Hispanic unemployment and a 5.4 percentage point change in unemployment (2008–10 relative to 2007). Lighter shaded bars are not statistically significant at the 10 percent level. LAC = Latin America and the Caribbean; CAPDR = Central America, Panama, and the Dominican Republic.

an estimated 200,000 Salvadorans, 90,000 Hondurans, and about 5,000 Nicaraguans and their families in the United States, contributing to an anticipated surge in return migration. Revocations have set terminations of TPS at January 5, 2019, for Nicaragua, September 9, 2019, for El Salvador, and January 5, 2020, for Honduras.²³ Third, a continued political stalemate on the future of the Deferred Action for Childhood Arrivals (DACA) program, which was rescinded by President Trump in September 2017 but reinstated for existing beneficiaries in February 2018 following federal court orders would leave in flux the status of almost 70,000 undocumented immigrants from the Northern Triangle who entered the United States as children.²⁴

security, and public safety. However, the Trump administration has taken a tougher stance on deportations, and the recent decline is expected to reverse.

²³The chapter was drafted in 2018:H1 and may not fully reflect recent developments in US immigration policy.

²⁴US immigrants from other CAPDR countries also benefit from DACA, but the number of DACA recipients from other CAPDR countries is significantly smaller than those from the Northern Triangle.

Quantifying the impact on home countries of a surge in return migration is subject to much uncertainty. Intensification of recent trends in deportations would likely reduce per capita GDP of CAPDR countries. The magnitude would depend on the skills composition of returning migrants and their integration into labor markets, the degree of average wage differentials with the United States, and effects on confidence and country risk premiums. For example, if return migrants are predominantly low-skilled, the impact on growth would likely be negative, but the return of high-skilled workers would be positive. On balance, the empirical estimates presented above suggest that the impact on CAPDR would be unequivocally negative. Using estimates from the empirical work to quantify the potential effect implicitly assumes that the effects of past migration apply in a symmetric manner to abrupt return migration and hence, that a significant share of the returning migrants would be employed in their home countries. The actual effects could be more negative, given the disruptive nature of a sudden increase in return migration, if economic conditions do not facilitate the absorption of these migrants into the labor force. Any increase in deportations, driven by any of the three factors mentioned above, would also propagate existing social challenges (for example, poverty and crime—see Chapter 6), particularly in the Northern Triangle.

CONCLUSIONS AND POLICY PRIORITIES

Policies should aim to tilt the balance of the range of adverse and beneficial effects of emigration and remittances on CAPDR in a favorable direction. Remittances merit policy support given their key financing and stabilizing role for the region.

Policy measures should focus on reducing the cost of remittances and facilitating formal intermediation. Given recent challenges to correspondent banking relationships, strengthening anti-money laundering/combating the financing of terrorism frameworks can help improve the regulatory environment and keep formal financial channels open. Development and enhancement of payments systems (including through new solutions like mobile money) would help to foster competition for remittances service providers and lower the cost of remittances.

At the same time, policy support should help control risks arising from the region's large dependence on remittances, including through measures that enhance financial sector resilience to volatility and potential sudden stops of remittances. Improvements in the business environment and strong institutions can help raise productivity and limit incentives for outward migration. Effective policies to improve the security situation, particularly in the Northern Triangle, will also be critical.

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Trade Integration: Taking Stock

KIMBERLY BEATON, XIAODAN DING, METODIJ HADZI-VASKOV, AND ROSALIND MOWATT

INTRODUCTION

Central America, Panama, and the Dominican Republic (CAPDR) has pursued trade integration as a pillar of its overall growth strategy.¹ The region is well integrated into global markets and its countries have continued efforts to promote trade, including through new trade agreements. However, as protectionist sentiment has risen in recent years, particularly in some advanced economies, the finger of blame has been pointed at trade and globalization for widening income inequality and impeding inclusive economic growth. The shift in attitudes about trading raises a question: What potential does CAPDR have to build on its position in global markets? Some stock-taking and exploration of the opportunities for trade integration and an assessment of the relationship between trade and economic growth in the region may go a significant way to providing the answer.

This chapter begins by investigating trade flows and their composition in a global context, looking at how the region's economies are integrated in value chains—in global markets and with countries in the broader region that are at similar levels of development. The export baskets of CAPDR countries are also compared. To shed light on factors that have shaped the region's integration and may increase potential for further movement in that direction, the determinants of trade and its composition are explored. Consideration is then given to how CAPDR trade policies may be changed to optimize the growth benefits. A policy overview, based on responses to a new survey of country officials, may foster a deeper understanding of trade strategies. That shows opportunities for where trade integration can support the priorities highlighted by empirical work.

The authors would like to thank Valerie Cerra for her guidance with this work. This chapter is based on IMF (2017) with the analysis updated and extended to CAPDR.

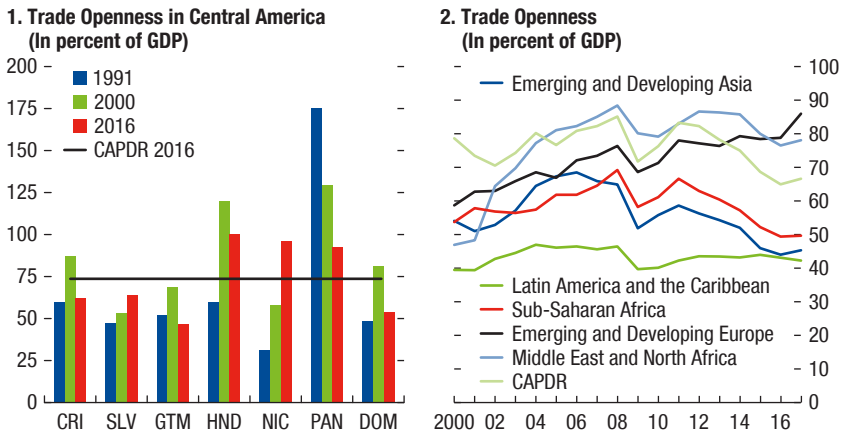
¹For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

TRADE INTEGRATION IN CAPDR IN THE GLOBAL CONTEXT

CAPDR is well integrated into global markets (Figure 5.1). CAPDR's trade openness, the most widely used measure of trade integration—and defined as the sum of exports and imports—represented about 74 percent of regional GDP in 2016, broadly consistent with other emerging market economies. Within the region, Honduras, Nicaragua, and Panama are the most integrated economies, while El Salvador and Guatemala are relatively less integrated. CAPDR's integration has increased over time, particularly as the region liberalized trade in the 1990s, but integration, as measured by trade openness, has either stabilized or declined slightly in many of its countries.

CAPDR's integration into global markets can be partially linked to efforts to expand its network of trade agreements (Figure 5.2). The number of trade agreements including emerging market and developing economies has significantly increased since the late 1990s.² Broadly in line with this trend, CAPDR countries began expanding trade agreements in the early 2000s and have continued with varying intensity. CAPDR countries now account for roughly half of the trade agreements involving countries in Latin America and the Caribbean (LAC) that have been notified at the World Trade Organization. With over 40 percent of the region's exports destined for the United States, the most notable agreement for the

Figure 5.1. Central America Trade Openness in Global Context



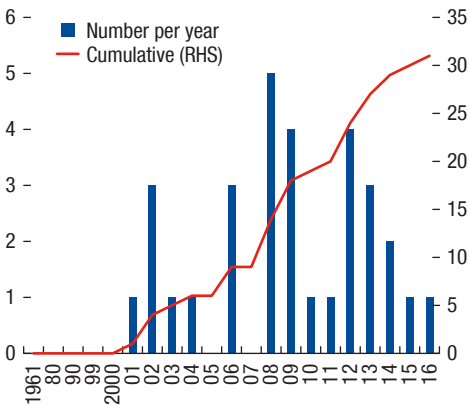
Source: IMF *World Economic Outlook*.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

²Besides stemming from the transition from centrally planned to market economies, this development also reflects a more general change of trade policy orientation toward export-led growth.

Figure 5.2. Central American Trade Agreements

(Number and date of entry)

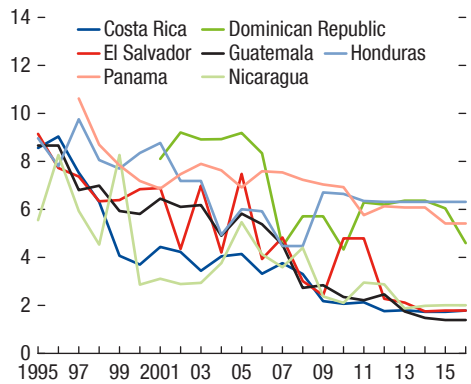


Sources: World Trade Organization and IMF staff calculations.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Figure 5.3. Weighted Average Tariffs in Central America

(In percent)



Sources: World Bank's WITS database and author calculations.

Note: Effectively Applied Weighted Average Tariff (in percent). The average of tariffs' weights by their corresponding trade value figures. For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

region is the Dominican Republic-Central America Free Trade Agreement (CAFTA-DR) with the United States.³ CAFTA-DR was signed in 2004 and took effect in 2006 as the first free trade agreement between the United States and Central America. It was aimed at expanding trade in goods and services, increasing investment opportunities, and promoting intellectual property rights.⁴

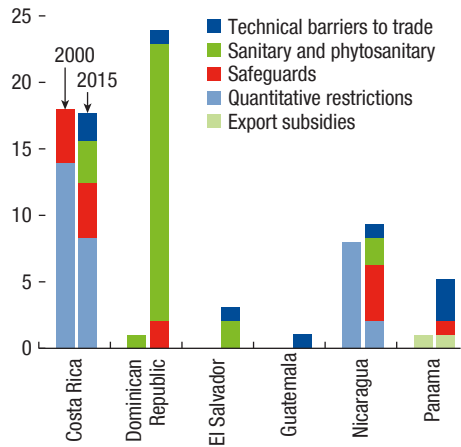
Overall, increased policy-based trade integration has expanded CAPDR's network of trade opportunities significantly and set the basis for deeper cooperation across areas such as investment, public procurement, and services. In parallel, trade liberalization has lowered the cost of trade: average import tariffs have declined markedly since the early 1990s, particularly in the Northern Triangle countries (Figure 5.3).

Despite the move to strengthen integration through trade agreements and the decline in tariffs, the use of nontariff barriers has increased (Figure 5.4). The rise in trade protectionism through nontariff barriers as a global phenomenon is reflected in CAPDR, although by less than in the broader region. Most countries

³Members include Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Dominican Republic.

⁴CAFTA-DR entered into force in 2006 for the United States, El Salvador, Honduras, Nicaragua and Guatemala, in 2007 for the Dominican Republic, and in 2009 for Costa Rica.

Figure 5.4. Central America Non-tariff Trade Barriers
(Number)



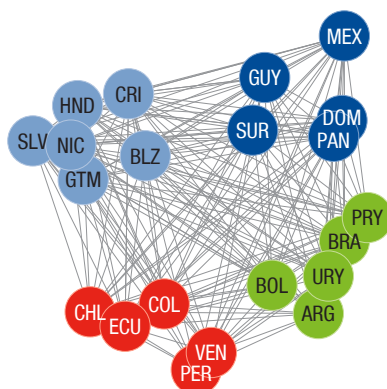
Sources: World Trade Organization, Integrated Trade Intelligence Portal (I-TIP) and IMF staff estimates.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

in the region have introduced nontariff measures that may hurt cross-border trade. Trade restrictions introduced by CAPDR countries are concentrated in sanitary and phytosanitary measures, technical barriers to trade, and various safeguards provisions. Costa Rica is the exception, where the use of nontariff barriers has remained relatively constant.

CAPDR's trade is dominated by interregional rather than intraregional trade. Over 70 percent of CAPDR's exports are destined for markets outside the region. This feature of the region's pattern of trade integration is comparable to other emerging market and developing economies. The United States is by far the most important destination for the region's exports. El Salvador, Guatemala, and Honduras are the most important intraregional destinations for exports. The Dominican Republic exports notably little to its regional counterparts. While intraregional trade remains low, CAPDR's trade within Latin America and the Caribbean has clustered around its CAPDR trading partners (Figure 5.5). Other trading clusters in the wider region are shaped by the main subregional trade agreements (Mercosur, Andean Community). Within Latin America and the Caribbean, there is no clear trading hub comparable to China in Asia or Germany in Europe, countries that form the center of their regional value chains, importing from within the region and exporting to global markets (IMF 2015). Instead, the United States is a much more pronounced hub for regional trade than any of the large LAC economies (Figure 5.6).

Figure 5.5. Regional Trade Clusters in Latin America and the Caribbean



Source: The trade cluster report IMF (2017).

Note: ARG = Argentina; BLZ = Belize; BRA = Brazil; BOL = Bolivia; CHL = Chile; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; GTM = Guatemala; GUY = Guyana; HND = Honduras; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PER = Peru; PRY = Paraguay; SLV = El Salvador; SUR = Suriname; URY = Uruguay; VEN = Venezuela.

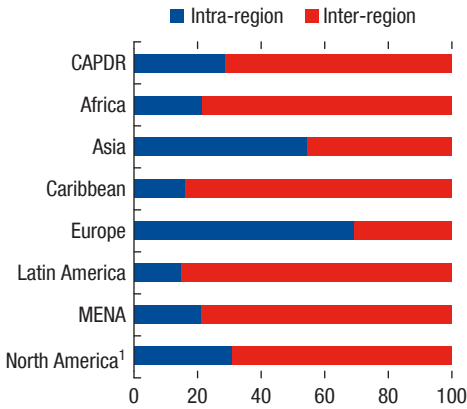
CAPDR firms have integrated into global value chains (GVCs), but are less integrated into production networks than other emerging markets. Over the past few decades, global production has become increasingly fragmented across countries. This has led to the development of GVCs or networks of the production stages of manufactured goods and services across borders. Insertion into GVCs offers greater opportunity for countries to benefit from learning and technology spillovers and enhance productivity. In particular, the intra-industry trade that characterizes participation in GVCs encourages producers to upgrade product quality, including by building on the foreign technologies to which they are exposed through trade (Baldwin and Yan 2014; de la Torre, Lederman, and Pienknagura 2015). As with the broader region, CAPDR countries have not been as successful at integrating into GVCs as other regions of emerging markets.⁵

While their overall participation remains weaker than other regions, CAPDR firms do take part in GVCs (Figure 5.7), particularly at the final stages of production. Due in part to their geographical location, CAPDR firms tend to

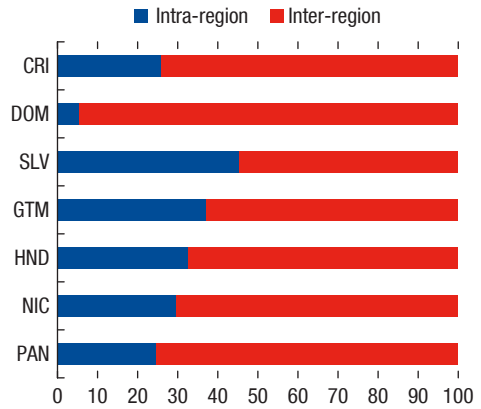
⁵Participation in GVCs is measured as the sum of a country's foreign value added in gross exports and indirect value added (the value of exported goods that are used as imported inputs by other countries to produce their exports) calculated using the Eora Multi Region Input Output (MRIO Table), as shown in Lensen, Kanemoto, Moran, and Geschke 2012, and Lenzen, Moran, Kanemoto, and Geschke 2013, based on Koopman, Wang, and Wei's decomposition of gross exports published in 2010.

Figure 5.6. Central American Trade Integration, 2015

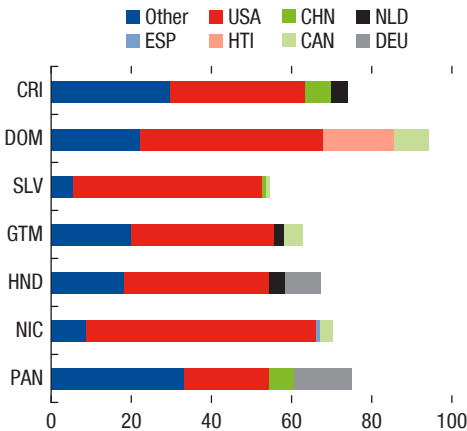
**1. Regional Export Shares
(Percent of total exports)**



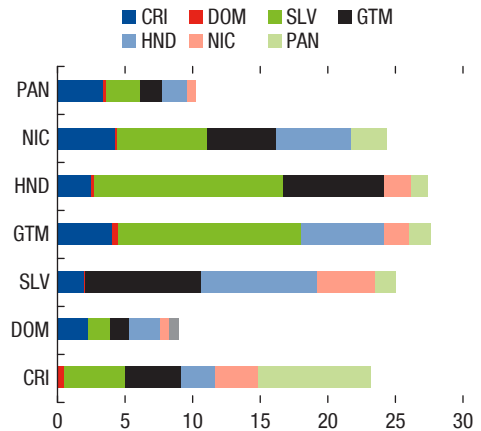
**2. CAPDR: Regional Export Shares
(Percent of total exports)**



**3. CAPDR: Interregional Export Shares
(Percent of total exports)**

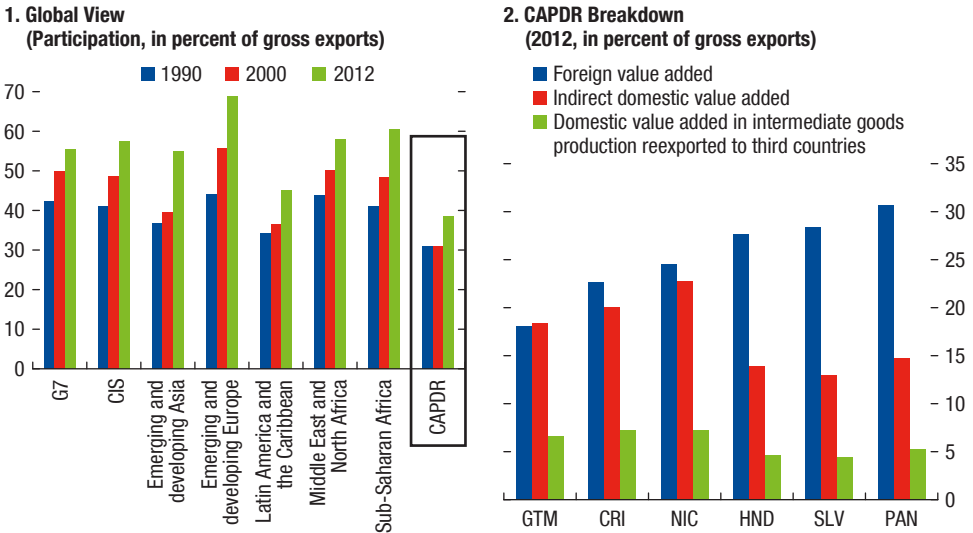


**4. CAPDR: Intraregional Export Shares
(Percent of total exports)**



Sources: IMF Direction of Trade Statistics database and author calculations.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. In panel 3, for each Latin American and Caribbean country, the top three interregional export markets are shown separately. All other interregional export markets are included in other. CAPDR = Central America, Panama, and the Dominican Republic; CAN = Canada; CHN = China; CRI = Costa Rica; DEU = Germany; DOM = Dominican Republic; ESP = Spain; GTM = Guatemala; HND = Honduras; HTI = Haiti; NIC = Nicaragua; NLD = Netherlands; PAN = Panama; SLV = El Salvador; USA = United States.

Figure 5.7. Central America in Global Value Chains

Sources: Eora multi-region input-output table (MRIO); and author calculations.

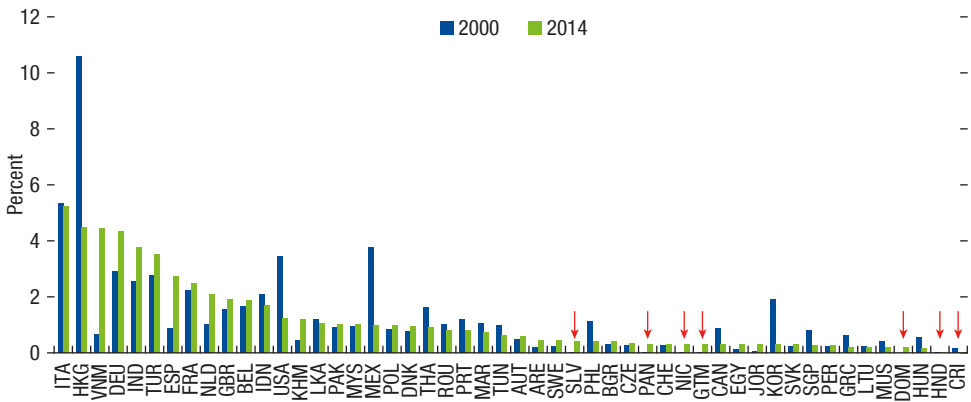
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

participate in production networks with North American firms. Participation in final production stages is captured by the higher share of foreign value added in their gross exports, which reflects a more downstream role in GVCs as they import intermediate goods to assemble and export final production. By this measure, Panama, El Salvador, and Honduras are the CAPDR countries most integrated into GVCs. The *maquilas* (subcontractors) of El Salvador and Honduras that specialize in textiles are good examples of CAPDR's role in this process as is the repacking and reexporting activity in Panama's Colon Free Zone. CAPDR countries' participation in the upstream part of production, measured by the value of exported goods that other countries use as imported inputs to produce their exports (indirect value added) is more limited. However, Nicaragua, Costa Rica, and Guatemala have had more success than other countries in the region at integrating in this earlier stage of the production process. A final feature of CAPDR's integration into GVCs is that they tend to participate in relatively simple production networks, consistent with lower complexity of the goods under production in the region's GVCs. The simplicity of production networks is captured by the domestic value added in intermediate goods production that is reexported to third countries (Koopman and others 2014).

Consistent with CAPDR's participation in GVCs in the downstream part of the production process, the region has specialized in the production and supply

Figure 5.8. Market Share in Apparel Sector

(Share measured as total apparel export over world average, excluding bottom 65 percent of countries and China)



Sources: Comtrade and IMF staff estimates.

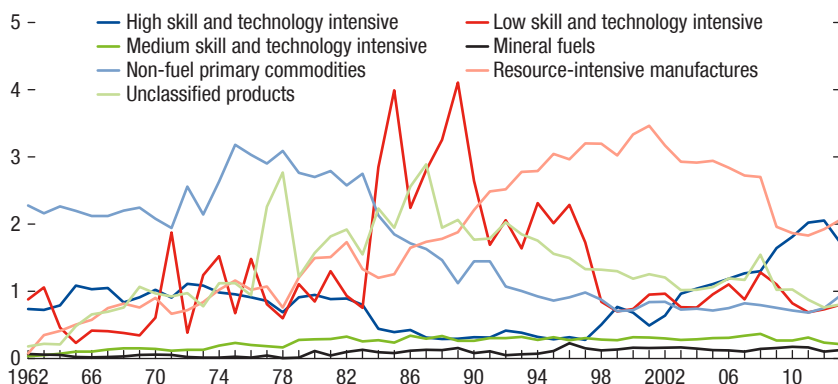
Note: ARE = United Arab Emirates; AUT = Austria; BEL = Belgium; BGR = Bulgaria; CAN = Canada; CHE = Switzerland; CRI = Costa Rica; CZE = Czech Republic; DEU = Germany; DNK = Denmark; DOM = Dominican Republic; EGY = Egypt; ESP = Spain; FRA = France; GBR = United Kingdom; GRC = Greece; GTM = Guatemala; HKG = Hong Kong SAR; HND = Honduras; HUN = Hungary; IDN = Indonesia; IND = India; ITA = Italy; JOR = Jordan; KHM = Cambodia; KOR = Rep. of Korea; LKA = Sri Lanka; LTU = Lithuania; MAR = Morocco; MEX = Mexico; MUS = Mauritius; MYS = Malaysia; NIC = Nicaragua; NLD = Netherlands; PAK = Pakistan; PAN = Panama; PER = Peru; PHL = Philippines; POL = Poland; PRT = Portugal; ROU = Romania; SGP = Singapore; SLV = El Salvador; SVK = Slovak Republic; SWE = Sweden; THA = Thailand; TUN = Tunisia; TUR = Turkey; USA = United States; VNM = Vietnam.

of low-skill and labor-intensive manufacturing goods. This is evident in its rising share of global apparel exports over the past 15 years, even as China and other Asian economies continue to dominate this market (Figure 5.8). Most CAPDR countries are ranked in the top 35 percent of apparel exporters globally, well above the wider regional average, despite being small economies. Their central role in the apparel industry reflects the concentration of production activity in the *maquilas* special economic zones in this sector (see the next section).

THE COMPOSITION OF TRADE

CAPDR's export baskets have developed consistently with comparative advantage, as shown by the region's revealed comparative advantage (RCA). This key indicator of export composition and performance compares the share of a product in a country's total exports with the share of that product's world exports in the global exports of all products.⁶ The region has established RCA in resource-intensive manufacturing products since the 1980s after experiencing a

⁶RCA shows the relative advantage or disadvantage that a country (or group of countries) has in exporting a certain good (or group of products). It is measured here with the RCA index by Balassa (1965) that divides the share of a certain good in a country's total exports by the share of that

Figure 5.9. Central America: Revealed Comparative Advantage

Sources: UN COMTRADE and IMF staff calculations.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. Products grouped according to UNCTAD classification of skill and technology intensity.

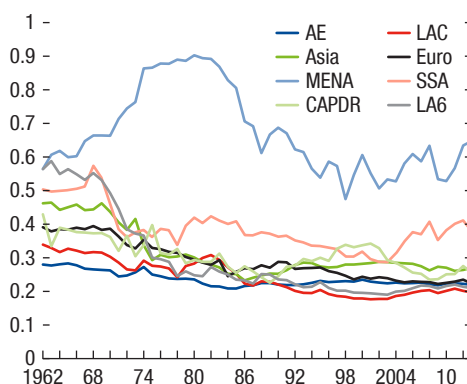
jump in the RCA of low-skill and technology-intensive manufacturing products in the 1980s (Figure 5.9).⁷ This evolution likely reflects the increased importance of the *maquila* sector for the region. Export-oriented production commonly located in *maquila* special economic zones has been concentrated in low-skill and technology-intensive as well as resource-intensive manufacturing products like textiles, footwear, tobacco, and simple components and devices. Since the early 2000s, the region has also seen RCA surge in high-skill and technology-intensive manufactures, likely reflecting the activities of multinationals with production facilities in the region. On the other hand, the region's high RCA in nonfuel primary commodities fell sharply from the mid-1980s, in line with the decline in the relative importance of these products in the region's export baskets.

In parallel with the RCA gains in new product groups, CAPDR diversified its exports until the early 1990s. The region's export concentration has remained relatively stable since then (Figure 5.10).⁸ To some extent, this may reflect the concentration of production activity in the special economic zones (or *maquilas*) on a limited number of products. While there has been a small push toward more diversification since the early 2000s, the CAPDR's exports remain relatively more concentrated than those of the largest economies in Latin America. That is surprising given the concentration of these economies' exports in commodities.

product's world exports in total world exports of all goods. Hence, if the RCA index is above one, it indicates a relative advantage for that country in exporting the product (or group of products).

⁷See Ding and Hadzi-Vaskov (2017) for a more detailed discussion of the broader region's RCA in various groups of products and a comparison of RCAs across regions.

⁸Export diversification measures differ widely, depending on the definitions and levels of product aggregation used in the analysis. See Ding and Hadzi-Vaskov (2017) for details on these calculations.

Figure 5.10. Export Concentration

Sources: UN COMTRADE and IMF staff calculations.

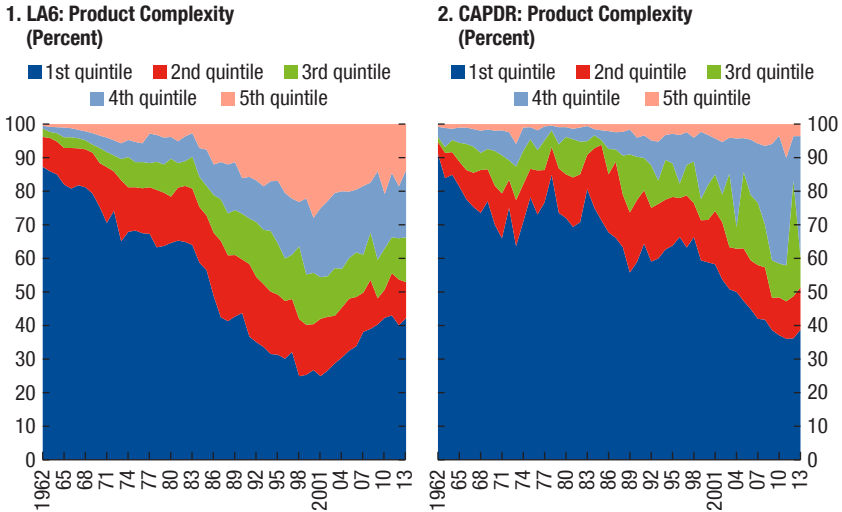
Note: AE = advanced economies; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SSA = sub-Saharan Africa; CAPDR = Central America, Panama, and the Dominican Republic; LA6 = Latin America 6.

CAPDR's exports are also more concentrated than in other regions besides the Middle East and North Africa and sub-Saharan Africa.

CAPDR's exports are also less complex than those of the larger Latin American economies. Economic complexity is related to the degree of productive knowledge that is revealed as embedded in a country's exports, and indicates the productive capabilities of a certain country.⁹ Highly complex goods (the 5th quintile) account for 5 percent of CAPDR's export portfolio, compared to about 20 percent for the larger Latin American economies in the LA6 (Brazil, Chile, Colombia, Mexico, Peru, and Uruguay) shown in Figure 5.11. While least complex goods accounted for about 90 percent of the export portfolios in both groups of countries in the 1960s, the LA6 countries have managed to move away from these products much faster, reducing their share to about 25 percent by the late 1990s. However, the commodity price boom in the 2000s reversed these gains to some extent, and the contribution of the least complex products in both country groupings' exports is similar in the most recent period.

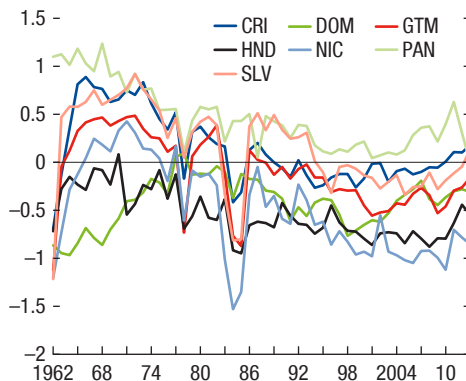
CAPDR countries' export baskets are indicative of different levels and paths of economic complexity. Within CAPDR, Honduras and Nicaragua have had the lowest levels of economic complexity, whereas Panama and Costa Rica have been at the top consistently (Figure 5.12). While the economic complexity index suggests a stable score for the region, the Dominican Republic has been able to increase its complexity, likely reflecting the move away from agriculture and the addition of more technologically intensive products in free economic zones.

⁹See Hidalgo and Hausmann (2009) and Hausmann and others (2014) for a formal explanation.

Figure 5.11. Product Complexities, LA6 versus Central America

Source: Ding and Hadzi-Vaskov.

Note: The chart shows the distribution of exports for Latin America and the Caribbean according to the level of product complexity: top area corresponds to the share of export products that belong to the top (fifth) quintile in terms of product complexity, and the bottom area corresponds to the share of products in the bottom quintile of the distribution. For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. LA6 = Latin America 6.

Figure 5.12. Central America: Economic Complexity Index

Sources: The Observatory of Economic Complexity, and IMF staff estimates.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

THE DETERMINANTS OF TRADE

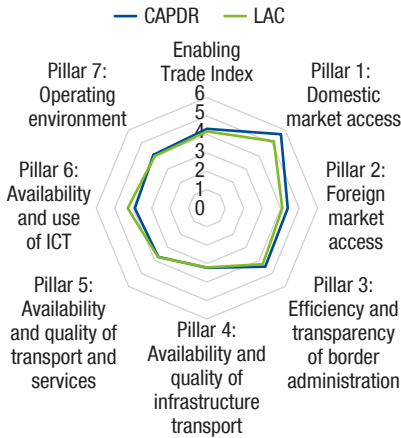
CAPDR countries appear to be trading in line with their fundamentals. Estimation results from gravity equations that model bilateral exports as a function of economic, historical, and geographic characteristics imply that economic size, common official language, contiguity, and having had a colonial relationship or common colonizer all have positive effects on bilateral trade flows. Conversely, larger geographic distance and being landlocked or trading with a landlocked partner restrict bilateral trade. Results from the gravity models that consider these factors suggest that CAPDR countries trade in line with their fundamentals (IMF 2015).

Structural factors can support trade expansion. Enabling indicators suggest the overall supportive environment for trade in CAPDR is similar to that in Latin America and the Caribbean as a whole and other emerging markets (IMF 2017). These are shown in Figure 5.13. On a country-by-country basis, enabling trade indicators suggest that performance is also broadly comparable across CAPDR countries, with all achieving similar rankings to the wider regional average (Figure 5.14). CAPDR performs a little better than LAC on market access (both domestic and foreign) and slightly worse on the availability and use of information and communication technology. Improvements in the operating environment and quality of infrastructure and transport services, particularly shipping connectivity and port infrastructure, and in the availability and use of information and communication technology, could support the expansion of CAPDR's trade. Similarly, streamlining customs procedures, which are more burdensome than in other emerging markets, could also help expand trade. Infrastructure quality could be improved to reduce transportation costs and facilitate trade. Despite authorities' concerted efforts to upgrade logistics and transport infrastructure over the past decade, persistent gaps remain. The exception is Panama, given its extensive port and air transport infrastructure.

Product proximity provides insights into the likely direction of change in which CAPDR can take advantage of its current areas of comparative advantage to diversify in related industries. Product proximity suggests that the ability of a country to produce certain products depends on how similar or close it is to the products that are already produced in the country: that is, the current composition of a country's export basket provides information about the type of goods it is relatively successful at producing.¹⁰ It is easier for a country to reuse or reemploy certain skill sets to produce similar goods than to acquire completely new skills and competencies and make revolutionary jumps in its product portfolio. For CAPDR, product proximity has correctly predicted the direction of change in RCA for all broad groups of exports over 1990–2013 (Figure 5.15, panel 1).¹¹ Looking ahead, the proximity between groups of products suggests that the region is likely to lower its RCA in high-skill and technology-intensive products and resource-intensive manufactures

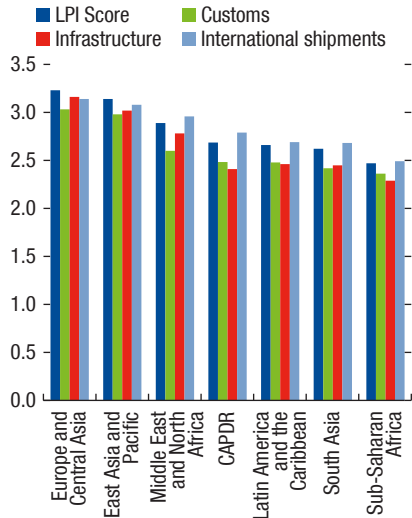
¹⁰For detailed discussion about the concept of product proximity see Hausmann and others (2014).

¹¹For details about the underlying methodology to predict the direction of change in RCA on the basis of proximity between groups of products see Ding and Hadzi-Vaskov (2017).

Figure 5.13. Enabling Trade Index, 2016

Sources: World Economic Forum and IMF staff estimates.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. ICT = information and communication technology; LAC = Latin America and the Caribbean.

Figure 5.14. Logistics Performance and Subcomponents, 2016¹
(1–5 worst to best)

Sources: World Bank LPI and IMF staff calculations. Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

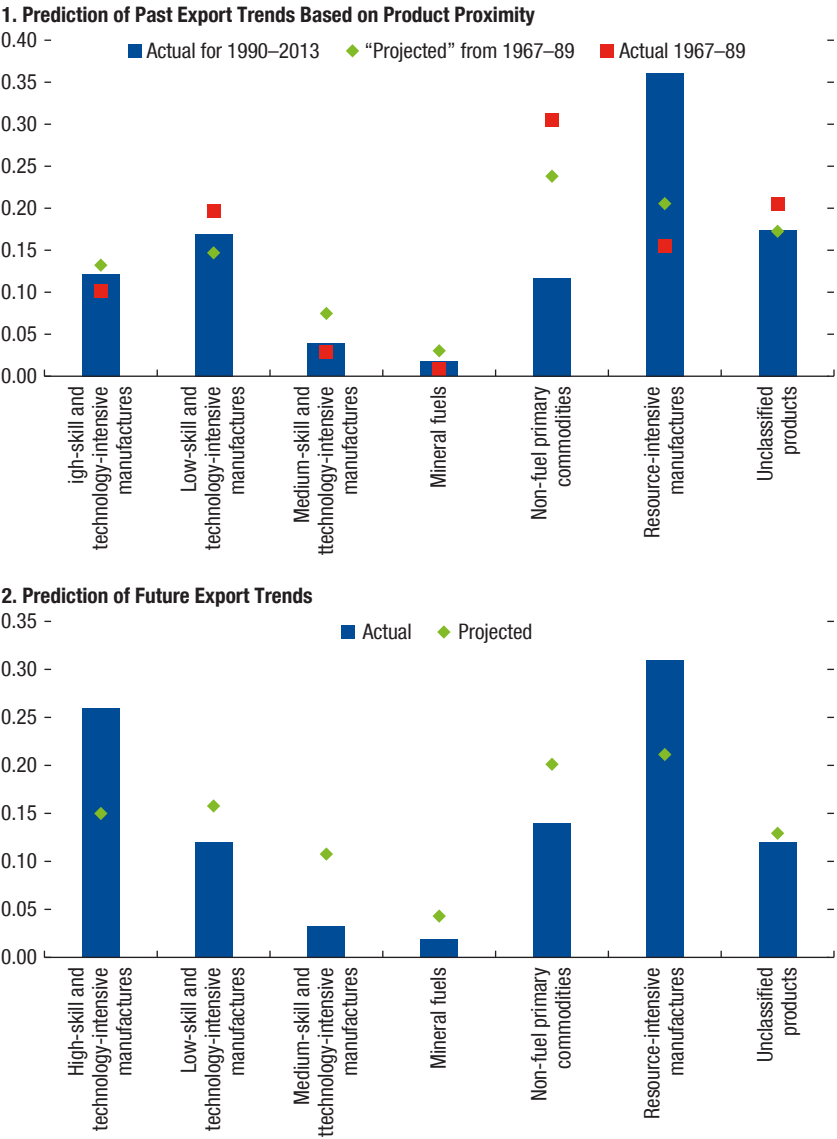
¹The logistics performance index (LPI) is the weighted average of the country scores on six key dimensions: efficiency of the clearance process, quality of trade and transport related infrastructure, ease of arranging competitively priced shipments, competence and quality of logistics services, ability to track and trace consignments, timeliness of shipments in reaching destination within the scheduled or expected delivery time.

(Figure 5.15, panel 2) absent significant policy changes.¹² On the other hand, RCA for the region is predicted to increase in medium- and low-skill and technology-intensive products as well as nonfuel primary commodities. This finding is likely related to lack of skills, technology, and adequate infrastructure, which hinders CAPDR countries' ability to move toward producing more complex products.

Further diversification of CAPDR's exports is likely to be gradual, but can be supported by policies to upgrade skills and infrastructure. Episodes of diversification have been characterized by a process where countries move into products similar to those they already produce—as predicted by product proximity. To modify the path implied by predictions and preserve or increase RCA in more high-skill-intensive products, CAPDR countries will likely need to implement

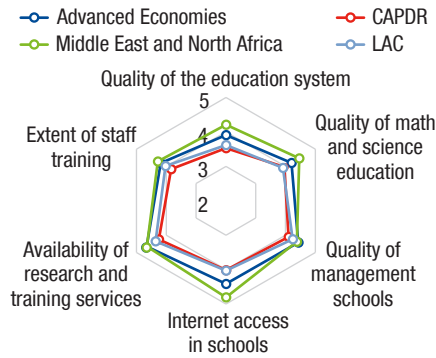
¹²Calculations are based on the methodology of Ding and Hadzi-Vaskov (2017).

Figure 5.15. Central America: Product Proximity and Comparative Advantage



Source: Ding and Hadzi-Vaskov (2017).
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. Units of measurement are “standardized” RCA that sum up to 1 across the seven product categories.

Figure 5.16. Global Competitiveness Index
(2017–18, Labor market efficiency, higher = better)



Sources: World Economic Forum, and IMF staff calculations.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. LAC = Latin America and the Caribbean.

substantive policy reforms. For instance, Ding and Hadzi-Vaskov (2017) show that better infrastructure and higher-quality education are associated with more complex and diversified (less concentrated) exports, as well as with higher RCA and shares of high-skill products in total exports (Table 5.1). For CAPDR, upgrading the existing

TABLE 5.1.

Determinants of the Composition of Trade

	I	II	III	IV
	complexity	concentration	RCA in high-skill products	share of high-skill products
Infrastructure	11.06*** (0)	−0.237* (0.0951)	4.346*** (0)	1.166*** (0)
Tariffs	−0.0317*** (0)	0.00304*** (7.57e−10)	−0.00286 (0.175)	−0.000816 (0.161)
Education	0.00512*** (0.00103)	−0.000973*** (0.000163)	0.0225*** (0)	0.00624*** (0)
Gini Index	−0.0217*** (1.58e−09)	−0.00180*** (0.00225)	0.00891*** (0.000531)	0.00237*** (0.000831)
Income per capita				
Constant	1.408*** (3.46e−10)	0.318*** (0)	0.177 (0.250)	0.0339 (0.426)
Observations	1,049	1,049	1,049	1,049
R-squared	0.551	0.131	0.224	0.225

Source: Ding and Hadzi-Vaskov (2017).

Note: Estimation results from panel regressions that include time fixed effects. Infrastructure is measured by the density of the railway network from the WDI, tariffs refer to average applied tariffs retrieved from the WITS database, education refers to secondary school enrollment rate and to share of population with tertiary education in regressions for RCA and share of high-skill products, and income inequality is measured by the net Gini index from the SWIID.

pval in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

export basket will require advancement not only in infrastructure but also human capital. The region performs relatively poorly compared to other regions on indicators of the quality of education, which can impede workers' ability to upgrade their skills and participate effectively in the production chain.

THE ECONOMIC IMPACT OF TRADE

How is economic growth affected by trade integration and how can CAPDR enhance the growth impact of its integration into global markets? What structural characteristics of trade help explain the relationship between trade and economic growth and how can CAPDR design its trade policy to optimize the growth impact of trade? Estimating medium-term growth equations using data for many countries can shed light on these questions. The equations are estimated in the form of five-year non-overlapping intervals for an unbalanced panel of up to 131 advanced and emerging market and developing economies, including CAPDR countries.¹³ The estimated equations include a full set of time fixed effects to account for global shocks such as shifts in commodity prices or the global business cycle. To address concerns about reverse causality and dynamic panel bias, the equations are estimated with system generalized method of moments.¹⁴ A CAPDR dummy variable is interacted with each trade characteristic to assess whether the structural characteristics of trade have differential growth effects for the CAPDR region.

CAPDR's integration into global markets is beneficial for economic growth. The results of the benchmark specification (Table 5.2) are broadly comparable to those in the literature: trade openness has a positive and statistically significant impact on average per capita economic growth.¹⁵ Evidence also exists of a conditional convergence effect, whereby countries with a lower initial level of real GDP per capita have higher growth rates. The effect of trade on growth also varies with the level of economic development: the growth benefit is stronger for advanced economies than those at earlier stages of economic development.¹⁶ This is consistent with other findings that the beneficial effects of trade increase as economies

¹³The equations estimated are as follows: $g_{it} = \beta_1 g_{it-1} + \beta_2 X_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$ where g_{it} is average per capita growth over each five-year period t , X is a matrix of country characteristics, α_i is a time-specific fixed effect, and γ_t are country-specific fixed effects. The set of country characteristics is standard and includes human and physical capital and foreign direct investment and the terms of trade in addition to indicators of trade openness. The model is outlined in more detail in Beaton and others (2017).

¹⁴See Arellano and Bover (1995) and Blundell and Bond (1998) for a description of system generalized method of moments. Use of this methodology to understand the trade-growth relationship follows recent contributions from Dollar and Kraay (2004), Loayza and Fajnzylber (2005), Chang and others (2009), and de la Torre and others (2015).

¹⁵A vast literature examines the effect of trade on growth. A seminal contribution by Frankel and Romer (1999) found that trade, instrumented with geography, has a positive effect on countries' income. These findings were disputed by some (for example, Rodríguez and Rodrik (2001), while more recent papers have found an important role for trade in economic growth. For examples, see Dollar and Kraay (2004), Loayza and Fajnzylber (2005), de la Torre and others (2015).

¹⁶Not reported on Table 5.2. See Beaton and others (2017).

TABLE 5.2.

Per Capita Real GDP Growth Equation Estimates						
	(1)	(2)	(3)	(4)	(5)	(6)
Initial GDP per capita	−3.763*** (0.737)	−4.546*** (0.656)	−3.840*** (0.554)	−4.271*** (0.624)	−3.957*** (0.622)	−3.963*** (0.958)
Labor force education	0.585 (0.546)	−1.557* (0.896)	−1.493* (0.800)	−1.724** (0.819)	0.477 (0.600)	0.350 (0.716)
Terms of trade	−1.245 (1.733)	−7.083 (4.828)	−5.236 (4.115)	−7.126 (4.672)	−2.440** (1.234)	−2.092 (2.262)
Public Infrastructure	1.733*** (0.397)	2.537*** (0.544)	2.388*** (0.487)	2.518*** (0.532)	1.590*** (0.539)	1.431** (0.679)
Trade openness	1.972*** (0.551)	2.702*** (0.921)	2.490*** (0.845)	2.796*** (0.835)	1.841*** (0.709)	1.650** (0.667)
Trade openness*CAPDR	−0.329** (0.149)					
Global Value Chain Participation ²		0.0693 (0.0440)				
Global Value Chain Participation*CAPDR		−0.0494 (0.0329)				
FVA/Gross Exports			0.0154 (0.0518)	0.0595 (0.0531)		
FVA/Gross Exports*CAPDR			−0.0553 (0.113)	−0.0301 (0.132)		
Indirect Value Added ³			0.0935** (0.0467)			
Indirect Value Added*CAPDR			0.0435 (0.123)			
Domestic Value Added in Intermediate Goods Exports Re-exported to Third Countries/ Gross Exports				0.467** (0.187)		
Domestic Value Added in Intermediate Goods Exports Re-exported to Third Countries/ Gross Exports*CAPDR				0.0760 (0.425)		
Export Quality ⁴					4.427* (2.397)	
Export Quality*CAPDR					10.05 (6.616)	
Export Product Concentration ⁵						−3.213** (1.626)
Export Product Concentration*CAPDR						−1.833** (0.849)
Observations	1,038	652	652	652	989	995
Number of ISO	135	135	135	135	133	129
Number of instruments	171	95	111	111	144	144
AR(1)	0.0181	0.0215	0.0204	0.0203	0.0269	0.0219
AR(2)	0.240	0.588	0.619	0.601	0.384	0.238
Hansen	0.933	0.0446	0.148	0.122	0.568	0.604

¹This table reports the results of regressions of growth in real GDP per capital on various indicators of the characteristics of countries' exports. All regressions include time fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Beaton, Cebortari and Komaromi (2017) for additional details.

²The sum of foreign value added as a share of gross exports and indirect value added as a share of gross exports.

³Indirect value added is the value of exported goods that are used as imported inputs by other countries to produce their exports.

⁴As measured by the IMF Export Quality Index. Higher values indicate higher export quality. Source: IMF Export Quality Database.

⁵As measured by the IMF Export Diversification Index. Higher values indicate lower (higher) diversification (concentration). Source: IMF Export Diversification Database.

develop and strengthen complementary policies that allow them to reap the benefits of trade (for example, Kim 2011). This includes, among other aspects, strengthening human capital development and physical infrastructure while improving institutional frameworks and putting in place policies that encourage investment.

The characteristics that spur trade integration in CAPDR are also beneficial for economic growth. Participation in GVCs, particularly upstream in production, enhances the effect of trade on economic growth. The region can foster participation in GVCs in support of growth by continuing efforts to reduce trade barriers, build better infrastructure, boost human capital formation, support research and development, and improve institutions.¹⁷ CAPDR also reaps growth benefits from the significant portion of its trade with advanced economies (particularly the United States). Results from the growth regressions show that trading with advanced economies is associated with stronger growth outcomes than trading with emerging market and developing economies.¹⁸ As with participation in GVCs, this positive growth effect may be attributable to knowledge and technology spillovers. Table 5.2 shows that different trade indicators have similar impacts from participating in GVCs on growth in the CAPDR region as for the global sample, with two exceptions: trade openness contributes less to growth in the region, while the negative effect of export concentration is amplified. Both findings may reflect the importance of *maquila* exports, which boost gross trade openness and export concentration.

Structural characteristics of trade matter in the trade-growth nexus. Higher quality and more diverse export baskets are associated with higher growth. CAPDR countries perform well in both dimensions. The region's export quality is considered better than that of the broader region, and the 50th percentile of the world distribution and its export products are less concentrated than in much of Latin America and the Caribbean and the 50th percentile of the world distribution.

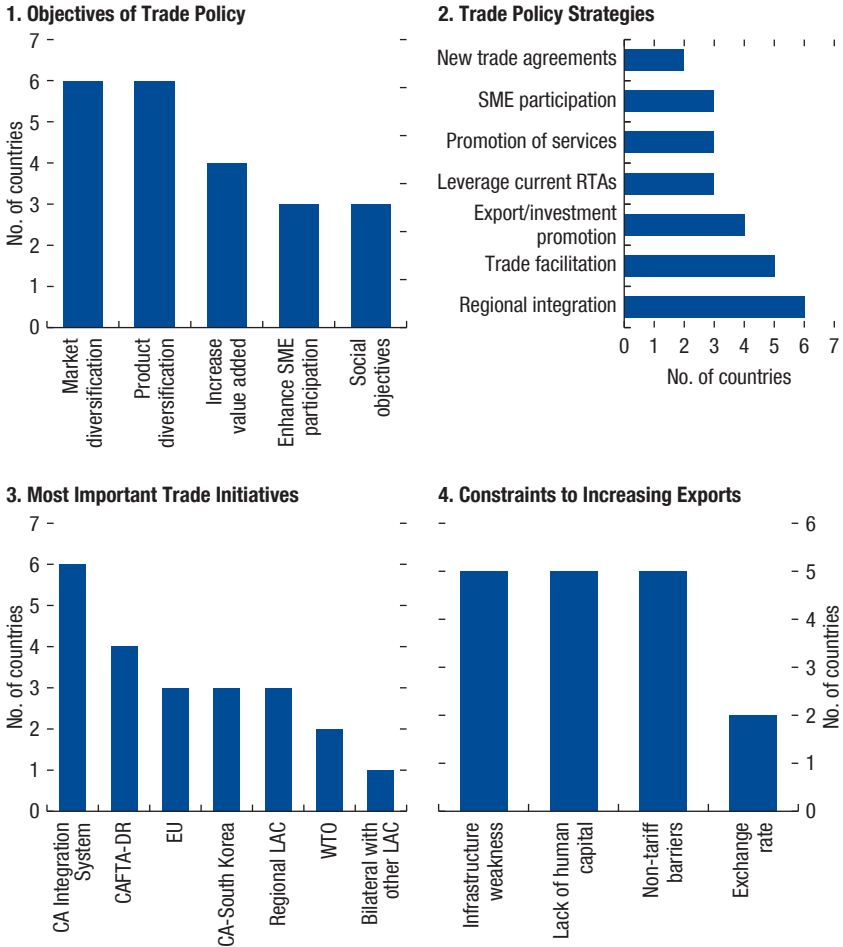
REGIONAL VIEW OF TRADE POLICY

A 2015–16 survey of CAPDR trade authorities provides some insight into their priorities for trade policy, their views on regional integration, and the major constraints that exporters experience in these countries.¹⁹ The results are summarized below and shown in Figure 5.17. The main objectives of trade policy in the CAPDR region are diversification of products and markets and increasing export sophistication. Respondents, including in countries that have already achieved some sophistication in their export baskets, mentioned increasing the value added of their exports as a goal. Expansion of service exports was mentioned as an

¹⁷See Cheng and others (2015).

¹⁸Not reported on Table 2. See Beaton, Cebotari, and Komaromi (2017).

¹⁹Responses were received from Costa Rica, the Dominican Republic, El Salvador, Guatemala, Nicaragua, and Panama between November 2015 and August 2016. The response from Honduras was received in December 2017. See IMF (2017) for further details on the survey.

Figure 5.17. Survey Results on Central American Authorities' Trade Policy Views

Source: IMF 2017.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. CAFTA-DR = Dominican Republic-Central America Free Trade Agreement; EU = European Union; LAC = Latin America and the Caribbean; RTAs = Regional Trade Agreements; SME = Small & Medium-Sized Enterprise; WTO = World Trade Organization.

objective by Costa Rica, Guatemala, and Panama. Guatemala saw its low labor costs as an advantage, while Panama aimed to become a global service hub. Also mentioned was the goal of integrating small and medium enterprises into trade (Costa Rica, El Salvador, Nicaragua), which would help to create employment and spread gains from trade more widely.

Preferential trade agreements have played a key role in CAPDR's efforts to expand and diversify trade; notably, bilateral and regional trade agreements were mentioned in the survey. In the survey, Guatemala and Nicaragua noted a focus on seeking new agreements with strategic partners. Costa Rica, Honduras, and Nicaragua saw opportunities for leveraging current agreements by identifying new products or firms in export markets where they already had preferential access, or though seeking more flexibility in rules of origin. Regional agreements and CAFTA-DR were the most frequently mentioned existing trade initiatives, while some responses pointing to the many bilateral trade agreements with other Latin American countries in effect or with negotiations underway. Costa Rica and El Salvador also cited Asia as a key target market. Costa Rica and Panama highlighted their participation in plurilateral negotiations at the World Trade Organization. Nicaragua, on the other hand, expressed concern about the possible fragmentation of the world trading system because of a preference for mega-regional agreements over the WTO and the impact this could have on small developing economies.

Beyond trade agreements, all CAPDR countries mentioned export and investment promotion as a strategy. Trade authorities in the region supported exporting firms through disseminating information, providing training, and sponsoring innovation. Investment promotion activities to attract foreign direct investment (FDI) are also an important component of trade policy, and the link between FDI and trade was mentioned by several countries, including Costa Rica, which attributes its relatively high export sophistication to the positive impact of four decades of FDI. The Dominican Republic highlighted the important role that FDI into free trade zones has played in export diversification, supported by investment provisions in the CAFTA-DR agreement and an improved legal framework to accommodate foreign investors.

Low human capital and infrastructure quality are important constraints for exports in the CAPDR region. Nicaragua and Guatemala noted that low education quality is a constraint on exporting. Costa Rica is encouraging the development of specialized skills to support the expansion of higher-value-added exports, including IT and language skills. Linked to human capital, several countries (Costa Rica, El Salvador, Guatemala, Panama) mentioned low productivity or slowing productivity growth as a constraint. It was recognized that except for Panama, which has a comparative strength in transportation services, transportation infrastructure could be improved to reduce the cost of getting goods to market. Trade facilitation and more efficient logistics operations were also seen as key challenges for the region, and one that almost all respondents saw as essential for increasing trade integration; a strategy to improve these aspects of regional trade was adopted by ministers in 2015.

Nontariff barriers are the most important external constraint to exporting. Given the importance of agricultural products in the region's export basket, sanitary and phytosanitary measures and agricultural subsidies were mentioned by several countries as significant constraints (Costa Rica, Dominican Republic, El Salvador, Guatemala, Nicaragua). Also, initiatives to harmonize technical barriers to trade across countries would reduce compliance costs (Costa Rica, Dominican

Republic, El Salvador). Costa Rica, Honduras, and Nicaragua noted the potential for agreements on rules of origin to boost trade and facilitate regional value chains, including through cumulation of origin mechanisms between trade agreements.

Completing the integration process in Central America is a priority. Movement toward integration began in 1960 and, although progress has been slow, trade barriers have been reduced and intraregional trade expanded. Honduras and Guatemala recently established a customs union, with the hope that neighboring countries will join. Countries in the region tend to produce similar products and there is a history of tax competition in the *maquila* sector. Nevertheless, closer regional integration has enabled joint trade agreements such as the one finalized between Central America and South Korea in 2018, while trade agreements with the European Union and the United States have also opened opportunities for intraregional trade. Panama recently joined the Central American Common Market, which should provide some growth opportunities for the bloc. Panama sees potential to export services to other Central American countries, but notes that significant barriers to a regional services market are still in place.

CAPDR countries expressed mixed views about integration with the rest of LAC. Asymmetries in the size of economies were highlighted as an obstacle to deeper integration, as some smaller countries are unable to compete and do not benefit as much from regional trade agreements. For Guatemala, the proximity of US and Mexican markets makes integration with South America less of a priority. El Salvador mentioned the idea of linking the various regional blocs in LAC, while noting some obstacles to such an initiative, including a lack of political will. On the other hand, Costa Rica and Panama are the two countries in the region that see the greatest potential in integration with LAC. For example, Panama discussed prospects for an agreement with Mercosur and both Panama and Costa Rica were interested in joining the Pacific Alliance, along with Honduras.

CONCLUSIONS AND POLICY IMPLICATIONS

The analysis in this chapter suggests that CAPDR has penetrated global markets and is well integrated into world trade. However, it also suggests ample scope for tackling structural challenges to preserve the region's comparative advantages or to diversify into new product groups and promote the growth benefits of trade. Three main messages are offered for the design of CAPDR's trade policy:

- *Support trade integration with complementary policies.* The analysis emphasizes the importance of complementary policies, particularly to strengthen infrastructure and human capital. Continued regional efforts on this front would be useful as part of a broad growth strategy, but they can also enhance trade integration, including by helping countries take part in global value chains, which may offer new opportunities for technology transfer and are critical to diversifying and upgrading the complexity of CAPDR's exports, which can also enhance the growth benefit of trade integration.

- *Diversify export products and markets.* Diversification of export products, particularly toward more complex products, can enhance the growth benefit of trade. For CAPDR, a successful diversification strategy will need to be supported by educational reform to protect comparative advantage and gain further revealed comparative advantage in high-skilled products. With the region's exports largely concentrated toward a single market, diversification of export markets can also promote external stability, productivity, and economic growth.
- *Exploit opportunities for regional cooperation.* While there may be little scope to expand intraregional trade given the similarity of the region's production structures and export bases, there is scope to enhance regional cooperation on trade. The region should continue its efforts to negotiate joint trade agreements (similar to DR-CAFTA and the recent agreement with South Korea). Cooperation could also be expanded to include regulatory issues, trade facilitation, and improvements in the region's interconnectivity. Cooperation on such initiatives would provide the region with economies of scale and facilitate broader trade integration by reducing administrative and compliance costs.

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Crime and Punishment in Central America

ANA LARIAU, DMITRY PLOTNIKOV, AND JOYCE WONG

INTRODUCTION

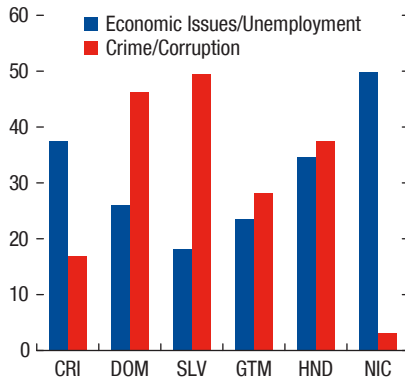
Persistent crime in Central America, including the Dominican Republic (CAPDR), presents one of the biggest challenges to economic development and surpasses unemployment as the most important issue in most countries in the region (Figure 6.1). The Northern Triangle countries—Honduras, El Salvador, and Guatemala—account for 4½ percent of world homicides outside of war, but only ½ percent of the world’s population. Aside from human and social costs, crime also distorts economic incentives. Northern Triangle and Dominican firms consistently cite crime and theft as among the five biggest problems for doing business (World Economic Forum 2017). The World Bank (2011) puts losses associated with crime in the Northern Triangle at about 10 percent of annual GDP. Crime tends to disproportionately impact poorer individuals who are unable to protect themselves, and so exacerbates inequality (Davoodi and others 2002).

Crime and economics are intrinsically linked. Theoretically, crime has direct and indirect costs. Direct costs include the share of output (goods and services) and resources (labor productivity of both victims and criminals) lost due to theft, robbery, murder, and other crimes, and the resources spent on security costs—public and private—that otherwise could have been used on productive activity. Indirect costs are potentially much larger. They include lower economic activity as individuals internalize the direct costs of crime. Examples include fewer employment opportunities, higher outward migration, the erosion of institutions, and corruption. All these outcomes, in turn, exacerbate crime and generate a vicious cycle.

While many studies have examined the negative relationship between crime and growth, starting with a seminal paper by Becker in 1968, much of this work remains hindered by both measurement and analytical issues, including:

- Crime is inherently hard to measure. First, definitions of crime differ across countries and time, complicating cross-country comparisons. A criminal action in one country is not necessarily illegal in another. Second, data on crime is often inaccurate and underreported, especially in emerging economies. For example, victimization surveys often indicate higher crime rates than official statistics (IMF 2017). To cut measurement error to a minimum, this chapter focuses primarily on homicide rates as the most consistent and

Figure 6.1. Crime as the Priority Problem for Central America
(Percent of respondents indicating the corresponding issue is important)



Source: Latinobarometro, 2016.

Note: CRI = Costa Rica; DOM = Dominican Republic; SLV = El Salvador; GTM = Guatemala; HND = Honduras; NIC = Nicaragua.

accurate measure of crime across countries. For comparison, robbery rates are also considered.

- Crime's effect on economic growth is difficult to isolate. The vicious cycle between growth and crime muddles causality. To identify its effect on growth, first, we instrument crime using criminal deportations from the United States (for homicides) and gun ownership (for robberies). These variables affect crime but have no direct impact on growth. Second, the effect of crime and labor market policies on economic and criminal activity is analyzed within a structural general equilibrium framework.

With this in mind, and with a focus on better understanding the economic drivers of crime in CAPDR, this chapter brings together an overview and examination of the facts about crime in CAPDR, an estimate of crime's causal impact on the region's economic growth, and case studies for Honduras and El Salvador that illustrate different approaches to fighting crime.

Criminal choices and policy options are featured within a structural general equilibrium framework that represents the first attempt to address the relationship of crime and output in Central America, and is one of the few attempts to incorporate crime into a macroeconomic model.¹ The model supports estimates

¹Engelhardt, Rocheteau, and Rupert (2008) and Huang, Laing, and Wang (2004) present search frameworks calibrated to data from the United States that are the closest to the model described in this chapter. Both papers focus on how employment, not output or growth, interacts with crime in the United States.

that the direct and indirect effects of crime in Central America suppress economic activity by as much as 16 percent of GDP. If CAPDR countries were able to bring crime rates down to the world average, economic growth would improve by about half a percentage point a year for the Northern Triangle countries and marginally for other Central American countries, according to other analysis in this chapter (Box 6.1).

Policy implications to improve countries' policies toward crime include deterrence, enforcement, and community engagement that supports economic development and more broadly tackles the root causes of crime.

SOME FACTS ON CRIME IN CAPDR

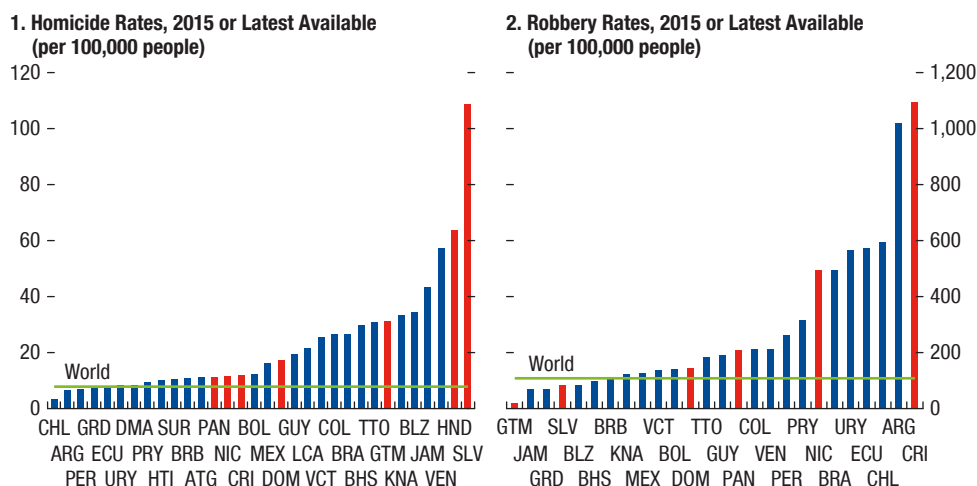
Rates of violent crime in Central America are among the highest in the world, driven by the Northern Triangle. El Salvador and Honduras have the two highest homicide rates in the world—109 and 64 for every 100,000 people in 2015.² These rates (Figure 6.2) are also significantly above the Latin America and Caribbean (LAC) average of 23 and the world average of 8 per 100,000 people recorded in the same year. At the same time, only 5 percent of homicides in CAPDR result in a conviction in comparison with 24 percent in Latin America and 43 percent globally (UNODC 2013). These patterns have contributed to significant emigration, predominantly to the United States. In 2014, nearly 2.8 million people from the Northern Triangle lived in the United States.³ Between October 2009 and September 2016, nearly 140,000 unaccompanied minors from the region crossed into the United States.⁴

By contrast, robbery rates in the Northern Triangle countries are relatively low, likely reflecting significant underreporting in some countries. Guatemala and El Salvador report robbery rates of 19 and 84 per 100,000 people, below the world average of 106. On the other hand, the highest reported robbery rate in LAC is in Costa Rica which, at 1,096 per 100,000 people, is one of the highest in the world, even as it has a homicide rate of 11 per 100,000 people. While these numbers could have some comparison value, they are likely driven by different reporting behaviors, reflecting factors such as a country's development level, institutional strength, and confidence in government, which in turn affect the crime rate.

²Honduras is missing data on robberies for 2015 and, therefore, is not included in the small graphic.

³While crime is a significant driver of recent migration patterns from the Northern Triangle, other factors have historically also been important (for example, conflict in home country). See IMF Working Paper 17/144 for discussions of different drivers.

⁴US Customs and Border Protection, *Southwest Border Unaccompanied Alien Children Statistics FY 2016* (<https://www.cbp.gov/site-page/southwest-border-unaccompanied-alien-children-statistics-fy-2016>). According to the reports by the United Nations and the American Immigration Council, most unaccompanied children are fleeing “join or die” gang threats.

Figure 6.2. Crime in Latin America and the Caribbean

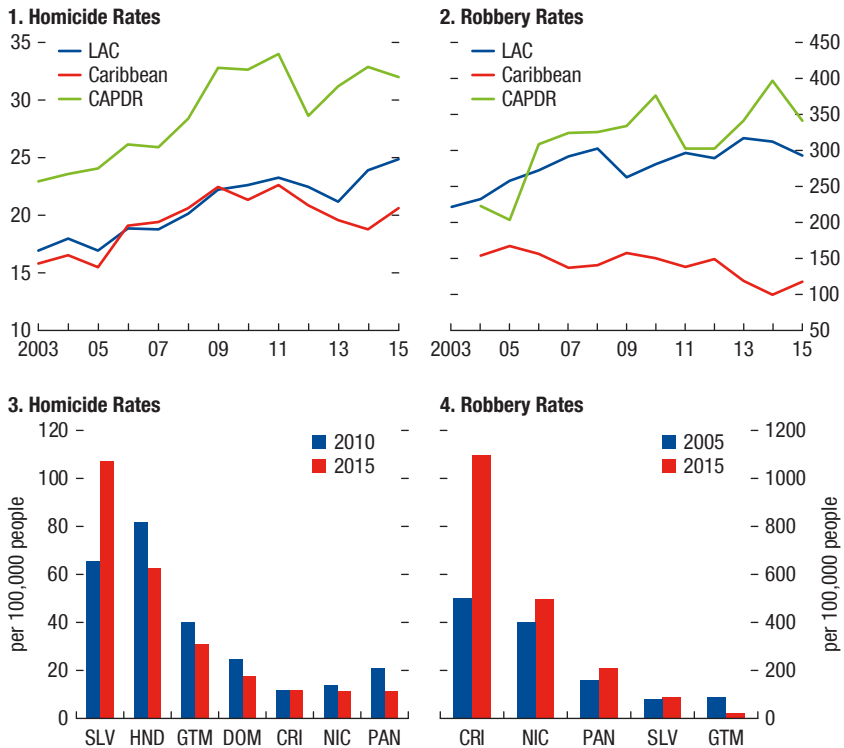
Sources: World Development Indicators; United Nations Office on Drugs and Crime; and IMF calculations.

Note: ARG = Argentina; ATG = Antigua and Barbuda; BHS = The Bahamas; BLZ = Belize; BOL = Bolivia; BRA = Brazil; BRB = Barbados; CHL = Chile; COL = Colombia; CRI = Costa Rica; DMA = Dominica; DOM = Dominican Republic; ECU = Ecuador; GRD = Grenada; GTM = Guatemala; GUY = Guyana; HND = Honduras; HTI = Haiti; JAM = Jamaica; KNA = Saint Kitts and Nevis; LCA = Saint Lucia; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PER = Peru; PRY = Paraguay; SLV = El Salvador; SUR = Suriname; TTO = Trinidad and Tobago; URY = Uruguay; VEN = Venezuela; VCT = Saint Vincent and the Grenadines.

Homicide rates in CAPDR have remained relatively constant since peaking in 2011. In 2010, Honduras was the most violent country in the world, but the homicide rate dropped by about 30 percent to 64 homicides per 100,000 inhabitants in 2015 (Figure 6.2). By contrast, El Salvador started from a similar level, but homicides have increased substantially. Factors behind these developments are examined in the case studies. Other countries have generally improved their security, although robbery rates for all CAPDR countries have increased since 2005, potentially driven by improved reporting (Figure 6.3).

A significant factor behind these high crime levels is drug trafficking. The 2017 US State Department International Narcotics Control Strategy Report estimates that 90 percent of cocaine trafficked to the United States in the first half of 2015 passed through Central America. UNODC (2012) estimates the value of cocaine that passed through Honduras in 2010 was equivalent to 13 percent of the country's GDP, or nearly two-thirds of spending on crime prevention in the entire region that year.

Victimization surveys are an important complement to official crime data (Figure 6.4). Robbery rates reported in these surveys for Guatemala and El Salvador are some of the highest in the region, in contrast to the official statistics. Nearly 800,000 Salvadoran residents, or 14 percent of Salvadoran residents,

Figure 6.3. Crime Trends in Central America

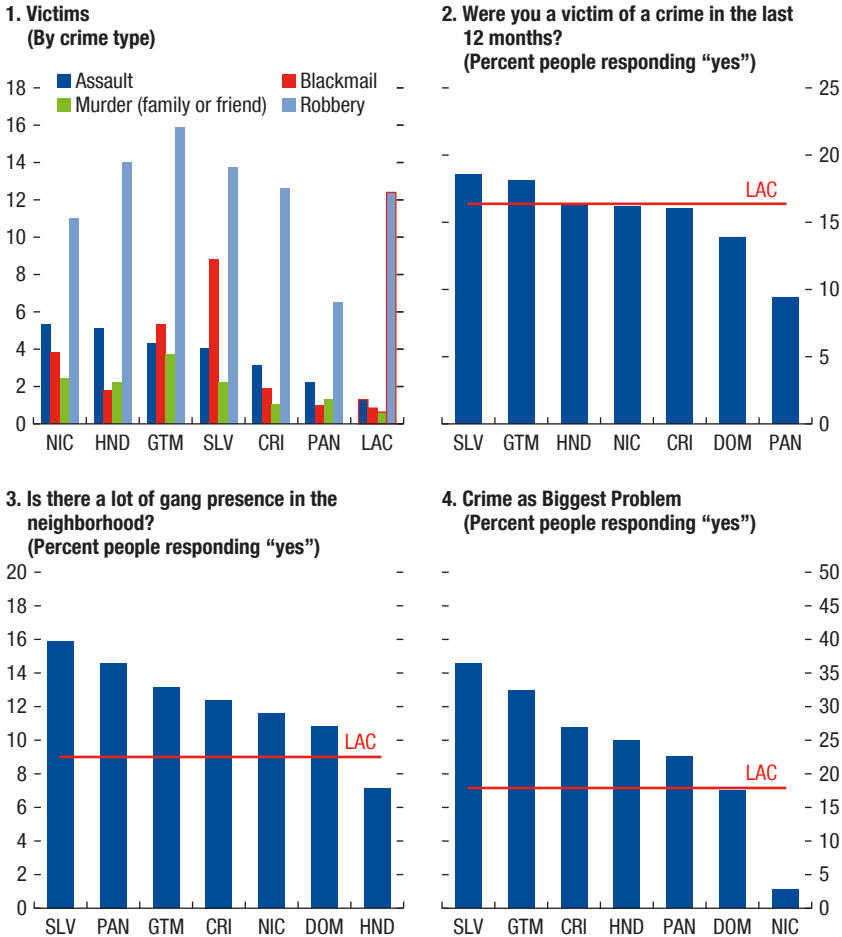
Sources: United Nations Office on Drugs and Crime; and IMF staff calculations.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

reported having been victims of robbery in 2012. That is 130 times higher than the 5,521 registered reports of robbery. Furthermore, the incidence of assault, blackmail, and murders in all CAPDR countries is higher than the LAC average, according to victimization surveys.

Victimization surveys also paint a picture of a region plagued by gangs and where tackling crime is a priority. Over 14 percent of people in Guatemala, Panama, and El Salvador say there is “a lot of” gang presence in their neighborhoods. Interestingly, Panama enjoys relatively low homicide rates, yet residents report a significant gang presence. Only 7 percent of Hondurans report significant gang presence, reflecting still low average gang membership compared to Guatemala and El Salvador (see, for instance, Seelke 2016). Over one-fifth of people surveyed in CAPDR countries except Nicaragua identify crime as their country’s biggest problem.

Figure 6.4. Evidence from Victimization Surveys



Sources: Latin America Public Opinion Project and IMF staff calculations.
 Note: CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras; LAC = Latin America and the Caribbean; NIC = Nicaragua; PAN = Panama; SLV = El Salvador.

CAUSAL LINK BETWEEN CRIME AND GROWTH

What is the effect on growth of such elevated crime levels? Reverse causation complicates the estimation of the causal link between crime and growth. While crime poses costs and hindrances to economic growth, growth also lowers the relative payoff of criminal activity—by generating more economic opportunities.

To establish the causal effect of homicide on growth, this chapter follows Blake (2017), using deportations from the United States as an instrument for crime.

Changes in the number of criminal deportees from the United States provide an exogenous source of variation to crime rates because such changes do not directly impact growth other than through their effect on crime. A potential criticism of this approach is that deportees may enter the labor force back in their home country and impact growth through that channel.

While robbery rates suffer from mismeasurement issues discussed in the previous section, they are also included in the analysis for comparison. Gun ownership rates are an instrument for robbery rates, as ownership has been found to affect burglaries and robberies (Cook and Ludwig 2002), but are unlikely to directly impact growth.

Deportations from the United States

US immigration laws significantly changed throughout the 1980s and 1990s. The Immigration Reform and Control Act of 1986 removed discretion from deportations and made them mandatory for people convicted of a set of “deportable” crimes. Together with the Anti-Drug Abuse Act of 1988, this law resulted in the immediate deportation of any non-citizen convicted of an aggravated felony crime (including offenses such as murder, dealing drugs, and firearm trafficking). The list of deportable crimes was expanded in the 1990s to include money laundering, theft and burglary, prostitution, tax evasion, armed assaults, some types of fraud, drug possession, and shoplifting, with deportation applicable retroactively for the expanded list of crimes. Immigrants previously convicted of any deportable offense became subject to criminal deportation, including naturalized US citizens who committed offenses before obtaining citizenship. Effectively, any non-citizens sentenced to one year or more in prison were deported, even if the sentence was suspended. Total deportations from the United States between 1998 and 2014 almost tripled, with several CAPDR countries leading the count (Figure 6.5).

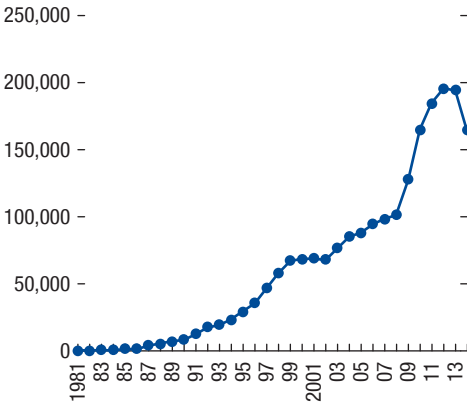
The results of the estimation (Box 6.1) indicate that if CAPDR countries were to bring their crime rates down to the world average, GDP growth could be around 0.6 percentage point higher a year for El Salvador, 0.5 percentage point higher for Honduras, 0.3 percentage point higher for Guatemala, and 0.1 percentage point higher for the other CAPDR countries. On a cumulative basis, El Salvador and Honduras lost over 9 and 8 percentage points of GDP, respectively, due to their higher-than-world-average crime rates during the analysis period.

The estimated effect for robberies is only significant at the 10 percent level, and lower for most countries. The effect ranges from 0 (Guatemala) to 0.5 percentage point a year for Costa Rica.

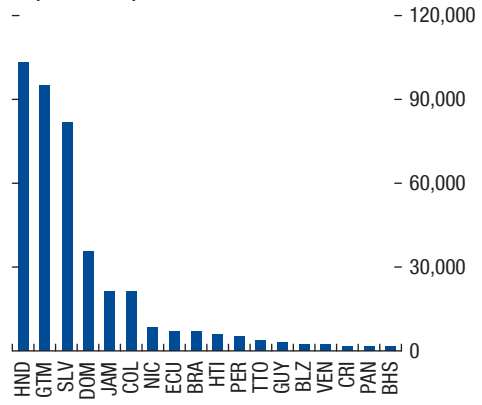
The estimation results described in Box 6.1 should be interpreted carefully because they are skewed by underreporting; the estimated effect of robberies on growth in Costa Rica (where underreporting of robberies is supposedly less serious) is quite large, and comparable to the effect of homicides for CAPDR countries’ growth (Figure 6.6). This hints at a potentially significant (and yet underestimated) effect of robberies (and crimes other than homicides) on growth.

Figure 6.5. Deportations from the United States

1. Number of Criminal Deportations to LAC



2. Total number of Criminal Deportations (1998–2014)



Sources: Sourcebook of Criminal Justice Statistics; US Department of Homeland Security; and IMF staff calculations. Note: BHS = The Bahamas; BLZ = Belize; BRA = Brazil; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; GTM = Guatemala; GUY = Guyana; HND = Honduras; HTI = Haiti; JAM = Jamaica; NIC = Nicaragua; PAN = Panama; PER = Peru; SLV = El Salvador; TTO = Trinidad and Tobago; VEN = Venezuela. LAC = Latin America and the Caribbean.

Box 6.1. Instrumental Variables for Judging the Effect of Crime

The effect of crime on growth is estimated using a two-stage least squares method with a large panel data set for Latin America and the Caribbean.⁵ At the first stage, a connection is established between homicides and robberies (as the dependent variables) and deportation rates and gun ownership rates (the explanatory variables). At the second stage, GDP growth is regressed on the instrumented homicide and robbery rates while controlling for other economic or social determinants of economic growth (X_{it}), including the level of PPP-GDP, government consumption, inflation, trade, foreign direct investment, the poverty rate (all lagged), years of schooling, population growth, capital account openness, changes in terms of trade, and dummy variables for legal origin, disaster, and war.⁶

⁵ The data set includes 34 Latin American and Caribbean countries over the period from 1995 to 2014. Deportation and homicide rates are included on a per capita basis (per 100,000 persons). The immigration data including number of criminal deportations are published annually on a country level basis in the *Yearbook of Immigration Statistics* by the US Department of Homeland Security. Criminal deportation refers to persons removed who have a prior criminal conviction, and it may include immigration- and smuggling-related crimes but excludes deportations based on immigration rules violations.

⁶ These are standard control variables in the growth literature (see for example Ghosh and Phillips 1998, or Ostry, Berg, and Tsangarides 2014).

Box 6.1. Instrumental Variables for Judging the Effect of Crime (continued)

First stage:

$$\text{Inhomicides}_{it} = \lambda_1 \text{Indeportation}_{it} + \eta_1 \text{Ingunown}_{it} + \gamma_1 X_{it} + \epsilon_{1it}$$

$$\text{Inrobberies}_{it} = \lambda_2 \text{Indeportation}_{it} + \eta_2 \text{Ingunown}_{it} + \gamma_2 X_{it} + \epsilon_{2it}$$

Second stage:

$$\Delta \text{GDP}_{it} = \alpha \widehat{\text{Inhomicides}_{it}} + \beta \widehat{\text{Inrobberies}_{it}} + \mu X_{it} + \delta_{it}$$

Results are reported in Box Table 6.1.1 below

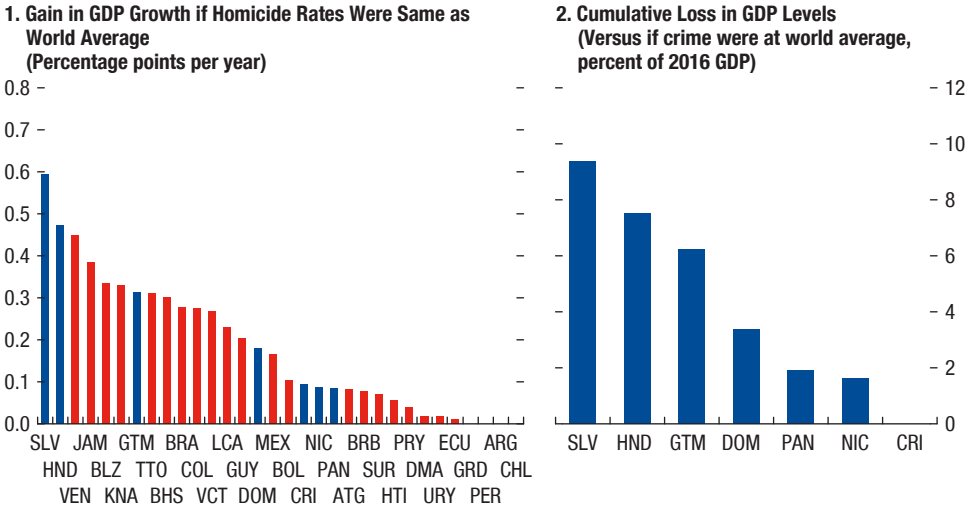
BOX TABLE 6.1.1

Dependent Variable: GDP Growth			
VARIABLES	(1) Naïve version	(2) 2SLS	(3) GMM
In Homicide rates	−0.0419 (0.0861)	−0.210* (0.127)	−0.225* (0.119)
In Robberies	0.204*** (0.0783)	−0.147 (0.341)	−0.119 (0.302)
GDP-PPP per capita (lagged)	1.72e-05 (1.38e-05)	4.21e-05 (2.75e-05)	4.97e-05** (2.16e-05)
Government Consumption (lagged)	0.00970 (0.0199)	−0.00436 (0.0264)	−0.0190 (0.0205)
Inflation (lagged)	−0.0115 (0.00784)	−0.00634 (0.00939)	−0.00941 (0.0127)
Trade Openness (lagged)	0.00741*** (0.00231)	0.00791*** (0.00254)	0.00670*** (0.00213)
FDI (lagged)	0.00752 (0.0177)	0.0104 (0.0184)	0.0102 (0.0205)
Ave. Years of Schooling	0.00560 (0.0497)	0.0182 (0.0717)	0.0134 (0.0756)
Change in Population	0.0177 (0.103)	0.0425 (0.121)	0.0742 (0.119)
Capital Account Openness	0.320 (0.228)	0.0174 (0.321)	−0.170 (0.279)
Change in Terms of Trade	1.691** (0.811)	1.400* (0.844)	1.148 (0.883)
English legal origin?	−0.620*** (0.230)	−0.898** (0.454)	−0.914** (0.415)
Disaster	−0.356** (0.157)	−0.408** (0.164)	−0.340** (0.152)
War	−0.228 (0.177)	−0.107 (0.210)	−0.156 (0.170)
Poverty rate (lagged)	−0.0127*** (0.00388)	−0.0124** (0.00549)	−0.0116** (0.00497)
Constant	0.102 (0.819)	2.441 (1.761)	2.630* (1.547)
Observations	191	191	191
R-squared	0.289	0.202	0.202

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

Figure 6.6. Effect of Homicides on GDP Growth



Source: IMF staff calculations.

Note: ARG = Argentina; ATG = Antigua and Barbuda; BHS = The Bahamas; BLZ = Belize; BOL = Bolivia; BRA = Brazil; BRB = Barbados; CHL = Chile; COL = Colombia; CRI = Costa Rica; DMA = Dominica; DOM = Dominican Republic; ECU = Ecuador; GRD = Grenada; GTM = Guatemala; GUY = Guyana; HND = Honduras; HTI = Haiti; JAM = Jamaica; KNA = Saint Kitts and Nevis; LCA = Saint Lucia; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PER = Peru; PRY = Paraguay; SLV = El Salvador; SUR = Suriname; TTO = Trinidad and Tobago; URY = Uruguay; VCT = Saint Vincent and the Grenadines; VEN = Venezuela.

STRUCTURAL FRAMEWORK

A structural approach confirms the important influence of crime on growth and facilitates evaluation of the impact of labor policies and output growth on crime, and the effect on economic activity of policies aimed at mitigating crime. The structural model presented in this section is based on Plotnikov (2019).

The general equilibrium framework in this section puts together key transitions for firms (job creation and production) and for workers: (1) employment and unemployment, (2) the choice between criminal and productive activities and (3) prison spells and the return to the labor market. The determinants of flows between these states are examined as part of the attempt to assess the relationship between economic output and crime.

Crime's Effect on Firms and Workers

The model builds on the standard Diamond-Mortensen-Pissarides (DMP) search framework. There are two types of agents: workers and firms. The main features of the model, including its interaction with crime, are presented here with additional details in Appendix 6.1 and in Plotnikov (2019). A search and matching

framework is a natural environment to study flows between employment, unemployment, criminal activity, and prison (Figure 6.7). The framework incorporates the frictions that exist in real world labor markets (such as costs of posting vacancies and searching) and generate unemployment in equilibrium.

The general idea behind the model is that individuals and firms can calculate a value of being in each possible state (vacancy and production for firms; employment, unemployment, criminal activity for individuals) given the underlying parameters. A higher value of employment relative to crime increases transition flows toward employment. Search frictions ensure that the flows are not instantaneous. A policy action changes the value of potentially every state, altering the transition flows among states and the number of economic agents in every state.

Representative firms post vacancies at a cost c per period. Similarly, individuals who are unemployed search for a job. Unemployed individuals and firms with vacancies meet randomly. The number of matches per time period is determined by a matching function $m = m(u, v)$, where u is the number of unemployed individuals and v is the number of firms with vacancies. Therefore, the probability per period of a firm filling an existing vacancy is $q = \frac{m}{v} = q(\theta)$, where $\theta = \frac{v}{u}$ is the labor market tightness. Similarly, the probability of a worker finding a job is equal to $\frac{m}{u} = \theta q(\theta)$.⁸

The present-discounted value of expected profit from an occupied job, V_j , can be written as

$$V_j = \frac{c}{q(\theta)} = \frac{\alpha(p - w)}{r + \lambda} \quad (1)$$

where c is the cost of posting a vacancy per period, p is labor productivity, w is the wage of a worker, r is the discount rate, λ is the exogenous job destruction rate, and $0 < 1 - \alpha < 1$ is the crime rate.

Equation (1) states that the present value of an open vacancy (left side) must equal the present value of the filled job (right side). This equation is standard in the search literature (for example, Pissarides 2000) except for the crime rate. The crime rate enters the equation under the assumption that after the firm produces output, a criminal steals it with probability $1 - \alpha$ and the affected firm and worker receive zero income in the same period. With probability α , a firm's output p is produced with no disruptions and is split between wage w and firm's profit $p - w$. Thus, criminal activity in the model can be interpreted as any economic disruption of production, including extortion by gangs through a "war tax," fraud, corruption, and theft of assets. An indirect effect of crime on job creation is clearly illustrated here: crime reduces expected profits and therefore leads to less vacancy posting, all else equal.

An unemployed worker receives z per period, representing gains from leisure or unemployment benefits. With probability $\theta q(\theta)$ an unemployed person finds a job, and with probability $1 - \theta q(\theta)$ the person continues to be unemployed in the next period. Employed individuals receive wage w per period with probability

⁸Assuming homogeneity of degree of one of the matching function m .

α , if the contracting firm is not affected by crime, and zero with probability $1 - \alpha$ if the firm is victimized. After the crime uncertainty is realized, the match is destroyed with exogenous probability λ . If the match is destroyed the worker becomes unemployed and the firm opens a vacancy. Under these assumptions, the values of being employed, V_w , and unemployed, V_u , are:

$$rV_w = (1 + r) \frac{\lambda z + \alpha w(r + \theta q(\theta))}{\lambda + r + \theta q(\theta)} \quad (2)$$

$$rV_u = (1 + r) \frac{z(\lambda + r) + \alpha w\theta q(\theta)}{\lambda + r + \theta q(\theta)} \quad (3)$$

Clearly, crime influences the present values of being employed, V_w , and unemployed, V_u (see annex for derivation of equations (2) and (3)). The value of being employed in the presence of crime ($\alpha < 1$) is lower than in a world without crime ($\alpha = 1$).

Accounting for Organized Crime

The model includes full-time rather than petty criminals, consistent with the prevalence of gangs in CAPDR. The transition rate into crime, b , is endogenous in the model and is such that individuals experience indifference between searching for a job and becoming a criminal.⁹ In equilibrium, every period a share b of unemployed individuals receives the opportunity to become criminals.

In the model, criminals earn per period income w_B (see equation (5)) and go to jail with exogenous probability η . The parameter $0 < \eta < 1$ measures overall effectiveness of the police and the judicial system in catching and prosecuting criminals, with higher values representing a more effective system. Criminals that have not been arrested continue to be criminals in the next period.

Prosecuted criminals are sent to jail where they earn zero income and transition into the unemployment pool with probability ξ , which represents the average sentence duration once a criminal is convicted.¹⁰ The value of criminal activity V_B can be expressed as

$$V_B = \frac{(1 + r)w_B + \eta \left(\frac{\xi}{r + \xi} \right) V_U}{\eta + r} \quad (4)$$

which, given assumptions, means that $V_B > V_U$ (that is, it is better to be a criminal than unemployed). Thus, criminal activity becomes less attractive if (1) the prosecution rate η increases, (2) the average sentence length increases (lower ξ) or (3) if the per-period income of criminal activities decreases.

How is the criminals' income, w_B , determined? For simplicity, the entire stolen income, which includes both wages and firms' profits, is assumed to be uniformly distributed across active criminals:

⁹This condition is required for coexistence of productive and criminal activities in the long term.

¹⁰Note that lower values of ξ correspond to longer sentences.

$$w_B = \frac{p(1-\alpha)N_L}{N_B} \quad (5)$$

where N_L is the number of producing firms—which equals the number of employed individuals—and N_B is the number of active criminals. The aggregate crime rate $1 - \alpha$ is an increasing function of the number of active criminals. Under certain regularity conditions, $\alpha(N_B)$ has the following two properties: (1) if there are no criminals, the first criminal will make an infinite profit; (2) two criminals together “steal” more output than one, but receive less income per person. This ensures the existence of an equilibrium with positive crime (see Plotnikov 2019).

Occupational Choices and Transitions

For productive and criminal activities to coexist in the steady state individuals must be indifferent between searching for a job or becoming a criminal. Therefore:

$$b V_B + (1 - b) V_U = \theta q(\theta) V_w + [1 - \theta q(\theta)] V_u \quad (6)$$

Equation (6) determines the transition rate to criminal activity, b and implies that the expected present value of becoming a criminal (left side) is equal to the expected present value of legal activities (right side).

In the steady state of the model, every period the unemployed pool grows with workers whose match was destroyed and ex-convicts released from jail and it decreases as workers find jobs or become criminals. The number of criminals grows as the unemployed transition in and shrinks as criminals are captured/convicted. The number of individuals in jail increases due to inflow of convicted criminals and decreases as convicts are released. Figure 6.7 summarizes flows within the model with corresponding per period rates.

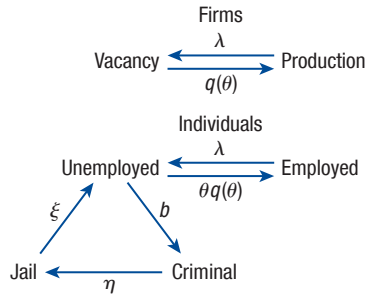
Results and Policy Experiments

The calibrated model implies a GDP loss of about 16 percent, through direct and indirect effects. About 13 percent is lost directly due to crime (that is if all crime were eliminated), while 3 percent is lost to its indirect effects.¹¹ Direct losses are in line with existing estimates in the literature (Jaitman 2017), although closer to the upper bound of the range. The main reason is that this measure of the cost of crime includes not only forgone labor income (the largest cost of crime mentioned in Jaitman 2017) but also firms’ lost profits. The estimated direct cost is below the cost of 16 percent of GDP for El Salvador and a slightly higher number for Honduras, both calculated by the UN Development program and quoted by the *Economist* in 2016.

One of the advantages of using the model is the possibility of estimating the indirect effect of crime. It is impossible to calculate it directly from the data

¹¹For simplicity, the model is calibrated for Honduras but qualitative results hold for other Northern Triangle countries. Details are in the Annex 6.1.

Figure 6.7. Flow Chart of State Transitions in the Model

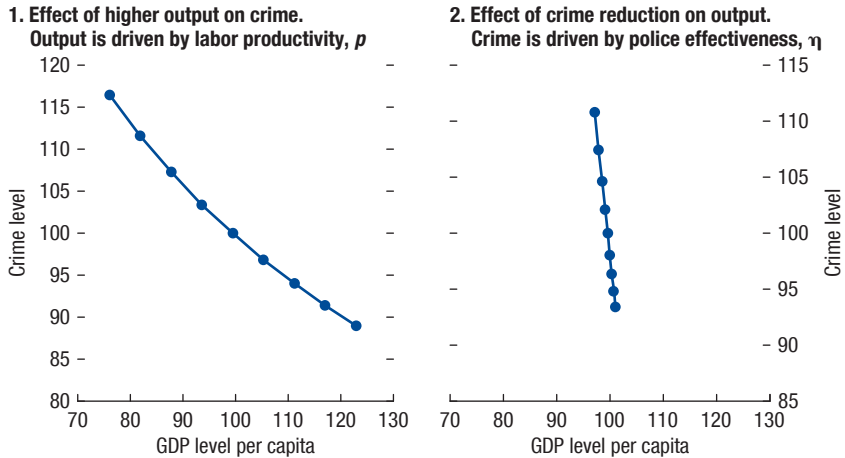


Source: Plotnikov (2019).

because doing this requires an estimate of the counterfactual level of employment in the absence of crime. However, it can be calculated in the model by setting $\alpha = 1$. The implied indirect cost of crime is an additional 25 percent of direct cost of crime (3 percent of GDP under the parameters used), measured by lower equilibrium output and employment due to crime. Labor demand is reduced because firms post fewer vacancies in expectation of lower returns from production (equation (1)). Labor supply is reduced because workers foresee lower returns from working (equation (2)).

The discussion now turns to the question that motivated the use of the model: the relationship between crime and output. Many underlying factors lead to the inverse relationship between crime and output observed in the data. The model quantifies the effects of two factors: one directly associated with output and only indirectly with crime, and other directly associated with crime and only indirectly with output.

The model implies that on average a 1 percent increase in output per capita, driven by an increase in labor productivity p , implies about $\frac{1}{2}$ percent decline in crime. To see this, Figure 6.8, panel 1, shows how crime rate and GDP per capita change when labor productivity varies from 80 percent of its steady state value to 120 percent of its steady state value (in 5 percent increments, see markers). The initial level of output and crime is normalized to 100. As productivity improves, legal activity becomes more attractive than criminal activity. Although existing criminals also receive higher income from higher growth, the higher profitability of the legal employment outweighs these gains. Higher firm profits in turn encourage more firms to enter the market, thereby expanding employment. The effect is nonlinear: the positive incremental effect on crime shrinks as productivity reaches higher levels. Crime is a multiplier between productivity and observed output: if productivity increases (decreases) by 10 percent, output per capita increases (decreases) by about 11 percent, while if the increase (decrease) is twice as big, output increases (decreases) by 23 percent.

Figure 6.8. Relationship between Crime and Output

Source: Model simulations or author calculations.

The model suggests that on average a decrease of about $5\frac{1}{4}$ percent in crime, driven by an increase in police effectiveness η , leads to about a 1 percent increase in output per capita. Figure 6.8, panel 2, presents the impact of changes in police effectiveness (again, in 5 percent increments of η) on output and crime. A 20 percent increase in police effectiveness, where by way of example the prosecution rate increases from 4 percent to 4.8 percent, decreases crime significantly—by about 7 percent. Again, effects are nonlinear and the positive effect from increased policing on output and crime shrinks at higher levels.

Next comes examination of the effects of three policy variables on crime and growth: (1) the leisure value of unemployment/recreational activities, (2) reducing barriers to entry for firms, and (3) higher unionization. The results of these experiments are summarized in Table 6.1.

Table 6.1 shows that increasing unemployment benefits or providing recreational activities for the unemployed reduces crime and improves output. Intuitively, increasing z makes crime less attractive by reducing the gap between the payoff of being a criminal and continuing to look for a job. Thus, the criminal population declines, which in turn improves the attractiveness of legal activities and increases output as less is lost to crime. However, the effect is small and is not welfare-improving. Why? Increasing the value of unemployment is costly (especially if one interprets z as unemployment benefits) and discourages job seeking. Therefore, providing higher unemployment benefits or recreational activities for high-risk youth can help reduce crime in the short term and increase trust in policing authorities, but in the medium term these policies should be complemented with job training and education to encourage reentry into the employed labor force.

TABLE 6.1.

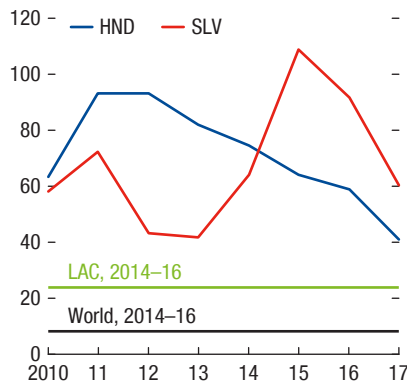
Effects of Policy Experiments on Crime and Growth								
Change in the policy variable, percent of sum of squares value	−20	−15	−10	−5	+5	+10	+15	+20
Leisure value/Outside activities, z								
Crime, percent	0.4	0.3	0.2	0.1	−0.1	−0.2	−0.3	−0.4
Output per capita, percent	−0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Vacancy cost/Barriers to entry, c								
Crime, percent	−13.2	−9.9	−6.6	−3.3	3.3	6.5	9.8	13.1
Output per capita, percent	3.8	2.8	1.9	0.9	−0.9	−1.8	−2.8	−3.7
Worker's bargaining weight/Unionization, β								
Crime, percent	−24.4	−19.1	−13.3	−7.0	7.9	16.9	27.6	41.1
Output per capita, percent	6.7	5.2	3.6	1.9	−2.1	−4.5	−7.4	−10.9

What constitutes z matters. For example, providing recreational activities to at-risk youth or organizing police fairs—as is currently done in Honduras—can increase trust in policing and, as a result, indirectly boost police effectiveness, η .

Reducing vacancy-posting costs is beneficial for both output and security (see Table 6.1). Vacancy-posting costs can be interpreted as hiring expenses, on-the-job training, or a flow-equivalent entry cost for firms. A decrease in these costs would imply that more firms will find it profitable to enter the market and start production once vacancy is filled. Vacancies posted by these additional firms will boost the job finding rate, employment, and therefore the value of legal activities. As relative attractiveness of criminal activities falls, the numbers of criminals decreases, reducing the crime rate. The model implies that 10 percent reduction in the vacancy cost per period reduces crime by 6.6 percent and improves output by almost 2 percent. In addition, since a fixed entry cost is most binding for firms with lower productivity, reducing it will lower inequality.

Table 6.1 also shows that, in the presence of crime, boosting attractiveness of legal employment by increasing wages through higher unionization or higher minimum wages might backfire. In the presence of crime, one may also wonder if higher bargaining power for workers (which can also be interpreted as higher minimum wage) will encourage the switch from crime into employment. Interestingly, the model shows that such policy would be detrimental to both growth and security. The reason for this is that, in the presence of crime, incentives for firms to enter the labor market are already weak. Increasing the bargaining power of workers reduces it further, resulting in lower vacancies. This in turn leads to a lower job finding rate and employment, encouraging criminal activity as an alternative. Fundamentally, increasing the bargaining power of workers has a purely redistributive effect, it generates no surplus and reduces firms' payoff for job-creation. That said, the negative effect on the economy is likely to be significantly lessened, as higher unionization is likely to push the economy toward informality rather than criminal activity, which is the only alternative to legal activity available in the model.

Figure 6.9. Homicide Rates in Honduras and El Salvador
(Per 100,000 inhabitants)



Source: United Nations Office of Drugs and Crime, Insight Crime.

Note: HND = Honduras; SLV = El Salvador.

CASE STUDIES

This section presents case studies of two countries in the region that have had very different approaches to crime. Honduras had higher crime than El Salvador in the beginning of the 2010s but that situation has since reversed (Figure 6.9). The case studies analyze the policies that contributed to this dynamic.

Honduras

Despite the decline in both the amount of drug trafficking and the homicide rate since the beginning of the 2010s, Honduras remains a major stop in the cocaine route to the United States. As in other Northern Triangle countries, the value of drug trafficking, a major factor behind crime and violence, declined from about 13 percent of national GDP in 2010 to about 5½–7½ percent in 2015.¹² This decline contributed to the drop in homicides—by more than 30 percent—over the same period. However, the still enormous drug trade value, together with persistently high poverty (about ⅔ of population live in poverty according to the national definition), weak institutions, low education levels, and wide availability of firearms, continue to fuel still-high violence.

To reduce homicides and drug trafficking, Honduras targeted police operations and crime prevention programs in the highest crime areas, and improved its

¹²This is calculated combining the amount of cocaine reported in the 2017 International Narcotics Control Strategy Report of the US State Department and wholesale prices of cocaine reported in World Bank (2011).

police force. Security resources were increased substantially to support these operations. As a percentage of GDP, the budget of Ministry of Security rose by 20 percent from about 1 percent of GDP in 2012 to 1.2 percent in 2017. The defense budget was increased even more—from 0.8 percent of GDP in 2012 to 1.3 percent in 2017.

To reduce homicides, the police concentrated efforts on the most violent areas over the previous five years. Many of the crime bosses who controlled these areas were captured and extradited to the United States. Crime prevention programs also focused on high-crime areas. To prevent homicides, the authorities focused on crimes that often lead to murders, such as extortion (InSight Crime 2017). The government implemented several real-time monitoring initiatives. These included two new 911 centers in the two largest Honduran cities, security cameras, street lights, and panic buttons in public buses. The government also improved the poor public opinion of the police force, which more than half of people said they distrusted at the beginning of 2016,¹³ by organizing fairs for citizens to meet police and receive free medical services. Since then, the authorities reported an increase in emergency calls to police and anonymous “tip” calls, which along with higher attendance to police fairs signal that the public image of the police is improving.

Both the quality and quantity of the police force have improved over the past three years. In 2013, Honduras simultaneously had the highest homicide rate in the world and one of the lowest police coverage rates—147 officers per 100,000.¹⁴ To correct for this, the authorities decided to train about 2,000 officers a year for five years, with the objective of doubling the number of police officers by 2022. Police training and equipment have also improved. First, a high school diploma is now mandatory to enter the police force. Second, mandatory police academy training has increased from three to eleven years, though it remains below the average of selected European countries in the 1990s (Pagon and others 1996). The average monthly salary of a police officer increased from \$300 in 2013 (170 percent of GDP per capita) to \$500 in 2016 (254 percent of GDP per capita). The authorities also invested in uniforms and vehicles, which many precincts were lacking. Third, to break ties between police and organized crime, a government-established civilian committee in charge of investigating and dismissing corrupt officers started operations in April 2016. As of October 2017, the committee had reviewed about 14,000 police employees of which 4,500, including several high-ranking officers, have been suspended.

To stop the homicide rate from rising, the authorities need to continue reforming the prison system. Honduran prisons are understaffed and overcrowded. According to the World Prison Brief, as of mid-2016, the prison population was at 163 percent capacity, with more than half of prisoners behind bars without

¹³According to a survey administered by the National University.

¹⁴According to the United Nations Office of Drugs and Crime (UNODC), the region had double the number of police officers on average—about 300 police officers per 100,000.

a conviction. Moreover, prisons had a staggering ratio of 9½ prisoners to every staff member in 2015, while Costa Rica had about 3¼.¹⁵ The high ratio inhibits monitoring and control of prison population, which can lead to the formation of gangs within prisons. In the past two years, Honduras has made several advances in prison reform. The most notorious and chaotic prison in San Pedro Sula was closed and two high-security prisons were built. This contributed to dismantling criminal organizations and a reduction in homicides.

While some progress has been made with the arrival of an Organization of American States anti-corruption mission, the judicial system remains one of the weakest links in the fight against corruption and crime. ASJ (2016) documents that, over 2008–15, only 8 percent of corruption complaints ended up in court, and only 17 percent of these resulted in a guilty verdict. In most guilty verdicts, no sentencing or jail time was handed out. Amid the embezzlement episode at the Honduran Social Security Institute (IHSS) that led to public outcry, the authorities obtained the help of the Organization of American States support mission against corruption and impunity (MACCIH).¹⁶ It received a four-year mandate, formally starting operations in April 2016. However, MACCIH's inability to open a criminal investigation without approval from the Honduran public prosecutor has inhibited progress.

The government needs to engage MACCIH on the justice reform, and to increase both the independence of the judicial system and its funding (it has been stagnant as a share of GDP since 2012). The authorities should also investigate and dismiss corrupt judicial system officials. Police reforms can serve as an example.

El Salvador

Despite street gangs not being the only criminal actors in El Salvador, the government and public opinion attribute the increase in violent crime to them. About 30 percent of homicides occur in San Salvador, the capital, and the victims are mostly young men aged between 15 and 35.¹⁷ Many of these deaths are a consequence of gang fights for territorial control, but gangs have also targeted public security officers. Armed robberies and extortions are common and constitute the gangs' main source of income (Cruz 2010). Almost 70 percent of the businesses in the country are forced to pay as a result of extortion, which amounts to 3 percent of GDP.¹⁸

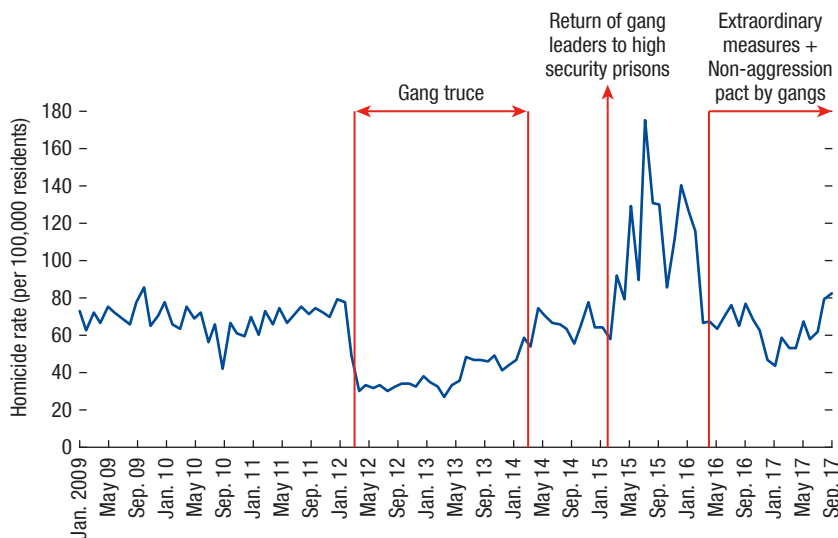
The fight against gangs up to 2011 had a repressive nature, mostly focused on law enforcement efforts, and did not reduce the violence. The *Mano Dura* and

¹⁵UNODC data.

¹⁶During 2010–14, the director of the IHSS appointed by the administration of then-president Lobo allegedly misspent at least \$120 million. At least part of this sum ended up in the National Party, to which the incumbent President Hernandez also belongs.

¹⁷El Salvador National Civil Police data.

¹⁸"The gangs that cost 16% of GDP." *The Economist*. May 21, 2016. Web access, January 24, 2018.

Figure 6.10. Homicides in El Salvador, 2009–17

Source: Author calculations based on data from El Salvador National Civil Police. Annualized monthly rates.

Super Mano Dura security plans of 2003 and 2004 introduced discretionary crimes that increased incarceration of gang members and prison sentences and involved military personnel in policing and prison control. Contrary to the authorities' objective, homicides rose during the *Mano Dura* era from 32 per 100,000 inhabitants in 2002 to 63 in 2006–11 (Figure 6.10).¹⁹ The mass incarceration of gang members led to overcrowding. Prisoners were separated according to gang affiliation, which strengthened group cohesion and helped gang leaders organize. To support their imprisoned peers, street-based gang members redoubled their illicit income-generating activities, leading to the increase of other crimes such as extortion (Wolf 2012; Cruz and Durán Martínez 2016).

In 2012, the government secretly negotiated the reduction of homicides with gang leaders. The two largest gangs, *MS-13* and *Barrio 18*, agreed to stop killing each other and to end attacks on public security officers. In exchange the government moved gang leaders to low-security prisons, provided them with visitation privileges, and reduced military control in prisons. The gang truce was effective at drastically reducing homicides from 14 to 6 a day (Figure 6.10). Several factors explained this. First, gangs were responsible for most homicides in El Salvador at the time. Second, gangs had a hierarchical structure with little or no fragmentation, which guaranteed that gang members in the streets would abide by the

¹⁹El Salvador National Civil Police data.

decisions of their imprisoned leaders. Third, the government provided gangs with incentives to reduce violence.

While it reported short-term benefits, the truce was fragile and did not prove to be a long-term solution to the violence. Criminals had incentives to conceal instead of abandon violence (Cruz and Durán-Martínez 2016). The truce also increased the power of gangs by legitimizing them as social entities and transforming them into political actors. A decline in public support for the truce, the new government's dismissal of key mediators, and limited programs to help gang members integrate back into society led to the truce's collapse. As shown in Figure 6.10, the homicide rate increased slowly about a year after the truce was agreed, and within two years it had reached past levels. Throughout 2014 a new government started reducing the benefits of the truce from imprisoned gang members and in February 2015 imprisoned gang leaders were sent back to high-security prisons. As a response, homicide rates increased to record highs. Violence continued through 2015, making El Salvador the most dangerous country in the world outside of war zones. In early 2016, the authorities resorted to repressive measures aimed at reducing communication of imprisoned gang leaders with members on the streets. At the same time the major gangs established a non-aggression pact. While it is hard to assess their relative effect, both measures reduced the number of homicides.

In the aftermath of the truce, the country has transitioned to a hybrid model that combines *Mano Dura* elements with *El Salvador Seguro*, a plan that incorporates stronger prevention and rehabilitation efforts to address the root causes of violence. The plan, established in September 2014, envisages using about \$1.5 billion in external funds for rehabilitation and prevention,²⁰ particularly to strengthen and expand *Yo Cambio*. This program helps inmates to develop work-force skills that can help them enter into productive life and earn legitimate income. While promising, *Yo Cambio* lacks methods and tools to monitor and evaluate its effectiveness, and its current size is insufficient to accommodate all youths in the prison population, the group most prone to recidivism.²¹ To tackle these challenges, El Salvador has received external financial support. However, there is still no evidence of impact because political polarization hinders the allocation of funds to security programs and slows down disbursements. Also, its effects may take longer to materialize due to the structural nature of the violence problem.

The recent hybrid approach contributed to reducing homicides. Rehabilitation and prevention components of *El Salvador Seguro* should help to sustain the result. However, this will also require stronger monitoring efforts through the development of unified and consistent crime statistics, which will help allocate

²⁰“El Salvador Government Releases Plan to Reduce Violence.” *Insight Crime*. January 16, 2015. Web access, January 24, 2018.

²¹“Violence Prevention Strategy Comprehensive Support Program (ES-L1025) Loan Proposal.” *Inter-American Development Bank*. 2012. Web access, January 24, 2018.

adequate resources to crime-prevention activities with potential to permanently reduce the violence.

CONCLUSIONS AND POLICY RECOMMENDATIONS

While crime remains a headline issue for CAPDR, not enough work has been directed toward quantifying the effects of crime in the region, examining its drivers, and formulating solutions. The reasons are many, including data limitations, capacity and resource constraints, a bias toward punitive rather than analytical or preventive measures in public policy, and sensitivities around the topic. In addition, despite substantial economics research into crime, not enough attention has been paid to the effects of economic policies on crime and vice versa.

From an economic perspective, as articulated by Becker half a century ago, criminals are rational individuals who compare the expected cost and benefit of committing crimes with those of legal activities. Taking the profit out of crime should be a key policy goal. As demonstrated in the general equilibrium setup in this chapter, a combination of higher returns to legal activities (productivity) and increased police effectiveness will reduce crime rates.

Given the deep poverty in CAPDR (especially the Northern Triangle), tackling crime will require a combination of:

- Policies to spur growth, promote labor market opportunities, and therefore increase expected benefits from legal and non-violent activities.
- Improvements to policing and other deterrence activities to curb gang activity.
- Strengthening the criminal justice system (impunity rates can currently be as high as 95 percent, according to the Wilson Center) while promoting the reintegration of ex-convicts (including lower-status gang members) in the productive economy.

From a fiscal point of view, higher resourcing (for example, tax revenues) could help public service provision. Given gangs' recruitment techniques among the youth, it is essential to reduce costs for skills development and support vocational programs and social programs that target at-risk youth. While providing recreational activities can reduce crime in the short term and obtain trust, in the medium term these programs should invest in job training and education. To succeed, there is a need to channel (scarce) resources to prevention programs, which are often understaffed and neglected, as are most budgets for a security focus on deterrence. Avoiding making public security a political issue would also help.

On the pillar of smart policing and deterrence, it is critical to invest in data collection and monitoring, and to adjust strategies in real time. Given the region's constrained fiscal resources, interventions should be targeted to the most-needed areas and adjusted based on evidence.

Strengthening the credibility and efficiency of the criminal justice system would allow for swift conviction and punishment of offenders. At the level of secondary prevention (working with the criminally active), governments should also provide basic skills training to convicts to bolster reintegration in the

productive sector. Lowering overcrowding and improving the quality of prison facilities and personnel to prevent crime and gang formation within prisons is vital.

Crime and low growth are closely intertwined. As demonstrated in the model, higher productivity is one of the most consistent drivers of crime reduction as it tilts incentives of unemployed individuals toward productive activity. Thus, complementing the crime-fighting recommendations in this chapter with policies that reduce barriers to entry for new firms and improve the business climate would be key to promote employment and increase profit of legal activities, therefore fostering job creation and a reduction in crime.

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ANNEX 6.1: DERIVATION OF EQUATIONS (2) AND (3) IN THE MODEL

The assumptions about income per period and transition probabilities from unemployment to employment and vice versa imply

$$V_u = z + \frac{1}{1+r} (\theta q(\theta) V_w + (1 - \theta q(\theta)) V_u) \quad (1)$$

$$V_w = \alpha w + \frac{1}{1+r} ((1 - \lambda) V_w + \lambda V_u) \quad (2)$$

Solving for the present values of being employed V_w and unemployed V_u leads to equations (2) and (3).

Wage is determined using Nash bargaining. Denote $0 < \beta < 1$ the bargaining weight of individuals. Then the wage is determined through

$$V_w - V_u = \beta (V_f + V_w - V_u) \quad (3)$$

The expression in parentheses is the total created from the match between the worker and the firm. Solving this yields the aggregate equilibrium wage equation

$$\alpha w = (1 - \beta)z + \beta(\alpha p + \epsilon\theta) \quad (4)$$

Intuitively, Equation (4) is an equivalent of the labor supply equation in the model. It says that the expected wage is a weighted average of a worker's income if unemployed, z , and the sum of the expected match surplus αp and the average hiring cost $\epsilon\theta$ per unemployed worker. Clearly, if the worker's bargaining weight decreases (and, therefore, the firm's bargaining weight increases) the wage decreases. In the extreme case when $\beta = 0$, individuals are indifferent between working and staying unemployed as both activities result in the same income. As in the standard model, a worker is rewarded for the saving of hiring cost that the firm receives when the match is formed, $\epsilon\theta$. See Plotnikov (2018) for more details and intuition.

ANNEX TABLE 6.1.1.

Calibration Summary		
Parameter name	Symbol	Source/Target
Discount factor	r	2.2 percent annual real interest rate
Job destruction rate	λ	Job average duration of 2 years as in the United States (Shimer 2005)
Outside option, leisure	z	Social spending—3.2 percent of GDP
Worker bargaining power	β	Surplus is split equally between worker and firm
Vacancy cost per period	c	Implied by other parameters and the target unemployment rate of 7.3 percent
Effectiveness of the judicial system	η	Four percent of murders are prosecuted per year
Release rate from jail	ζ	Average imprisonment duration is 15 years. Lower bound for murder in the Honduras penal code.
Matching function	$q(\theta) = A\theta^{-s}$	The scaling factor A is implied by λ and the target unemployment rate (7.3 percent). The matching function is assumed to be equally elastic to the number of vacancies and unemployed ($s = 1/2$)
Effectiveness of criminals	$\alpha(N_B^N) = N_B^\mu$	Parameter μ is assumed to be $1/2$.

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Benchmarking Social Spending in Central America

JAVIER KAPSOLI AND IULIA TEODORU

INTRODUCTION

The legacy of the global financial crisis includes many important lessons for developing and low-income countries. The large fiscal buffers accumulated before the crisis opened up space to implement countercyclical policies that limited the negative impact on growth and employment (IMF 2010 and Celasun and others 2015). However, the easing was not followed by a timely withdrawal. As a result, buffers were depleted and in some cases debt reached unsustainable highs.

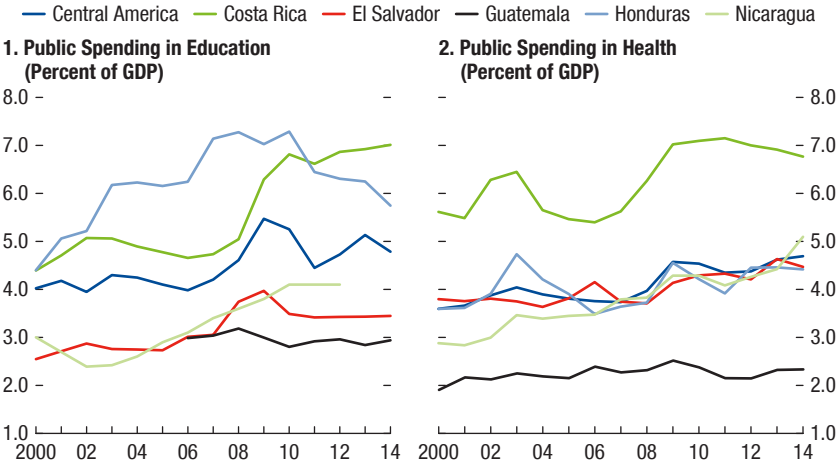
Restoring the fiscal buffers required for protection from a new shock is challenging for these countries. This is especially so given high uncertainty about the global outlook, constraints on spending due to the servicing of debt, and long-term demographic pressures highlighted in the previous chapter. Although it is difficult to assess the exact size of buffers required to shield against contingencies, the experience of the global financial crisis highlights the value of building ample buffers.

The need to rebuild buffers runs parallel with the need to increase public spending to close gaps in the provision of social services. Improving health and education outcomes is critical to achieve this objective and boost human capital. Abundant literature on endogenous growth shows a close connection between accumulation of human capital and growth (Barro and Sala-i-Martin 2004). A healthy and educated population is more productive, which in turn raises income per capita.

How is the puzzle of restoring buffers and simultaneously increasing social spending solved? In short, by increasing the efficiency of public spending. Higher efficiency in the use of public resources allows buffers to be restored and essential public services to be increased. The focus in this chapter is on gauging the efficiency of social spending on health and education.

Calculated efficiency measures can be used to estimate potential expenditure savings. Due to the size of social spending, these savings are significant. On average, public spending in developing and low-income countries is about 23 percent of GDP, with the bulk allotted to health and education. Because of this, even small improvements in the efficiency of public spending provide sizable resources

Figure 7.1. Social Spending Trends



Sources: The World Bank, WHO, and UNICEF.

for use in other sectors with greater value for money. Tackling inefficiencies in public spending could help governments increase their delivery of public services while simultaneously keeping fiscal balances under control.

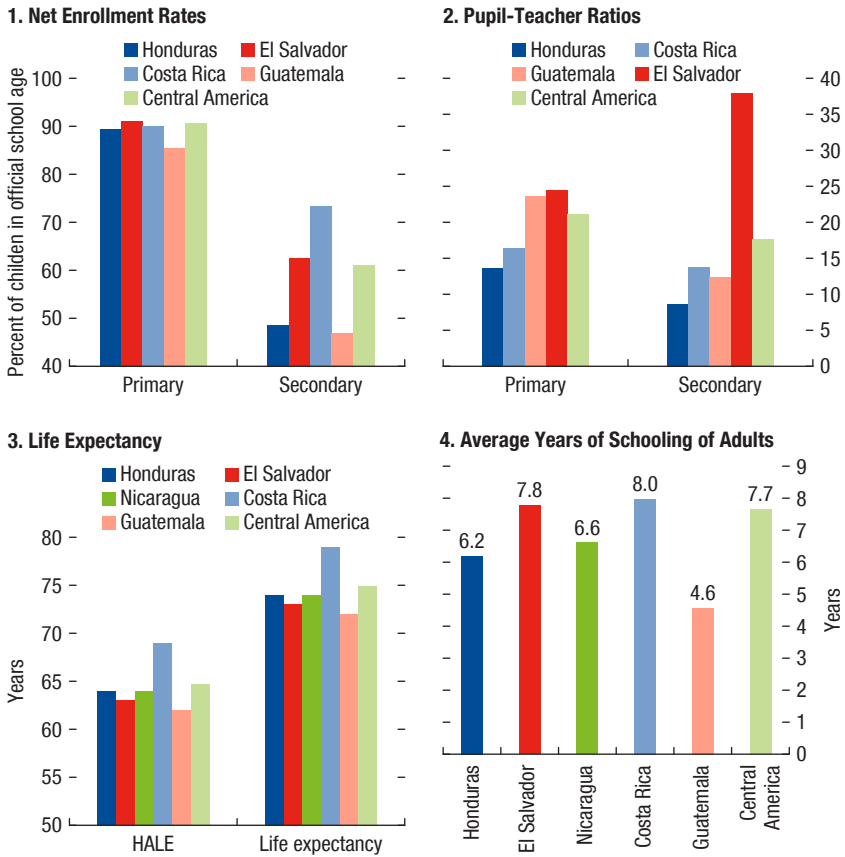
The chapter starts by describing the main trends in health and education spending in Central American countries and comparing how efficiently inputs translate into outputs using a benchmarking methodology detailed in Annex 7.1. Policy recommendations are proposed to improve the efficiency of social spending in several of the region’s countries.

SOCIAL SPENDING TRENDS

The empirical analysis starts with a review of the main trends in countries discussed in this chapter. As Figure 7.1 shows, social spending has been increasing slowly in Central America. Increases in health and education expenditure since 2000 are in both cases around 1 percentage point of GDP, from an average of around 4 to 5 percent of GDP. This trend is mirrored in Latin America as a whole, where public spending has also generally increased by 1 percentage point of GDP.

Social spending is consistently higher in Costa Rica than in Central American peers, while this is the case for Honduras only in education spending. However, spending in Honduras is coming down, while in Costa Rica it seems to be on an increasing trend. On the other hand, social spending in Guatemala, in both health and education, is largely below the regional average.

Figure 7.2 shows some interesting comparisons, which are matched in the results of the benchmarking exercise. Honduras, Guatemala, and El Salvador

Figure 7.2. Selected Educational Input and Output Comparisons

Sources: World Bank; World Health Organization; United Nations Educational, Scientific, and Cultural Organization; and Barro-Lee database.

Note: HALE = health-adjusted life expectancy.

(and Latin America in general) have large enrollment gaps in secondary education. This is consistent with the current demography of the region: a relatively young population, large dropout rates, and low average years of schooling. Population aging, while limited so far, is expected to accelerate over the coming decades creating the need to divert resources from lower to higher levels of education and achieving more efficiency of spending at the same time (Chapter 8). For example, pupil-teacher ratios in Honduras are very low relative to its peers. Guatemala also lags its peers in pupil-teacher ratios in secondary education. This points to a currently overfunded educational system and the need to rationalize resources with a focus on improving outcomes in secondary and tertiary education.

As can be seen in Figure 7.2, public spending in education is highly concentrated toward primary grades, and more so in El Salvador, Guatemala, and Honduras than in other regional peers. If spending is raised to account for population aging, it should focus on higher, rather than primary, education.

EMPIRICAL RESULTS

As explained in the technical analysis in Annex 7.1, both available methodologies for empirical analysis assume an underlying technological process to create certain social outcomes based on certain inputs (among them public spending). This framework requires the assumption of some degree of homogeneity across countries. The benchmarking literature identifies a shortcoming regarding this assumption; factor prices tend to be higher in wealthier than in medium or low-income countries.¹ Higher prices usually imply higher spending; therefore, rich countries can be deemed inefficient only inasmuch as this effect applies. Since previous researchers have encountered a similar problem, in the current sample, all industrialized economies are excluded so that developing and low-income countries do not appear relatively more efficient only because of the higher factor prices paid in the industrialized world (see Gupta and Verhoeven 2001, or Herrera and Pang 2005).

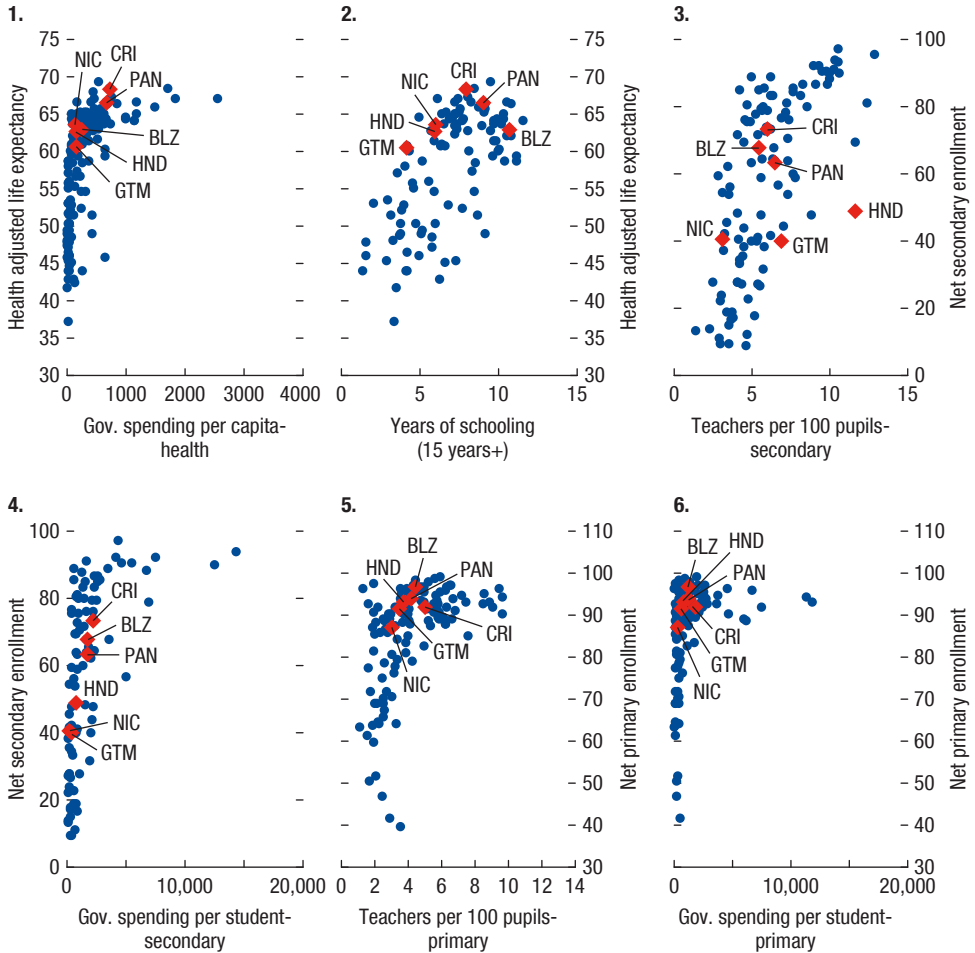
Our input-output model specification is consistent with Herrera and Pang (2005), or Grigoli and Kapsoli (2013) in that it uses health-adjusted life expectancy (HALE) as output and public spending, private spending, and the educational level of adults as inputs.² All spending variables are expressed in 2011 PPP US dollars. The educational attainment of adults is measured by the average years of schooling for population older than 15 years. For education, separate estimates are prepared for primary and secondary education. Net enrollment rates as output and public spending and the teacher-pupil ratio are used as inputs.³ In the case of education, a common critique is that enrollment rates do not adequately measure educational achievements. This is true, but unfortunately the standardized tests (PISA, TIMMS, and PIRLS) commonly used to measure achievement have limited country coverage, particularly for low-income countries.

Based on the input-output combinations for health and education spending, the efficiency scores and their corresponding confidence intervals are estimated using the bootstrapped data envelopment analysis (DEA) approach described in Annex 7.1. Specifically, efficiency scores are estimated for health and primary and secondary education spending using 2000 replications based on a sample of emerging and low-income countries. All variables are averages starting from 2000 until the last available observation. Figure 7.3 shows scatter plots for selected

¹The “Harrod-Balassa-Samuelson effect” describes how prices in wealthier countries are higher than in poorer countries. See Obstfeld and Rogoff, 1996, Chapter 4.

²HALE is estimated by the WHO and is defined as the average number of years that a person can expect to live in “full health,” thus deducting years lived in disease and/or injury from the regular life expectancy.

³Net enrollment rates reflect only students enrolled relative to the corresponding school age excluding repeaters.

Figure 7.3. Selected Inputs and Outputs for Social Spending

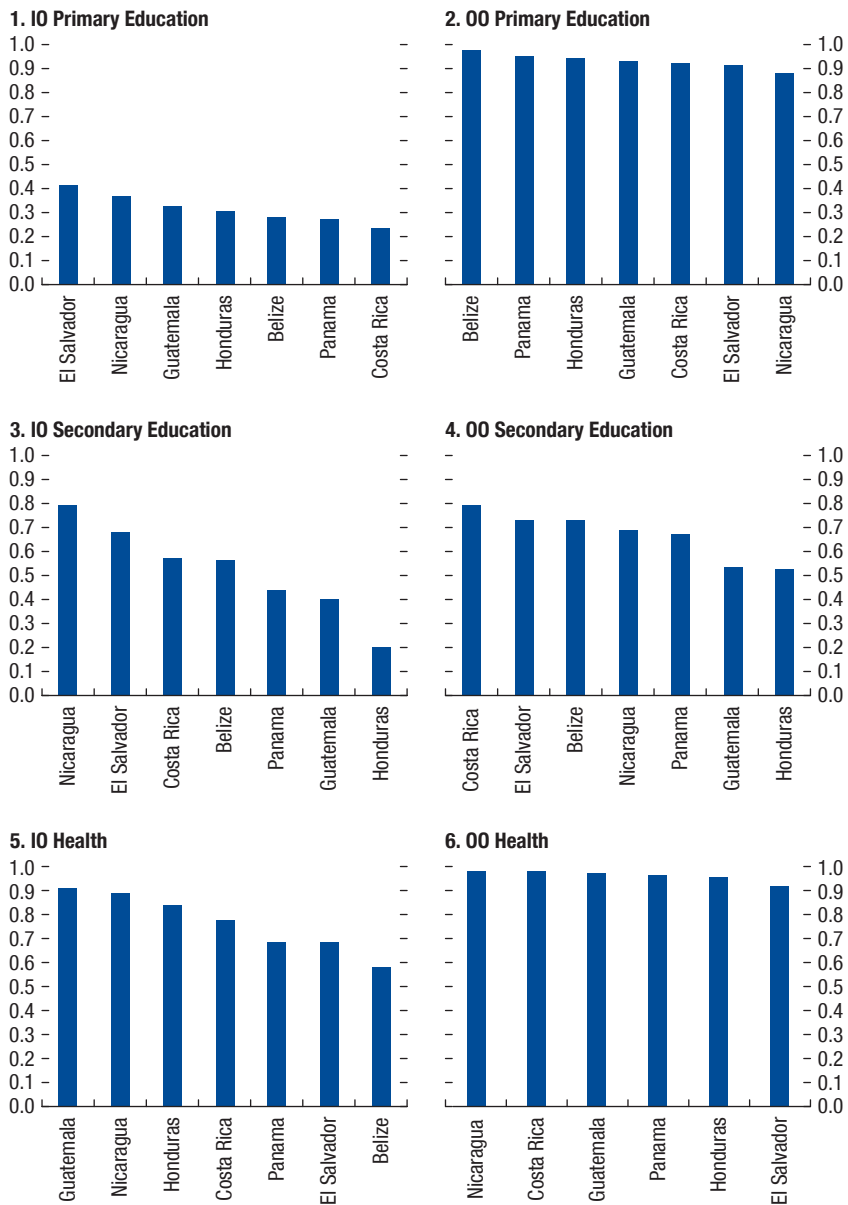
Sources: World Bank; World Health Organization; United Nations Educational, Scientific, and Cultural Organization; and Barro-Lee database.

input-output combinations. To make viewing easier, labels are shown only for Latin American countries. As can be seen, all bijections seem positive.

Figure 7.4 shows the main results of the chapter, that is the estimated efficiency scores for Central American countries. Detailed efficiency scores and confidence bands for all countries in the sample are available in Annex 7.2.

Honduras. The output-oriented (OO) score for health in Honduras is 0.955, showing limited room for getting better outcomes with inputs efficiently; however, the input-oriented (IO) score is 0.840 meaning that all inputs could be reduced by around 15 percent without a marked impact on output. In education,

Figure 7.4. Benchmarking Social Spending Results



Source: Authors' estimations.

Honduras performed poorly in secondary education, ranking last among 88 countries in the IO score (0.208) and 66 out of 88 in the OO measure (0.522). The score is better for primary education, reaching 0.307 in the IO and 0.948 in the OO measures. These results imply potential efficiency savings in educational inputs between 70–80 percent. On the potential efficiency gains, they seem only significant in secondary education (around 50 percent).⁴

Guatemala. The OO score for health in Guatemala is 0.976, which also shows limited room for getting better outcomes with inputs efficiently, however, the IO score is 0.910 meaning that all inputs could be reduced by around 10 percent without a reduction in the output. In education, Guatemala performed poorly in secondary education, ranking 69 out of 88 countries with an input-oriented score of 0.403 and 65 out of 88 in the output-oriented measure (0.534). The result is better in primary education in the OO measure scoring 0.932, while it is worse for the input-oriented case (0.328). These results imply potential efficiency savings in educational inputs of between 60–70 percent. On the potential efficiency gains, they seem only significant in secondary education by around 50 percent.

El Salvador. The OO score for health is 0.918 in El Salvador, pointing to a margin of around 8 percent to increase outcomes by using inputs efficiently. The estimated IO score of 0.679 shows that significant room exists for efficiency savings, where all inputs could be reduced by around 33 percent without a change in the output. El Salvador performed better in secondary education, achieving higher IO and OO scores (0.681 and 0.733), but there are still efficiency savings and gains to be realized. The results are not as good in primary education, with scores of 0.419 for the IO measures but better for the OO measures, with scores of 0.921. These results imply potential efficiency savings in educational inputs of between 30–60 percent. Potential efficiency gains seem only significant in secondary education (at about 30 percent).

Costa Rica. Health and primary education show high OO efficiency scores, implying little room for efficiency gains. However, secondary education shows a margin for efficiency gains of around 25 percent. In IO scores, Costa Rica shows a better prospect for input savings particularly in primary education, where it ranked last in the Central American region.

Nicaragua. High OO efficiency is recorded in health and primary education but there is a lot of room for efficiency gains in secondary education (around 30 percent). Analyzing IO, Nicaragua shows large room for input savings in education.

In sum, the efficiency metrics show limited room to increase health outcomes without an increase in inputs; however, there is an opportunity for savings, particularly in El Salvador. In primary education, there is no space for sizable improvement in outcomes but all countries show ample room for savings. In secondary education, there is room for sizable efficiency improvements to achieve better outputs and to save on inputs.

⁴Depending on the model, an efficiency gain is defined as a percentage increase in output without using more inputs in an output-oriented model or a percentage reduction in the use of inputs keeping the output constant in an input-oriented model.

For an idea of the policy implication of these estimations, potential long-term savings can be calculated for the scenario where all inefficient spending is removed.⁵ If Honduras and Costa Rica could remove all inefficiencies in education spending, they could attain savings worth around 3 percent of GDP. Savings in education in El Salvador and Guatemala would amount to 1¼ percent of GDP. In the health sector, savings from using inputs efficiently as a proportion of GDP would amount to 1½ percent in Costa Rica, ½ percent for Nicaragua and Honduras, and ¼ percent for Guatemala. It is important to highlight that these are medium- to long-term savings, which must be underpinned by deep structural reforms, as will be discussed in the next section.

IMPLICATIONS AND POLICY RECOMMENDATIONS

This chapter has shown that significant room exists to improve social spending efficiency with potentially large fiscal savings. From an input-oriented perspective, Guatemala and Honduras perform poorly on education spending efficiency. On health spending efficiency, Guatemala is the best performer in the region, while Honduras and El Salvador have room for improvement. From an output-oriented point of view, on health spending efficiency all countries appear to be in line with regional comparators and relatively efficient. There is some room to improve education spending efficiency, particularly in secondary education (to a lesser extent in El Salvador). Considering the rising social needs in these countries, but also the need to build fiscal buffers (El Salvador and Costa Rica) or maintain them (Honduras), improving spending efficiency can contribute to reducing the risk of fiscal stress.

Based on the identified efficiency gaps, the discussion turns to some possible measures to generate savings and align policies to best-performer countries.

El Salvador

The wage bill represents 68 percent of the education budget and 65 percent for health. This emphasizes the need to focus on compensation as part of a fiscal consolidation effort. In El Salvador, the main issue is the presence of a large public-private wage premium (García-Escribano and others 2015). Such a premium is mainly explained by structural rigidities stemming from different compensation frameworks (*escalafones*). Given its size and that it is the most inequitable of the many compensation frameworks, the priority should be to limit the fiscal pressure from health sector *escalafón*.⁶ Other—broader—alternatives could be

⁵These savings were calculated using the IO efficiency score and the last observation available of public spending as a percent of GDP for each social spending category.

⁶The law was enacted in 1994 when annual inflation was around 8 percent and the economy was not dollarized. Notwithstanding dollarization since 2001, the law is still valid and has not been modified.

explored such as wage bill limits or rightsizing employment but, from a fairness point of view, tackling the health sector wage bill is critical.

In education, the problem also seems to be the wage bill. The education budget has become more rigid due to wage increases based on the teachers' *escalafón* and the incorporation of staff from the formerly community-based EDUCO program.⁷ The education wage rose by 82 percent from 2007 to 2014. As in Honduras, wage increases are unrelated to teachers' performance evaluations. El Salvador ranked among the worst in math/science tests (49 out of 53 countries in the 2007 TIMSS, Trends in International Maths and Science Study, report). Also, teachers' wages seem too compressed: the gross wage for teachers with graduate studies is only 10 percent more than for teachers with only undergraduate studies (García-Escribano and others 2015).

Pupil-teacher ratios in primary and secondary education are higher than regional peers (Figures 7.2 and 7.3). To account for the aging of the population, the number of primary teachers should decline in favor of those in secondary education. El Salvador has a sizable coverage gap in secondary and tertiary education, since the bulk of the spending in education is at the primary level (Figures 7.2 and 7.3).

Guatemala

Guatemala presents a more complex issue as its social spending level is systematically below the regional average and other comparators. Public education spending in Guatemala has been virtually flat since 2006 at around 3 percent of GDP, being the lowest in the region even though in 1991 the national law on education established the earmarking of 35 percent of total revenues for financing education. The law also establishes that the government should target an increase in spending on education to 7 percent of GDP. Spending on education is also extremely rigid with most of it allocated for paying teachers' salaries leaving only a small fraction for infrastructure investment. The education wage bill went up from 53 percent of total education expenditure in 2007 to 70 percent in 2013.

Similarly, public spending on health has increased only slightly as a share of GDP since 2000, remaining by far the lowest in the region at an average around 2.2 percent of GDP. Spending rose only slightly, from 1.9 percent of GDP in 2000 to 2.3 percent of GDP in 2013 (Figure 7.1). More than half of spending is allocated to personnel salaries/benefits and another 40 percent to medical supplies.

Therefore, achieving better outcomes in health and education will require an increase in inputs, notably in public spending. While efficiency improvements could be achieved, they are small and any efforts could go hand-in-hand with increasing spending, which in turn requires ensuring a stable source of additional revenues. The situation in Guatemala is dramatic as it has the lowest tax burden

⁷The "Law of Teachers' Carrier" defines the "*escalafón*," which is the teachers' carrier ladder, and the compensation and benefits associated with each level.

in the region (CEPAL 2017). The necessity of higher revenues is more pressing considering that the poverty rate is close to 60 percent.

Honduras

In health and education, the priority for Honduras is to tackle the disconnection between compensation rules and productivity. As mentioned, the wage bill represents 80 percent of the education budget and 60 percent of the health budget. Therefore, achieving sizable savings in both sectors would necessarily require reforms in their compensation policies. IMF (2016) has identified the fragmentation of the public compensation framework as the main problem of the wage bill. These different compensation frameworks result mainly from pressures from powerful interest groups, particularly teachers.

Generous wage increases, and indexation benefits granted to teachers in 2009 have been the main drivers of the increase in education spending. They established the indexation of teachers' wage to the minimum wage, and instituted performance evaluations that were never implemented. Given the size of the education sector in the budget, revision of this policy is suggested in accordance with the original agreement to align compensation to performance and ultimately to the performance of students in standardized tests. Additionally, as suggested by Arcia and Gargiulo (2010), the required affiliation to a trade union for being a teacher grants excessive bargaining power and should be revised.

Over the coming years, Honduras also needs to adjust its public policies to tackle the impact of population aging. This will entail moving resources from primary to secondary and tertiary education and changing the composition of the teaching profession to reduce the number of primary teachers and increase the roll in higher levels of education. In Honduras, pupil-teacher ratios indicate over-staffing. Honduras has a sizable coverage gap in secondary and tertiary education while the bulk of the spending in education is at the primary level (Figures 7.2 and 7.3). At least part of these coverage gaps is explained by the relatively short instructional time received by students.⁸ The estimations in this chapter show that the process of moving resources from primary to higher levels of education can be done through efficiency savings, therefore preventing a dramatic short-term adjustment on primary education spending.

The issue of compensation fragmentation is particularly severe in the health sector. The health sector has six of the eight compensation frameworks in Honduras. Although some favor only a small group of workers, they are still largely inequitable.⁹ These frameworks should be revised in line with the need to

⁸On average, the effective instructional time is 64 percent of total teachers' time, but for schools in the bottom quintile of the distribution it is only 37 percent. In practice, this means that students in top-quintile schools receive 96 days more schooling than students in bottom-quintile schools (Bruns and Luque 2014).

⁹For example, because of the application of the pharmaceutical-chemists' *estatuto*, chemists earn the same wage as doctors and two times a dentist's wage (Banco Interamericano de Desarrollo 2014).

expand coverage as stated in the law of social protection. Also, since the provision of health care services is goods-intensive, administrative measures could be implemented to exploit economies of scale stemming from the size of the public sector as a purchaser (World Bank 2015).

Nicaragua

As in other Central American countries, the wage bill represents a large share of the budget leaving limited room for investment and strengthening capacities. Compensation of employees corresponds to 71 and 55½ percent of the education and health budgets, respectively.

In education, spending is highly concentrated on the primary level (about 45 percent of the budget) where the efficiency score shows more room for savings. That the registration of primary students has been declining due to population aging also points toward rationalizing this spending. Additionally, the number of teachers without certification is high, particularly in secondary education where uncertified teachers could reach 50 percent of the teachers' population.¹⁰

In health spending, efficiency scores show little room from efficiency gains, which highlights the need to provide higher inputs to attain better outcomes. Nicaragua in particular needs more medical facilities in rural areas. Also, a limited coverage partnership with the private sector could be an option in urban areas.

Costa Rica

In Costa Rica, increased focus on raising the efficiency, rather than the level, of expenditure on education is critical to achieve higher educational outcomes. While efficiency of expenditure on health care appears high, continued gains will be important given the long-term pressures from population aging. Costa Rica's general government budget is dominated by education and health care spending. Expenditure on these two sectors represents over 60 percent of the budget, more than double the share in emerging markets and the OECD on average. Within Latin America, Costa Rica has the largest expenditures on both education and health care as a share of GDP. Compensation of employees corresponds to 76 percent of the education budget and close to 70 percent of the health budget. Attaining efficiency gains in these sectors could yield large benefits in expenditure rationalization over the long term.

Education outcomes do not reflect the significant public expenditure outlay on schooling. Even though the country spends less per capita than only Denmark and Sweden, education outcomes are not remarkably better than in other emerging markets. Pupil-teacher ratios are much lower than the average of Latin America or emerging markets, pointing to overstaffing and relatively elevated teaching salaries by international standards. Regarding policy outcomes, while school enrollment ratios in primary education are in line with OECD countries,

¹⁰Baltodano and Pacheco (2016).

they are not significantly higher than in other emerging markets. OECD standardized test (PISA) scores for secondary school students broadly match those of emerging economies that spend much less on education, suggesting there is significant scope for improving efficiency. PISA scores on reading, math, and science are consistently well below those of advanced economies.

Looking at policy recommendations, authorities in Costa Rica should move away from an emphasis on increasing spending toward establishing better educational outcomes as their main policy target. Given the large share of wages in the education budget, and salaries that are much higher than for workers in the private sector, payroll savings would be important to support needed fiscal consolidation efforts. Rationalization of bonus schemes that have contributed to total salary increases well above inflation could be particularly important. Specific recommendations made by the OECD in the context of accession included improving evaluation mechanisms and enhancing accountability for teachers, as well as improving professional development and harmonizing their qualifications. Reinforcement of the vocational technical track would also contribute to reducing dropouts in secondary schools and tackling high youth unemployment.

The scope for early gains in efficiency appears much more limited in the health care sector. Public spending on health care as a share of GDP is high relative to Costa Rica's level of development, significantly higher than the emerging markets average, and higher than in richer countries like Chile, Uruguay, and Mexico. Efficiency in public spending on health care also appears to be strong, with near universal coverage and health outcomes close to OECD levels despite significantly lower health expenditure per capita.

These favorable outcomes are not explained by significant additional private sources of health spending, as Costa Rica has one of the lowest shares of out-of-pocket and other private health expenditures in the region. Notwithstanding this favorable assessment, since Costa Rica is one of the countries in the region where population aging is more advanced, spending on health care is projected to double over the next 50 years if universal access and current service levels are to be maintained (see Chapter 8 for details). This highlights the need for measures to gradually increase efficiency. As in the education sector, there is scope to contain the wage bill. OECD recommendations include updating information systems to better monitor performance indicators and the forward-looking allocation of resources to consider changing demographic patterns and disease trends and introducing diagnosis-related funding schemes that provide stronger incentives to control spending than fee-for-service schemes that can result in service oversupply (OECD 2016).

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ANNEX 7.1

Benchmarking Methodology

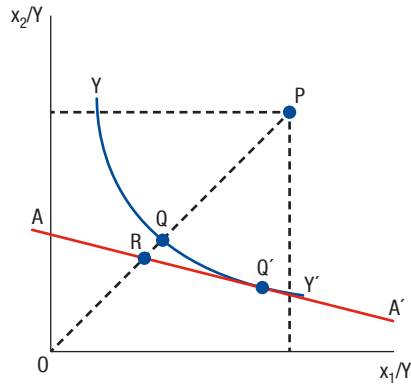
Benchmarking is the systematic comparison of the performance of one unit against peers. It involves comparing units implementing the same transformation processes consuming inputs to produce goods and services (outputs). These units could be firms, industries, and so on, but for this chapter, they are countries. This comparison is done based on performance evaluations. Because of this, any benchmarking exercise is intimately related to the concept of efficiency. In the benchmarking literature, efficiency is measured by identifying the best-performing units and using them to build a frontier. This frontier is called the “efficiency frontier.” Once the frontier is obtained, the performance of all units is assessed by measuring their distances relative to the efficiency frontier.

The modern discussion of gauging efficiency started with Farrell’s seminal paper in 1957. The paper defines two types of efficiency, technical and allocative. Figure 7.1.1 illustrates both concepts using the familiar isoquant diagram assuming a production function with two inputs x_1 and x_2 . To simplify the analysis, inputs are normalized relative to the output so that the level of production is always 1. The YY isoquant represents the optimal (minimum) combination of normalized inputs required to produce one unit of output. The point P represents a suboptimal production bundle because it produces one unit of output, but with more inputs relative to Q (which is part of the isoquant). As point Q represents the optimal consumption of inputs required to efficiently produce one unit of output, the ratio QP/OP would be a measure of technical inefficiency, which means that distance QP could be saved if inputs were used efficiently.

The latter is a view of efficiency entirely based on the technical capacity to obtain the higher level of output with the minimum consumption of inputs. However, one can see efficiency also from a cost minimizing perspective. Let p_1 and p_2 be the prices of inputs x_1 and x_2 then the slope of line AA’ would be $-p_2/p_1$ and Q’ would be the optimal bundle assuming such price levels. For the production bundle P, the ratio OR/OQ would be a measure of the allocative or cost efficiency. Allocative efficiency measures the amount of resources that could be saved if, given input prices, the consumption of inputs would be used to reduce the unit’s total cost to a minimum. Because of the lack of comparable multicountry data on prices, this chapter has focused entirely on the estimation of technical efficiency.

Technical efficiency could be estimated based on input- or output-oriented models. In input-oriented models, the efficiency scores are the proportional amount by which input consumption could be reduced while leaving outputs unchanged. On the other hand, output-oriented (OO) efficiency scores are defined as the proportional amount by which outputs could be increased while leaving inputs’ consumption unchanged.

There are two families of methodologies—parametric and non-parametric—to estimate technical efficiency. Each methodology has advantages and disadvantages. Parametric methods require several assumptions on the errors’ stochastic

Annex Figure 7.1.1. Technical and Allocative Efficiency

distribution and the functional form underpinning the model. At the same time, parametric methods assume a stochastic relationship between inputs and outputs allowing separation in the efficiency estimation of the part that is real inefficiency from the part explained by measurement errors or other noise in the data.¹¹ The flagship of the parametric methods is the stochastic frontier model (SFA).¹²

Non-parametric methods, on the other hand, are based on linear programming and therefore do not require any errors' distributional assumption or assumptions relative to the functional form of the relation between outputs and inputs. However, non-parametric models do not include randomness, so therefore all the data by construction provide information on the inefficiency or the technological frontier. This assumption makes non-parametric models very sensitive to the presence of outliers or noise in the data. Data envelopment analysis (DEA) is—by far—the most widely method used in the benchmarking literature. DEA is a mathematical programming method that can solve the two main tasks involved in a benchmarking exercise: (a) calculate the frontier based on the best performer units, and (b) evaluate performances relative to such frontier. A DEA model requires some basic assumptions about the frontier: (1) free disposability, (2) convexity, (3) returns to scale, and (4) additivity. Note that returns to scale cover DEA specifications ranging from constant to variable returns to scale. The constant returns model has only one best performer unit, while the variable returns model allows for several best performers operating on a convex efficiency frontier.

¹¹Parametric methods could also be classified in non-distributional and distributional methods. The first involves adjustments on simple econometric methods to comply with the restrictions that all estimated errors lie below the frontier while the second involves the specification of a full econometric model including stochastic assumptions for the behavior of the inefficiency parameter.

¹²See Kumbhakar and others 2015, Chapter 3, for more details on the SFA model.

As mentioned, the DEA model has drawbacks. First, it is a purely deterministic method that ignores the presence of noise in the data, such as measurement errors. Such noise is very common in the case where the units under analysis are countries, and in particular emerging or low-income countries. Second, DEA estimations are biased. They estimate the efficiency frontier based on “best performer” units, which do not necessarily represent the true frontier. The SFA model also has drawbacks beyond the many assumptions required to set up the model. It assumes inefficiency as one of the parameters to estimate. This assumption needs a prior on the statistical distribution of such inefficiency term. The most popular distributional assumptions are half-normal, truncated normal, and exponential. All of them involve a zero or constant average for the inefficiency parameter, therefore, resulting in an underestimation of it (that is, the efficiency scores are overestimated).

Simar and Wilson (1998, 2000) developed a methodology using bootstrapping to add a layer of randomness to the DEA model to overcome these drawbacks. They pointed out that a DEA frontier is an estimation of the true frontier based on a single sample drawn from an unknown population. Because of that, the efficiency measures are sensitive to the sampling variations underpinning the estimate of the frontier. A way to assess this sensitivity is using bootstrapping. Bootstrapping is a computer-based statistical method that generates an artificial, new random data set obtained by sampling with replacement from a given data set. This new data set could be used to calculate some statistics called “replicates.” The procedure is repeated many times, each generating new replicates to build a sample. Based on this sample conclusions can be drawn on the distribution of the original data under the assumption that it mimics the distribution of the bootstrapped sample.³

Bootstrapping allows bias in the efficiency scores to be corrected and it calculates corresponding confidence intervals. As mentioned, as the DEA frontier is based on best-performing units, it would capture only the lower bound of the true frontier. This, by definition, generates an upward bias in the estimated efficiency scores. If it is assumed that the distribution of the difference between the estimated and the bootstrapped efficiency scores mimics the distribution of the difference between the true and the estimated efficiency scores, the bias can be estimated, the efficiency scores corrected, and their confidence intervals can be found.

¹³See Bogetoft and Otto (2011), Chapter 6, for details on bootstrapping and its application to DEA models.

ANNEX 7.2

ANNEX TABLE 7.2.1.

Point Estimates and Confidence Intervals. Input Oriented— Primary Education							
Country	Lower bound	Efficiency score	Upper bound	Country	Lower bound	Efficiency Score	Upper bound
Central African Republic	0.616	0.714	0.906	Lao P.D.R.	0.262	0.306	0.358
Mozambique	0.572	0.657	0.737	Chile	0.263	0.302	0.330
Malawi	0.555	0.641	0.907	Botswana	0.274	0.301	0.320
Vanuatu	0.551	0.641	0.911	Iran	0.252	0.299	0.381
Uruguay	0.538	0.628	0.924	Samoa	0.253	0.298	0.362
Cambodia	0.542	0.627	0.922	Jamaica	0.265	0.298	0.319
Chad	0.527	0.616	0.714	Fiji	0.250	0.294	0.356
Congo, Republic of	0.549	0.609	0.662	Algeria	0.256	0.293	0.325
Rwanda	0.505	0.590	0.773	Bolivia	0.258	0.289	0.313
Ethiopia	0.507	0.575	0.649	Dominican Republic	0.259	0.289	0.313
Tanzania	0.494	0.566	0.628	Guyana	0.255	0.287	0.313
Zambia	0.471	0.554	0.651	Equatorial Guinea	0.243	0.285	0.335
Cameroon	0.455	0.531	0.611	Belize	0.241	0.281	0.356
Benin	0.453	0.529	0.606	Panama	0.240	0.278	0.314
Mali	0.448	0.515	0.589	Cabo Verde	0.225	0.262	0.325
Burkina Faso	0.431	0.482	0.538	St. Lucia	0.215	0.246	0.271
Uganda	0.408	0.480	0.622	Costa Rica	0.213	0.241	0.259
Bangladesh	0.395	0.463	0.562	Mauritius	0.201	0.238	0.289
India	0.393	0.451	0.501	Sri Lanka	0.201	0.236	0.300
Tunisia	0.377	0.448	0.586	Armenia	0.212	0.234	0.251
Burundi	0.380	0.448	0.551	Vietnam	0.197	0.232	0.283
Kenya	0.399	0.442	0.478	Tonga	0.195	0.230	0.292
Côte d'Ivoire	0.396	0.440	0.487	Indonesia	0.198	0.229	0.259
Lesotho	0.393	0.437	0.471	Peru	0.194	0.228	0.281
Madagascar	0.361	0.427	0.525	Ecuador	0.195	0.226	0.290
El Salvador	0.373	0.419	0.455	Jordan	0.185	0.219	0.261
Mauritania	0.374	0.419	0.461	Trinidad & Tobago	0.191	0.218	0.235
Senegal	0.368	0.414	0.455	Ukraine	0.186	0.210	0.225
South Africa	0.369	0.411	0.436	Grenada	0.181	0.207	0.230
Philippines	0.345	0.394	0.435	Romania	0.184	0.206	0.220
Guinea	0.329	0.390	0.489	Moldova	0.185	0.206	0.222
Niger	0.333	0.388	0.449	Thailand	0.175	0.204	0.230
Mongolia	0.332	0.374	0.403	Dominica	0.179	0.203	0.224
Namibia	0.336	0.371	0.394	Malaysia	0.167	0.198	0.252
Nicaragua	0.318	0.369	0.418	Antigua and Barbuda	0.177	0.197	0.210
Togo	0.308	0.362	0.467	United Arab Emirates	0.176	0.195	0.206
Nepal	0.298	0.354	0.430	Bulgaria	0.162	0.192	0.222
Swaziland	0.320	0.353	0.380	Maldives	0.159	0.186	0.233
Gambia, The	0.298	0.351	0.418	Oman	0.165	0.183	0.194
Comoros	0.305	0.350	0.395	Serbia	0.152	0.180	0.211
Djibouti	0.313	0.349	0.389	Barbados	0.153	0.177	0.195
Ghana	0.308	0.346	0.380	Lithuania	0.139	0.162	0.182
Yemen	0.294	0.333	0.367	Seychelles	0.140	0.159	0.174
Colombia	0.297	0.332	0.355	Brunei Darussalam	0.125	0.142	0.153
Bhutan	0.294	0.330	0.359	Qatar	0.119	0.136	0.147
Guatemala	0.285	0.328	0.369	Saudi Arabia	0.120	0.134	0.144
Morocco	0.292	0.324	0.346	Hungary	0.113	0.126	0.134
Mexico	0.274	0.321	0.365	Kuwait	0.107	0.123	0.135
Paraguay	0.276	0.312	0.342	Georgia	0.098	0.116	0.148
Honduras	0.265	0.307	0.347	Poland	0.094	0.112	0.135

Source: Authors' calculations.

ANNEX TABLE 7.2.2.

Point Estimates and Confidence Intervals. Output Oriented—Primary Education							
Country	Lower bound	Efficiency score	Upper bound	Country	Lower bound	Efficiency Score	Upper bound
Uruguay	0.985	0.991	0.998	Romania	0.907	0.913	0.918
Vanuatu	0.982	0.991	0.997	Grenada	0.906	0.912	0.918
Tunisia	0.981	0.987	0.992	Hungary	0.904	0.911	0.915
Iran	0.979	0.984	0.987	Nepal	0.897	0.911	0.917
Belize	0.977	0.982	0.986	Uganda	0.872	0.907	0.926
Fiji	0.972	0.978	0.982	India	0.896	0.906	0.912
Malaysia	0.970	0.977	0.982	Philippines	0.897	0.905	0.909
Cambodia	0.940	0.977	0.998	Malawi	0.759	0.901	0.996
Ecuador	0.968	0.975	0.981	Bolivia	0.893	0.899	0.902
Cabo Verde	0.969	0.975	0.979	Moldova	0.893	0.899	0.904
Maldives	0.968	0.974	0.980	Antigua and Barbuda	0.892	0.898	0.903
Mauritius	0.967	0.973	0.976	Oman	0.891	0.898	0.902
Vietnam	0.963	0.969	0.974	Togo	0.875	0.897	0.910
Poland	0.962	0.969	0.974	Benin	0.879	0.895	0.904
Peru	0.960	0.966	0.972	Morocco	0.889	0.895	0.898
Sri Lanka	0.958	0.966	0.972	United Arab Emirates	0.885	0.892	0.896
Mexico	0.960	0.965	0.969	Central African Republic	0.677	0.890	0.996
Jordan	0.959	0.965	0.970	Namibia	0.882	0.888	0.891
Serbia	0.957	0.964	0.969	Nicaragua	0.875	0.885	0.890
Tonga	0.954	0.962	0.968	Zambia	0.860	0.881	0.893
Bulgaria	0.953	0.960	0.965	Cameroon	0.847	0.864	0.874
Panama	0.951	0.956	0.959	Dominican Republic	0.855	0.861	0.864
Georgia	0.949	0.955	0.961	Lao P.D.R.	0.840	0.852	0.858
Lithuania	0.945	0.952	0.957	Botswana	0.844	0.848	0.851
Thailand	0.946	0.952	0.957	Armenia	0.829	0.834	0.838
Samoa	0.942	0.951	0.956	Tanzania	0.810	0.827	0.837
Chile	0.945	0.950	0.953	Guyana	0.812	0.818	0.822
Honduras	0.943	0.949	0.952	Comoros	0.805	0.815	0.821
Kuwait	0.941	0.948	0.953	Bhutan	0.800	0.807	0.810
Algeria	0.942	0.947	0.950	Lesotho	0.793	0.802	0.806
Barbados	0.938	0.945	0.950	Yemen	0.781	0.789	0.793
St. Lucia	0.938	0.943	0.947	Mozambique	0.737	0.778	0.799
Indonesia	0.934	0.940	0.945	Swaziland	0.767	0.773	0.776
Qatar	0.931	0.938	0.942	Kenya	0.754	0.763	0.767
Seychelles	0.929	0.935	0.940	Congo, Republic of	0.705	0.726	0.737
Mongolia	0.928	0.935	0.938	Gambia, The	0.711	0.726	0.734
Trinidad & Tobago	0.927	0.933	0.937	Ghana	0.712	0.718	0.722
Brunei Darussalam	0.926	0.932	0.937	Senegal	0.707	0.715	0.719
Guatemala	0.925	0.932	0.936	Mauritania	0.694	0.703	0.706
Bangladesh	0.915	0.932	0.940	Madagascar	0.670	0.694	0.706
Dominica	0.924	0.930	0.936	Burundi	0.651	0.686	0.705
Costa Rica	0.924	0.929	0.933	Côte d'Ivoire	0.642	0.650	0.655
Jamaica	0.921	0.927	0.930	Equatorial Guinea	0.640	0.650	0.654
Colombia	0.921	0.926	0.929	Guinea	0.624	0.647	0.660
Saudi Arabia	0.919	0.926	0.930	Mali	0.628	0.644	0.652
Ukraine	0.918	0.924	0.929	Chad	0.567	0.608	0.631
El Salvador	0.912	0.921	0.924	Burkina Faso	0.515	0.524	0.528
South Africa	0.911	0.918	0.922	Ethiopia	0.491	0.509	0.518
Paraguay	0.910	0.916	0.919	Niger	0.465	0.473	0.476
Rwanda	0.848	0.915	0.952	Djibouti	0.418	0.421	0.423

Source: Authors' calculations.

ANNEX TABLE 7.2.3.

Point Estimates and Confidence Intervals. Input Oriented— Secondary Education							
Country	Lower bound	Efficiency score	Upper bound	Country	Lower bound	Efficiency Score	Upper bound
Philippines	0.808	0.878	0.979	Togo	0.487	0.542	0.603
Chile	0.781	0.873	0.974	Brunei Darussalam	0.462	0.539	0.612
Guinea	0.758	0.853	0.972	Hungary	0.449	0.522	0.601
Ethiopia	0.753	0.838	0.972	Mexico	0.475	0.509	0.540
Tonga	0.701	0.833	0.980	Qatar	0.436	0.507	0.565
Central African Republic	0.726	0.827	0.976	Seychelles	0.455	0.495	0.521
Samoa	0.708	0.825	0.971	Antigua and Barbuda	0.434	0.493	0.537
Colombia	0.762	0.821	0.864	Yemen	0.429	0.490	0.558
Fiji	0.716	0.818	0.905	Bhutan	0.456	0.489	0.515
South Africa	0.751	0.807	0.855	Malaysia	0.449	0.480	0.506
Nicaragua	0.705	0.795	0.884	Bulgaria	0.417	0.479	0.544
Nepal	0.698	0.791	0.978	Pakistan	0.420	0.455	0.492
Thailand	0.727	0.787	0.830	Moldova	0.392	0.447	0.495
Cambodia	0.680	0.770	0.975	Uruguay	0.404	0.447	0.486
Serbia	0.635	0.760	0.949	Panama	0.408	0.437	0.468
Jordan	0.641	0.735	0.816	Mali	0.401	0.434	0.468
Mongolia	0.661	0.734	0.782	Ukraine	0.374	0.433	0.499
Guyana	0.609	0.730	0.970	Mozambique	0.369	0.425	0.476
Lithuania	0.605	0.728	0.977	Georgia	0.354	0.425	0.503
Bolivia	0.657	0.722	0.775	Djibouti	0.374	0.420	0.456
Malawi	0.639	0.708	0.786	Bahrain	0.365	0.417	0.471
Sierra Leone	0.601	0.687	0.777	Morocco	0.388	0.416	0.440
Saudi Arabia	0.578	0.687	0.797	Lesotho	0.383	0.416	0.442
Bangladesh	0.614	0.686	0.769	Cameroon	0.378	0.409	0.440
El Salvador	0.629	0.681	0.741	Guatemala	0.353	0.403	0.446
Barbados	0.588	0.677	0.782	Indonesia	0.364	0.401	0.448
Dominican Republic	0.620	0.674	0.738	Burkina Faso	0.352	0.401	0.456
Sri Lanka	0.552	0.672	0.826	Chad	0.346	0.400	0.460
Grenada	0.589	0.670	0.736	Vanuatu	0.368	0.394	0.415
Jamaica	0.611	0.665	0.708	Ghana	0.355	0.384	0.413
Kuwait	0.539	0.652	0.787	Botswana	0.353	0.379	0.404
Kenya	0.599	0.649	0.700	Lebanon	0.322	0.377	0.438
Madagascar	0.568	0.632	0.695	Senegal	0.334	0.372	0.409
Oman	0.576	0.627	0.677	Mauritania	0.322	0.365	0.402
Dominica	0.543	0.623	0.687	Benin	0.329	0.365	0.398
Poland	0.522	0.616	0.736	Uganda	0.324	0.363	0.406
Peru	0.518	0.577	0.633	Burundi	0.319	0.362	0.411
Mauritius	0.534	0.576	0.609	Comoros	0.306	0.352	0.414
Namibia	0.536	0.575	0.608	Ecuador	0.310	0.337	0.370
Costa Rica	0.532	0.574	0.605	Niger	0.291	0.336	0.388
Lao P.D.R.	0.508	0.570	0.624	Paraguay	0.307	0.335	0.372
Belize	0.530	0.568	0.601	Swaziland	0.300	0.323	0.340
Cabo Verde	0.524	0.567	0.612	Equatorial Guinea	0.290	0.319	0.349
St. Lucia	0.508	0.549	0.578	Honduras	0.184	0.208	0.241

Source: Authors' calculations.

ANNEX TABLE 7.2.4.

Point Estimates and Confidence Intervals. Output Oriented—Secondary Education

Country	Lower bound	Efficiency score	Upper bound	Country	Lower bound	Efficiency Score	Upper bound
Serbia	0.943	0.975	0.995	Lebanon	0.693	0.736	0.772
Barbados	0.926	0.959	0.977	El Salvador	0.693	0.733	0.764
Lithuania	0.914	0.946	0.989	Belize	0.701	0.732	0.753
Saudi Arabia	0.910	0.943	0.971	Malaysia	0.704	0.727	0.741
Tonga	0.869	0.928	0.989	Mexico	0.672	0.699	0.714
Kuwait	0.891	0.928	0.964	Sierra Leone	0.611	0.698	0.762
Chile	0.883	0.927	0.990	Nicaragua	0.596	0.694	0.786
Poland	0.897	0.927	0.960	Bangladesh	0.628	0.692	0.744
Jordan	0.879	0.919	0.945	Indonesia	0.639	0.679	0.706
Samoa	0.864	0.916	0.986	Panama	0.654	0.678	0.694
Brunei Darussalam	0.877	0.909	0.942	Cabo Verde	0.629	0.671	0.705
Ukraine	0.879	0.906	0.929	Ecuador	0.621	0.644	0.659
Hungary	0.872	0.902	0.937	Yemen	0.587	0.631	0.665
Guyana	0.842	0.902	0.990	Paraguay	0.596	0.629	0.649
Qatar	0.865	0.901	0.934	Kenya	0.577	0.615	0.652
Bulgaria	0.869	0.896	0.920	Botswana	0.584	0.602	0.613
Fiji	0.833	0.888	0.930	Malawi	0.523	0.594	0.658
Dominica	0.851	0.885	0.909	Comoros	0.546	0.585	0.623
Sri Lanka	0.826	0.884	0.952	Namibia	0.552	0.579	0.602
Georgia	0.832	0.878	0.904	Lao P.D.R.	0.507	0.551	0.587
Philippines	0.804	0.877	0.990	Guatemala	0.502	0.534	0.562
Bahrain	0.844	0.877	0.911	Honduras	0.493	0.523	0.545
Antigua and Barbuda	0.847	0.873	0.895	Morocco	0.497	0.518	0.529
Colombia	0.825	0.865	0.899	Bhutan	0.454	0.477	0.501
Nepal	0.742	0.859	0.987	Madagascar	0.413	0.473	0.517
Moldova	0.829	0.859	0.878	Ghana	0.407	0.435	0.455
Oman	0.826	0.859	0.876	Vanuatu	0.410	0.428	0.440
Jamaica	0.824	0.858	0.878	Pakistan	0.391	0.416	0.444
Grenada	0.803	0.851	0.882	Cameroon	0.388	0.415	0.442
Guinea	0.698	0.847	0.973	Mali	0.371	0.394	0.415
Thailand	0.788	0.828	0.866	Togo	0.345	0.384	0.418
South Africa	0.776	0.822	0.869	Swaziland	0.326	0.340	0.347
Mongolia	0.754	0.802	0.842	Benin	0.317	0.337	0.357
Seychelles	0.773	0.796	0.815	Lesotho	0.317	0.332	0.343
Bolivia	0.751	0.796	0.829	Djibouti	0.245	0.259	0.272
Mauritius	0.766	0.795	0.811	Uganda	0.229	0.243	0.256
Costa Rica	0.765	0.794	0.810	Equatorial Guinea	0.226	0.242	0.259
St. Lucia	0.758	0.784	0.800	Senegal	0.229	0.241	0.251
Peru	0.730	0.777	0.809	Burundi	0.218	0.234	0.248
Ethiopia	0.547	0.773	0.990	Mauritania	0.204	0.214	0.222
Cambodia	0.543	0.770	0.988	Burkina Faso	0.195	0.213	0.227
Central African Republic	0.547	0.769	0.990	Mozambique	0.144	0.158	0.174
Uruguay	0.725	0.758	0.779	Chad	0.128	0.139	0.150
Dominican Republic	0.711	0.749	0.782	Niger	0.118	0.125	0.131

Source: Authors' calculations.

ANNEX TABLE 7.2.5.

Point Estimates and Confidence Intervals. Input Oriented—Health							
Country	Lower bound	Efficiency score	Upper bound	Country	Lower bound	Efficiency Score	Upper bound
Morocco	0.866	0.919	0.973	Libya	0.628	0.662	0.689
Guatemala	0.864	0.911	0.983	Haiti	0.593	0.659	0.744
Colombia	0.793	0.891	0.986	Kyrgyz Republic	0.566	0.643	0.743
Nicaragua	0.799	0.888	0.983	Bahrain	0.591	0.638	0.702
Maldives	0.823	0.878	0.982	Egypt	0.602	0.635	0.669
Thailand	0.793	0.876	0.965	Barbados	0.581	0.634	0.681
Kuwait	0.781	0.869	0.984	Rwanda	0.579	0.632	0.696
Nepal	0.784	0.859	0.983	Yemen	0.553	0.628	0.718
Honduras	0.785	0.840	0.889	Brazil	0.576	0.611	0.659
Cambodia	0.737	0.836	0.984	United Arab Emirates	0.550	0.595	0.647
Tajikistan	0.688	0.836	0.990	India	0.518	0.587	0.655
Liberia	0.755	0.836	0.984	Belize	0.529	0.581	0.641
Senegal	0.741	0.823	0.985	Mauritania	0.528	0.576	0.647
Brunei Darussalam	0.649	0.819	0.979	Fiji	0.493	0.572	0.665
Tunisia	0.754	0.816	0.891	Poland	0.508	0.565	0.616
Gambia, The	0.747	0.815	0.896	Saudi Arabia	0.527	0.565	0.618
Mali	0.713	0.811	0.914	Iran	0.536	0.565	0.598
Malawi	0.711	0.810	0.986	Togo	0.505	0.557	0.627
Central African Republic	0.701	0.805	0.985	Sierra Leone	0.484	0.551	0.605
Afghanistan	0.720	0.802	0.893	Jordan	0.520	0.548	0.573
Mozambique	0.702	0.799	0.982	Philippines	0.476	0.541	0.613
Niger	0.709	0.799	0.984	Albania	0.481	0.539	0.596
Algeria	0.752	0.796	0.833	Malaysia	0.506	0.538	0.566
Romania	0.708	0.796	0.867	Jamaica	0.495	0.536	0.574
Turkey	0.754	0.795	0.827	Serbia	0.499	0.528	0.556
Papua New Guinea	0.667	0.787	0.985	Lithuania	0.478	0.506	0.531
Vietnam	0.640	0.782	0.984	Bulgaria	0.476	0.504	0.533
Bangladesh	0.661	0.780	0.984	Tanzania	0.448	0.492	0.536
Tonga	0.668	0.780	0.981	Ghana	0.422	0.482	0.562
Costa Rica	0.632	0.778	0.986	Armenia	0.406	0.476	0.558
Uruguay	0.678	0.777	0.869	Kenya	0.430	0.476	0.533
China	0.628	0.771	0.982	Moldova	0.437	0.475	0.514
Chile	0.574	0.767	0.986	Bolivia	0.419	0.463	0.523
Paraguay	0.686	0.766	0.834	Ukraine	0.423	0.458	0.489
Ecuador	0.659	0.749	0.831	Cameroon	0.412	0.457	0.506
Mexico	0.648	0.741	0.825	Mongolia	0.412	0.440	0.475
Venezuela	0.676	0.734	0.790	Hungary	0.397	0.421	0.445
Qatar	0.648	0.726	0.823	Congo, Republic of	0.364	0.404	0.455
Sri Lanka	0.624	0.724	0.832	Guyana	0.359	0.394	0.435
Iraq	0.678	0.718	0.751	Uganda	0.332	0.372	0.421
Pakistan	0.629	0.711	0.793	Namibia	0.334	0.372	0.412
Dominican Republic	0.641	0.699	0.743	Trinidad & Tobago	0.341	0.361	0.390
Benin	0.630	0.690	0.752	Côte d'Ivoire	0.296	0.341	0.395
Croatia	0.591	0.685	0.775	Kazakhstan	0.318	0.338	0.358
Burundi	0.616	0.684	0.776	Russia	0.298	0.314	0.337
Lao P.D.R.	0.608	0.681	0.768	Lesotho	0.274	0.309	0.353
Panama	0.597	0.680	0.754	Swaziland	0.259	0.300	0.340
El Salvador	0.644	0.679	0.708	Zambia	0.244	0.273	0.310
Peru	0.578	0.678	0.773	Gabon	0.201	0.230	0.259
Indonesia	0.603	0.672	0.749	South Africa	0.175	0.199	0.219
Mauritius	0.626	0.671	0.712	Botswana	0.144	0.162	0.185

Source: Authors' calculations.

ANNEX TABLE 7.2.6.

Point Estimates and Confidence Intervals. Output Oriented—Health							
Country	Lower bound	Efficiency score	Upper bound	Country	Lower bound	Efficiency Score	Upper bound
Colombia	0.974	0.987	0.998	Yemen	0.899	0.931	0.952
Morocco	0.966	0.982	0.997	Armenia	0.906	0.931	0.947
Thailand	0.966	0.982	0.996	Mozambique	0.782	0.931	0.998
Brunei Darussalam	0.968	0.981	0.998	Central African Republic	0.783	0.931	0.998
Chile	0.969	0.981	0.998	Pakistan	0.908	0.930	0.945
Nicaragua	0.963	0.981	0.998	Serbia	0.919	0.928	0.937
Romania	0.969	0.980	0.988	Mali	0.880	0.928	0.956
Costa Rica	0.967	0.980	0.998	Lithuania	0.918	0.928	0.935
China	0.957	0.976	0.998	Saudi Arabia	0.917	0.927	0.937
Guatemala	0.957	0.976	0.998	Jamaica	0.913	0.925	0.935
Kuwait	0.955	0.975	0.998	Philippines	0.901	0.924	0.940
Qatar	0.963	0.975	0.984	Libya	0.912	0.922	0.932
Tunisia	0.959	0.972	0.983	Jordan	0.913	0.922	0.928
Uruguay	0.962	0.972	0.983	Iraq	0.902	0.920	0.933
Tajikistan	0.923	0.972	0.998	Lao P.D.R.	0.898	0.919	0.935
Cambodia	0.944	0.970	0.998	Indonesia	0.894	0.919	0.942
Vietnam	0.942	0.969	0.999	Hungary	0.908	0.919	0.927
Croatia	0.957	0.969	0.980	Afghanistan	0.866	0.918	0.949
Nepal	0.943	0.969	0.998	El Salvador	0.905	0.918	0.931
Mexico	0.959	0.969	0.978	Iran	0.906	0.916	0.923
Maldives	0.940	0.965	0.998	Ukraine	0.903	0.915	0.923
Peru	0.951	0.964	0.978	India	0.894	0.911	0.924
Sri Lanka	0.943	0.964	0.981	Egypt	0.895	0.909	0.920
Panama	0.953	0.964	0.974	Moldova	0.894	0.908	0.920
Kyrgyz Republic	0.948	0.964	0.975	Mauritania	0.874	0.894	0.909
Tonga	0.927	0.964	0.998	Bolivia	0.880	0.893	0.906
Venezuela	0.952	0.963	0.970	Rwanda	0.867	0.887	0.905
Ecuador	0.941	0.959	0.974	Benin	0.853	0.879	0.900
Poland	0.948	0.958	0.967	Mongolia	0.866	0.877	0.886
Paraguay	0.940	0.958	0.970	Burundi	0.826	0.864	0.891
Honduras	0.939	0.955	0.971	Ghana	0.835	0.862	0.885
Barbados	0.945	0.955	0.963	Kazakhstan	0.854	0.862	0.868
Senegal	0.898	0.954	0.998	Trinidad & Tobago	0.849	0.860	0.871
Turkey	0.938	0.951	0.962	Guyana	0.840	0.854	0.865
Belize	0.939	0.950	0.959	Russia	0.843	0.852	0.860
Gambia, The	0.923	0.949	0.971	Haiti	0.813	0.852	0.877
Bangladesh	0.879	0.947	0.998	Kenya	0.798	0.824	0.839
United Arab Emirates	0.936	0.947	0.956	Namibia	0.808	0.821	0.835
Albania	0.933	0.946	0.955	Tanzania	0.794	0.818	0.832
Bahrain	0.934	0.945	0.956	Togo	0.766	0.808	0.831
Algeria	0.928	0.944	0.956	Congo, Republic of	0.779	0.800	0.813
Mauritius	0.933	0.944	0.953	Cameroon	0.758	0.775	0.787
Papua New Guinea	0.840	0.940	0.998	Gabon	0.758	0.769	0.777
Dominican Republic	0.923	0.939	0.951	Uganda	0.741	0.754	0.766
Fiji	0.915	0.935	0.953	South Africa	0.733	0.741	0.749
Malaysia	0.926	0.934	0.940	Côte d'Ivoire	0.720	0.734	0.746
Brazil	0.924	0.934	0.941	Swaziland	0.715	0.728	0.738
Bulgaria	0.925	0.934	0.940	Zambia	0.708	0.720	0.730
Malawi	0.782	0.933	0.998	Botswana	0.709	0.717	0.725
Liberia	0.785	0.933	0.998	Lesotho	0.686	0.701	0.709
Niger	0.782	0.932	0.999	Sierra Leone	0.630	0.649	0.665

Source: Authors' calculations.

The Long-Term Fiscal Costs of Population Aging

JAUME PUIG-FORNE

INTRODUCTION

Even as they are now experiencing a demographic dividend, Central American countries are not exempt from the same economic challenges from population aging that blight long-term growth prospects in countries where the dividend is spent. Falling fertility rates in CAPDR countries have increased their shares of working-age population relative to the elderly. And although their demographic dividend is projected to last longer than in other Latin American and emerging market economies, given less steep declines in fertility rates, population aging may come to exert a huge fiscal burden.

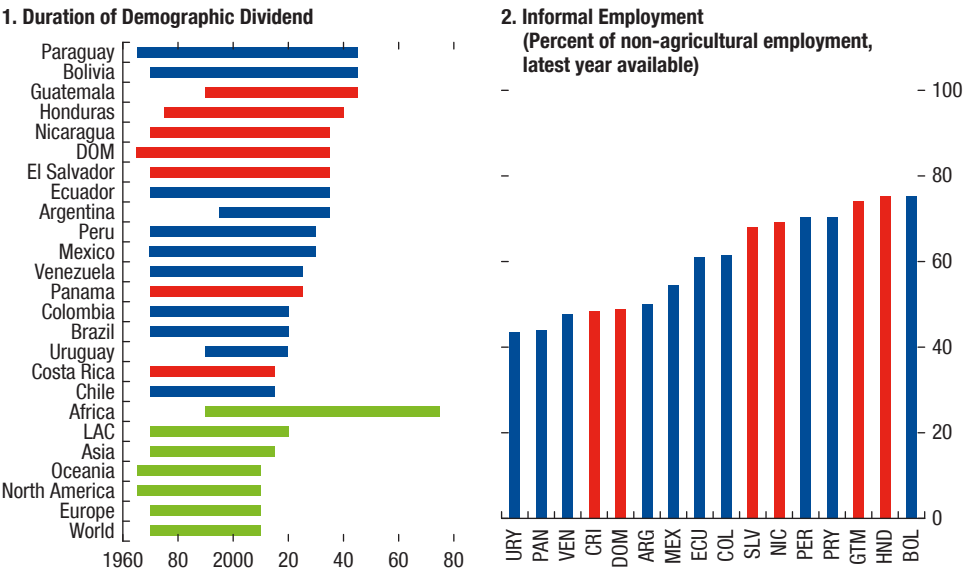
Increasing old-age dependency (the ratio of retirement-age population to working-age population) will indeed create important fiscal challenges in countries with generous public defined-benefit pay-as-you-go (PAYG) pensions (Table 8.1) and comprehensive public health systems. Other countries with less generous and comprehensive pension and health care systems may also eventually struggle. Fiscal pressures will undoubtedly mount as states are forced to weigh in to provide socially acceptable levels of coverage and benefits.

This chapter examines some of the fiscal challenges likely to affect economic growth prospects in CAPDR in the future. It aims to address the following questions: (1) What is special about the demographic conditions in CAPDR? (2) What are the main characteristics of pension systems and health coverage in CAPDR? (3) What are the fiscal costs associated with public PAYG pension systems with defined benefits? (4) What are the fiscal costs associated with public health coverage? (5) Are there potential contingent fiscal risks in countries with inadequate coverage of PAYG and public health care systems, or with defined contribution systems likely to generate socially unacceptable pension benefits?

Demographic projections underlying the estimated fiscal costs from population aging in this chapter are drawn from the UN's *World Population Prospects* report of 2015. The report projects population growth until 2100 for about 200 countries.

Prepared by Jaume Puig, based on a study of long-term fiscal gaps in Latin America and the Caribbean by a team led by Lorenzo Figliouli (IMF 2018). The study covered 17 countries in Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Figure 8.1. Demographic and Labor Characteristics in Latin America



Sources: Inter-American Development Bank 2016, and International Labor Organization.
Note: The bars in panel 1 depict the period in which the total dependency ratio is falling. The total dependency ratio is those not in the labor force (ages 0 to 15 years and ages 65+ years) over those in the labor force (typically ages 15 to 64 years). LAC = Latin America and the Caribbean. ARG = Argentina; BOL = Bolivia; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; SLV = El Salvador; GTM = Guatemala; HND = Honduras; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PER = Peru; PRY = Paraguay; URY = Uruguay; VEN = Venezuela.

The methodologies for the UN’s demographic projections and for our projections of fiscal costs from population aging are described in Annex 8.1.

DEMOGRAPHIC DIVIDEND DELAYS RECKONING ON AGING

CADPR’s working population is younger and more concentrated in the informal sector than in the rest of Latin America. Despite sharp declines over the last few decades, fertility rates are still relatively higher in CAPDR countries than other Latin American countries. Even with substantial negative net migration of mostly working-age citizens, the projection is for a more durable demographic dividend and later onset of fiscal pressures from aging than in the rest of Latin America, with the notable exception of Costa Rica. At the same time, UN long-term projections indicate that the average old-age dependency ratio in CAPDR could be among the highest in the world by 2100.

High informality of employment is another important phenomenon in several CAPDR countries, especially Guatemala and Honduras (Figure 8.1). This is a key driver of the low coverage of contributory pension and health care provision in many of these countries. Frequent transitioning between informal and formal

employment sectors also has a negative impact on the density of contributions to contributory systems, thereby limiting the accrual of pension rights. These considerations have important implications for the fiscal costs of aging, through non-contributory pension schemes, for those who either do not qualify for benefits, or do not receive adequate benefits, from contributory pension funds.

Pensions and Health Care Characteristics

Pensions

Public spending on pensions is low by international standards, given generally low coverage of PAYG pension systems and limited non-contributory benefits, as well as transition to defined contribution systems in some countries.

- Five out of the seven countries in CAPDR have public PAYG systems: Costa Rica, Guatemala, Honduras, Nicaragua, and Panama. These are integrated into the social security system and funded by worker and employer contributions. Since the 1990s, four out of the seven countries have also introduced public non-contributory pensions, following the general trend in Latin America: Costa Rica (1995), the Dominican Republic (2003), El Salvador (1998), and Panama (2009). Total public spending on these systems is comparatively low, at about 1.9 percent of GDP on average in 2015, compared with a 3.7 percent average in Latin America, 8.7 percent in high-income countries, and 9.5 percent in emerging Europe (Table 8.2). In addition to CAPDR's less-advanced stage in population aging, this reflects the low coverage of most PAYG and non-contributory systems (below 20 percent in Guatemala, Honduras, El Salvador, and Nicaragua), the absence of non-contributory systems in some countries (Guatemala, Honduras, and Nicaragua), and the advanced stage of the transition to a system funded by defined contributions in the Dominican Republic (Figure 8.2).
- Regarding pension system parameters, pensionable ages are broadly in line with international averages, between ages 60 and 65, except in El Salvador and Panama, where women retire earlier. In contrast, PAYG systems have relatively generous benefits and low contribution rates by international standards (panel 2). On the funding side, particularly low contribution rates of 6 percent in Guatemala and Honduras stand out. On expenditure, replacement rates in Costa Rica, Nicaragua, and Panama are well above the average for the wider region (Table 8.1).

Several countries use systems funded by defined contributions, resulting in potentially inadequate benefits when not coupled with a PAYG pillar. In the late 1990s and early 2000s, several CAPDR countries joined the regional trend of transitioning from unfunded PAYG systems to funded defined contribution systems. Costa Rica and Panama maintain combinations of DB and defined contribution systems, with workers generally¹ having the obligation to contribute to both pillars. In contrast, the Dominican Republic and El Salvador are phasing out

¹In Panama, low-wage earners only participate in the DB system.

TABLE 8.1.

Key Pension System Parameters in CAPDR

Country	Type of System ¹	Statutory Pensionable Age ²	Vesting Period (Years)	Contribution Rates, 2015 ³		Gross Replacement Rate ⁴ (Percent)
				Total	Employer	
				(Percent)		
CAPDR						
Costa Rica	DB/DC	65	25	12.2	8.3	79.4
Dominican Republic	DC	60	30	10.0	7.1	22.8
El Salvador	DC	60 (55)	25	13.5	7.3	46.6
Guatemala	DB	60	20	5.5	3.7	67.8
Honduras	DB	65 (60)	15	6.0	3.5	64.9 (60.9)
Nicaragua	DB	60	15	13.0	9	94.2
Panama	DB/DC	62 (57)	20	13.5	4.3	78.4 (72.8)
CAPDR Average	N/A	61.7 (59.6)	N/A	10.5	6.2	66.2 (64)
LAC Average	N/A	62.1 (59.8)	N/A	16.6	7.7	66.1 (55.1)
OECD average	N/A	64.7 (63.5)	N/A	19.6	11.2	52.9

Sources: Organisation for Economic Co-operation and Development (OECD, 2013 and 2015) (average contribution rates; average pensionable age); OECD/IDB/World Bank 2014 (type of system; gross replacement rates); US Social Security Administration 2016 (pensionable age; vesting period; contribution rates).

Note: Ages in parentheses are for women where different from those for men. DB = defined benefit; DC = defined contribution; N/A = not applicable.

¹DC systems may include a DB pillar in the process of being phased out. For countries with fragmented systems, the largest single component is taken as a benchmark.

²Actual retirement ages may be lower than the statutory age in many Latin America Countries (LAC) if a large fraction of contributors retire several years earlier based on the length of their contributing history.

³In percent of reference salary. Includes old-age, disability, and survivors.

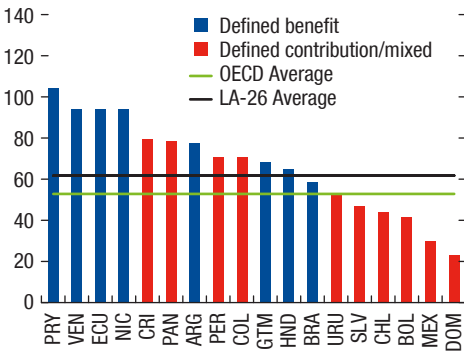
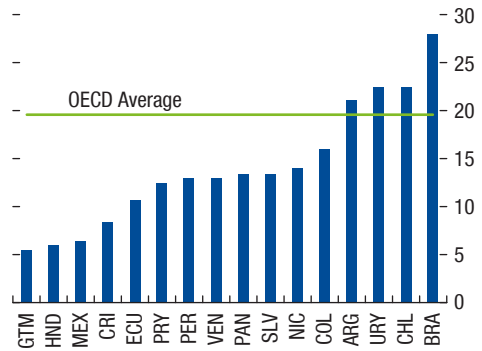
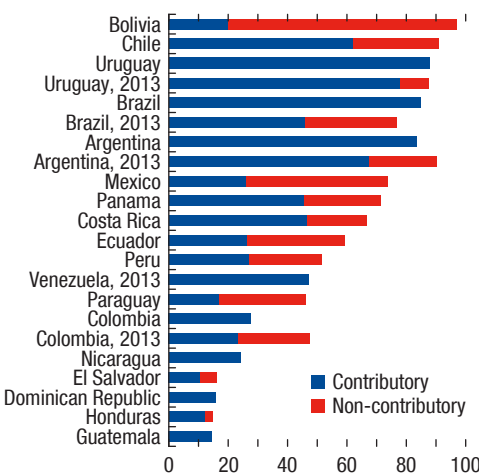
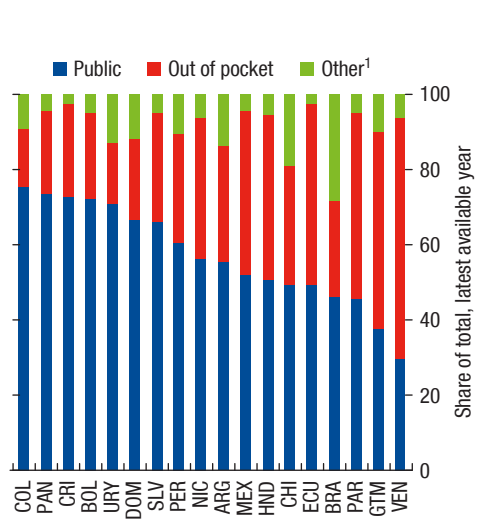
⁴Latest available. Gross pension entitlement in percent of gross pre-retirement earnings. Comparisons are based on a specific set of assumptions. See OECD/IDB/World Bank 2014 for detailed information. Data for some LAC are from OECD 2015.

the preexisting DB pillars, and the new defined contribution systems are generating low replacement rates that may not be socially sustainable.²

Health Care Systems

Varying levels of coverage and quality of care drive public spending on health care across the region. On average, public outlays in CAPDR are similar to those in other emerging and developing regions, at 4.7 percent of GDP in 2015 (Table 8.3). This masks considerable variations, with public spending ranging from 2–3 percent of GDP in Guatemala and the Dominican Republic to 6–8 percent in Panama and Costa Rica, consistent with higher income status and coverage. In Guatemala, Honduras, Nicaragua, and El Salvador, most people are uninsured and rely on basic government health services, which may not always be easily accessible or free of charge, particularly for medicines, as indicated by the higher share of out-of-pocket spending in some these countries (Figure 8.2).

²As part of reforms introduced in 2017, El Salvador raised the contribution rate in the defined contribution scheme to 15 percent from the level shown in Table 8.1, in addition to introducing changes in some other parameters. The simulations shown in the chapter are however based on the parameters that were in effect prior to the 2017 reform. Preliminary actuarial studies indicate that the 2017 reform only marginally tackled the key social sustainability problems of high inequality of benefits and of low coverage and replacement rates, as the latter are estimated to increase only slightly relative to the pre-reform scenario.

Figure 8.2. Pension and Health Care System Characteristics**1. Contributory Benefits in Latin America
(Gross replacement rates, men, in percent)****2. Contribution Rates: DB Pillars
(Percent)****3. Contributory and Non-contributory Passive Coverage
in Latin America
(Percent of population aged 65 and older, 2016–15)****4. Health Expenditure, Latin America**

Sources: Inter-American Development Bank, 2014 and 2016; Organisation for Economic Co-operation and Development, 2015; SIMS; World Health Organization; and IMF staff estimates and projections.

Note: In panel 3, where available, earlier data are reported for countries where the latest disaggregation between contributory and non-contributory coverage was not available as of 2016–15. Data for Venezuela was not available as of 2016–15. LA-26 = Latin America 26. ARG = Argentina; BOL = Bolivia; BRA = Brazil; CHL = Chile; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; GTM = Guatemala; HND = Honduras; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PAR = Paraguay; PER = Peru; PRY = Paraguay; SLV = El Salvador; URU = Uruguay; VEN = Venezuela.

¹Includes expenditures covered by private plans and the non-profit sector.

TABLE 8.2.

Latin American Pension Expenditure (Percent of GDP)

	Pension Expenditure				Spending Change			PDV Spending Change		
	2015	2030	2065	2100	2030	2065	2100	2015–2030	2015–2065	2015–2100
CAPDR										
Costa Rica	2.8	5.0	13.5	15.8	2.2	10.7	13.0	17.9	171.9	391.1
Dominican Republic	0.1	0.6	1.1	1.7	0.5	1.0	1.6	5.6	23.8	47.4
El Salvador	2.6	2.3	0.7	0.2	–0.2	–1.9	–2.4	4.2	–30.0	–69.3
Guatemala	1.0	1.1	2.1	3.2	0.1	1.2	2.2	0.4	14.3	44.9
Honduras	1.4	1.7	2.0	2.4	0.3	0.6	0.9	3.1	13.9	28.2
Nicaragua	2.7	3.8	9.7	13.0	1.1	7.0	10.3	7.4	104.4	265.6
Panama	3.0	3.3	1.8	0.7	0.3	–1.2	–2.3	0.6	5.9	–29.8
CAPDR Average	1.9	2.6	4.4	5.3	0.6	2.5	3.3	5.6	43.4	96.9
LA Average	3.7	4.3	6.9	8.6	0.6	3.3	4.9	4.9	52.0	127.0
Advanced Average	8.7	9.3	9.7	10.7	0.6	1.1	2.0	3.3	27.1	53.0
Emerging Average	4.5	5.4	8.1	9.6	1.0	3.6	5.2	7.3	66.4	145.8
Emerging Asia Average	2.0	3.2	5.9	7.3	1.2	3.9	5.3	7.5	73.4	156.5
Emerging Europe Average	9.5	8.4	8.7	9.3	–1.1	–0.8	–0.2	–9.8	–40.7	–51.5

Source: IMF staff estimates and projections.

POTENTIAL FISCAL COSTS: PENSIONS

As populations age, public spending on pensions in some CAPDR countries is expected to rise sharply, generating large fiscal gaps. The empirical analysis in this chapter projects average public spending on PAYG and non-contributory systems in Costa Rica and Nicaragua to climb over the next few decades, increasing from about 2¾ percent of GDP in both countries in 2015 to 15.8 percent in Costa Rica and 13 percent in Nicaragua by 2100 (Table 8.2).³ With revenues from pension contributions projected to grow broadly in line with GDP, and investment revenue dwindling as reserves are depleted,⁴ pension deficits are projected to increase in line with expected increases in pension spending. Through a combination of large coverage, generous benefits, and comparatively adverse demographic trends, the pension systems of both countries are projected to generate two of the largest long-term fiscal gaps in Latin America—almost 400 percent of GDP in Costa Rica and 275 percent of GDP in Nicaragua. These systems are well beyond reasonable estimates of fiscal sustainability absent parametric reforms.

³The rationale behind the choice of years 2030 and 2065 as intermediate points for the analysis presented in Table 8.2 is to focus on: (1) a relatively early period (2030) when currently unforeseen changes in demographic trends resulting from potential new policies could not yet have an impact on pension expenditure projections; and (2) a sufficiently long period of time when new workers joining the workforce under less generous pension system conditions would start having an impact on pension expenditure projections as they retire (2065).

⁴In some country cases with approved future increases in contribution rates, such as Costa Rica, these are already incorporated in the projections. Depletion of pension system reserves where available are also taken into account in the projections.

Questionable Sustainability

CAPDR countries beyond Costa Rica and Nicaragua are not troubled by fiscal pressures under current policies, but the social sustainability of their pension systems is questionable, suggesting contingent fiscal risks. While the long-term increase in public spending on existing pension systems is expected to be quite limited in other CAPDR countries, these results reflect two aspects that raise questions about their social sustainability. The first is the starting low coverage of pension systems, at around 15 percent of the population above pensionable age for example in Guatemala and Honduras. This is assumed to remain constant under projections in this chapter where policies are unchanged. However, social demands for reforms to increase coverage to cater to the needs of a rising share of elderly in the population are likely to lead to policy changes that will put pressure on these countries' fiscal situations. The second factor behind the projections of low public expenditure under current policies is the transition to defined contribution systems in the Dominican Republic, El Salvador, and Panama. This obviously shrinks—or even cancels out—projected increases in public spending on pensions. However, improved fiscal sustainability under current defined contribution systems can come at the cost of inadequate benefits, as average replacement rates tend to be lower in countries that have transitioned (Table 8.1 and Figure 8.2). This again raises questions about the social sustainability of current policies in these countries, and associated contingent fiscal risks if states are eventually forced to step in and top up pensions.

Adequacy Doubts in Defined Contribution Systems

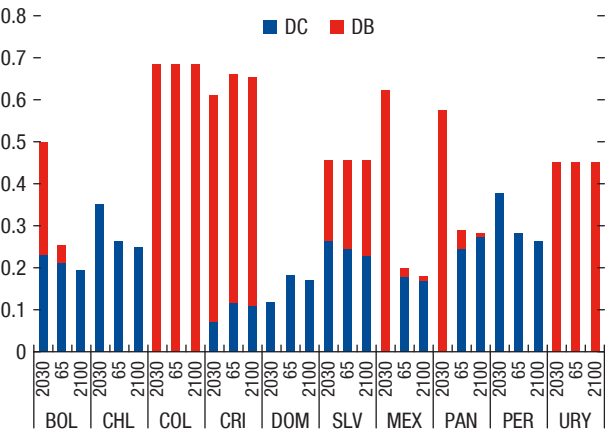
Simulations of replacement rates suggest that adequacy issues are likely to intensify over time in countries transitioning to fully funded defined contribution pension systems. Calculations of theoretical adequacy ratios and replacement rates in countries with a defined contribution component in their pension systems suggest that current adequacy issues are likely to persist and even worsen (Figure 8.3).

Replacement rates relative to salary before retirement and adequacy ratios relative to average earnings are projected to remain relatively unchanged from starting low levels in the Dominican Republic, reflecting the advanced stage of the transition to a defined contribution system in the country. Meanwhile, in Panama, where the PAYG system is already closed to new entrants but not expected to end until 2055–60, adequacy ratios are projected to drop sharply in the long term. In El Salvador, the minimum pension guarantee will help alleviate the risk of old-age poverty, but replacement rates for higher-income pensioners imply a sharp decline in their incomes relative to pre-retirement earnings.⁵

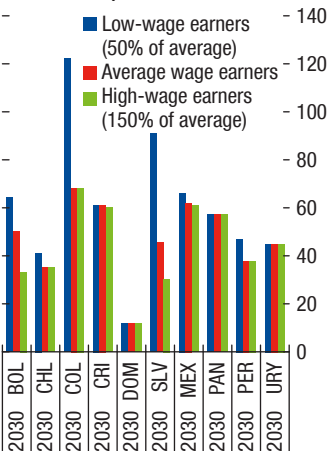
⁵Projections in Table 8.2 of public spending on pensions falling to 0.2 percent of GDP in El Salvador are based on the actuarial model of the authorities. Alternative calculation of the cost of minimum pensions consistent with IMF projections of pension adequacy in Figure 8.3 could rise as high as 1.5 percent of GDP. In practice these estimates are highly uncertain as they depend on the density of contributions and people's choices (whether to take a lump-sum reimbursement or continue to work beyond statutory retirement age to try to qualify for minimum pension rights).

Figure 8.3. Pension Adequacy Ratios and Main Drivers

1. Adequacy Ratios for Men, by Pension Source
(Percent of average wage)



2. Replacement Rates for Men, by Wage Level
(Percent of last earnings before retirement)



Sources: International Association of Pension Supervisors, Inter-American Development Bank, national sources, Organisation for Economic Co-operation and Development, and IMF staff estimates and projections.

Note: The projection of theoretical replacement rates in defined contribution systems is done in five steps: (1) Projection of the average wage life-cycle profile for each year over the projection horizon. In the baseline scenario, contributors earn the average wage in the economy over the entire contribution career; (2) Computation of pension contributions by age for each year, based on the assumed wage profile, contribution density, and the applicable contribution rate. The baseline projection considers a 75 percent contribution density; (3) Computation of the value of individual retirement accounts or sum of accrued contributions and earned interest (after costs) by age for each year; (4) Computation of gender-specific pension annuities based on life expectancy at retirement, the expected real rate of return, and the rate of indexation of future pensions; (5) Finally, two indicators are computed to assess two key dimensions of pension adequacy, namely the extent to which pension schemes help to smooth income over the life cycle (using the replacement rate, which relates the starting pension of a new retiree to his/her last earnings before retirement) and to what extent they can alleviate old-age poverty risk (using the adequacy ratio, which compares the starting pension of a new retiree directly to the average earnings of the working population).

Low replacement rates in our projections for contributory schemes in CAPDR are driven by current contribution rates, assumed low contribution densities—linked to high informality—as well as assumed limited real returns on assets, based on historical experience in the region.

POTENTIAL FISCAL COSTS: HEALTH CARE

CAPDR is the region with the largest projected increase in health care expenditure and resulting long-term fiscal gap. Health care expenditure is projected to rise faster than economic growth in all countries due to population aging, as most health expenditure occurs later in life. Moreover, technological improvements result in better, but costlier, services for any patient (this is reflected in the “excess

TABLE 8.3.

International Comparison of Public Health Expenditure
(Percent of GDP)

	Health Expenditure				Health Spending Change			NPV Health Spending Change		
	2015	2030	2065	2100	2030	2065	2100	2015–2030	2015–2065	2015–2100
CAPDR										
Costa Rica	8.0	11.1	20.9	24.9	3.0	12.9	16.8	20.1	214.7	494.3
Dominican Republic	2.9	3.7	6.8	9.1	0.8	3.9	6.2	5.7	62.7	156.6
El Salvador	4.4	5.8	11.3	14.8	1.3	6.8	10.4	8.8	102.9	266.3
Guatemala	2.5	3.1	5.6	7.8	0.6	3.1	5.3	3.8	46.1	123.7
Honduras	4.5	5.9	12.0	16.1	1.4	7.5	11.5	9.1	111.1	290.9
Nicaragua	4.7	6.3	13.2	17.5	1.6	8.5	12.7	10.7	128.6	327.7
Panama	5.5	7.2	12.8	16.4	1.7	7.3	10.9	11.3	122.3	290.4
Averages										
CAPDR	4.7	6.1	11.8	15.2	1.5	7.2	10.6	9.9	112.6	278.6
Latin America	4.4	5.7	10.6	13.5	1.3	6.2	9.1	8.9	99.3	242.5
Advanced economies	7.1	8.7	12.3	13.8	1.6	5.2	6.7	10.3	99.9	207.8
Emerging economies	3.4	4.4	7.9	9.7	1.0	4.5	6.3	6.8	74.4	174.2
Emerging Asia	2.3	3.1	5.6	7.1	0.7	3.3	4.7	4.9	53.9	127.8
Emerging Europe	5.0	6.4	10.6	11.9	1.4	5.5	6.9	9.5	96.6	210.9

Source: IMF staff estimates and projections.

cost growth” factor in our model). In the baseline scenario in this chapter, with a 1 percent annual excess cost growth based on historical trends in health expenditure in advanced economies (IMF 2012), average health care spending in CAPDR would more than triple by 2100, from 4.7 percent to 15.2 percent of GDP. Most countries in the region would reach higher projected public health expenditures than the projected average for advanced economies (13.8 percent of GDP), and would be well above other emerging market economies (Table 8.3). This reflects the already relatively high public expenditure on health care as a share of GDP in many countries, as well as the intense projected aging from a relatively less advanced stage in the process compared to other emerging market economies. The high projected expenditure on health care is mirrored in the estimates of projected long-term fiscal gaps from health spending, with four CAPDR countries—Costa Rica, Panama, Nicaragua, and Honduras—in the five Latin American countries with largest estimated gaps, reflecting both relatively high starting levels of expenditure and projections of rapid population aging. While acknowledging the high uncertainty in making long-term projections,⁶ the ones in this chapter are broadly consistent with literature on the impact of aging on health care spending.⁷

⁶Long-term projections for health care spending are even more uncertain than for pension spending. In addition to the same uncertainties regarding long-term demographic projections, uncertainties about the evolution of the excess cost growth parameter significantly widen the range of possible outcomes.

⁷Glassman and Zoloa 2014; Acosta-Ormaechea and others, forthcoming; Miller, Mason, and Holz 2011; de la Maisonneuve and Martins 2013.

POLICY OPTIONS

Carefully designed reforms will be needed to ensure fiscal sustainability while providing socially acceptable levels of coverage and adequacy of pensions and health care. Policymakers grappling with the fiscal challenges of aging populations can reshape the fiscal profile directly through parametric reforms to pension and health care systems or indirectly through policies related to fertility, migration, and formal labor force participation with the aim of mitigating the decline in the working-age population.

On Pension Reforms

Parametric pension reforms in CAPDR can effectively slow the growth of age-related public spending. Raising the retirement age in line with higher life expectancy, especially for women, would improve pension sustainability, as a longer working life reduces the length of benefits while increasing the contributions to the system. Linking retirement ages to (rising) life expectancy could therefore be particularly effective as a reform that would introduce an automatic stabilizing mechanism while insulating reforms from political pressures that accompany discretionary decisions. Increases in the retirement age should be accompanied by improved disability systems to protect vulnerable segments of the workforce who might not be able to prolong their careers for health reasons.

An exercise with consistent objectives for reducing long-term fiscal gaps provides specific parametric reform recommendations for PAYG pension systems in CAPDR countries. To provide a unifying and comparable framework across countries, Table 8.4 presents results from an exercise that quantifies parametric reforms needed to reach consistent reform objectives across countries. The two objectives analyzed are keeping medium-term pension deficits in line with GDP (stable deficit-to-GDP ratio between 2015 and 2030) and limiting the increase of the long-term deficit to an additional 3 percent of GDP (in 2015–65). Consistent with the size of estimated fiscal gaps, the most aggressive parametric reforms are required in Costa Rica, while Nicaragua is the only other CAPDR country where reforms are needed to reach fiscal sustainability objectives set out for the end of the century.

Rapidly widening fiscal gaps in some CAPDR countries, especially if coverage were increased to socially acceptable levels, would require a more balanced approach to PAYG systems.⁸ Beyond the specific results of the cross-country exercise outlined above—with specific assumptions such as constant coverage at

⁸Raising contribution rates is the least preferred option due to its impact on labor demand, competitiveness, and economic growth. Regarding its effects on informality, international evidence indicates that the pension system design is less relevant compared to the design of the health care system for the choice between formal and non-formal work (Aterido, Hallward-Driemeier, and Pagés 2011; Attanasio, Meghir and Otero 2011; Bérgholo and Cruces 2014; Cuesta and Bohórquez 2011; Levy 2008; Levy and Schady 2013; Loayza and others 2009; Lewis 1954; Harris and Todaro 1970; Pagés, Rigolini, and Robalino 2014; IDB 2016).

TABLE 8.4.

Parametric Reforms for Public Pension Systems		
Country	Zero deficit increase by 2030	Deficit increase under 3 percent of GDP through 2065
Costa Rica	Gradually increase the retirement age to 69 OR gradually increase contribution rates to 14 percent (from current level of 8.5 percent and above planned increases to 10.5 percent) OR cut benefits by 21 percent.	Gradually increase the retirement age to 75 OR gradually increase contribution rates to 32 percent OR cut benefits by 35 percent.
Dominican Republic ¹	N/A	N/A
El Salvador ¹	N/A	N/A
Guatemala	Increase retirement age to 65 by 2025.	N/A
Honduras	Increase the contribution rate for the private sector by 4 percentage points.	N/A
Nicaragua	Eliminate the reduced pension by 2020 and raise retirement age from 60 to 65 by 2030.	Increase retirement age from 65 to 67 by 2065.
Panama	Increase retirement to age 65 for both men and women in 6 month increments, starting in 2018.	N/A

Source: IMF staff.

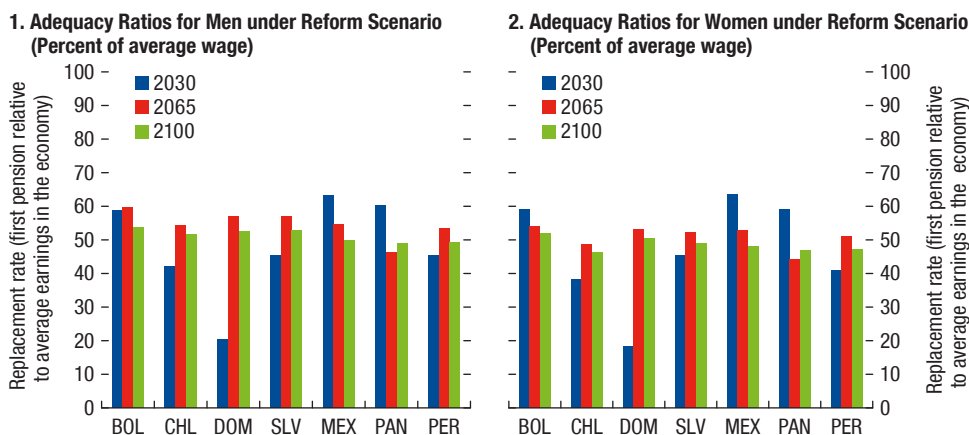
Note: Deficit increases are with respect to 2015. N/A = not applicable.

¹Reform measures are not necessary to achieve the targets.

current levels through the projection period—several CAPDR countries would benefit from parametric changes to make the system less financially unbalanced and so support expanded coverage without adding to fiscal costs. In addition to the Costa Rican case, Guatemala and Honduras would benefit from increases in PAYG contribution rates as these are exceedingly low by international standards. Reductions in benefits are recommended in countries with high replacement rates, including Nicaragua and Costa Rica. Even in countries such as Guatemala and Honduras, where estimated long-term fiscal gaps would not be large if currently low coverage is unchanged, efforts to make their pensions systems socially, as well as fiscally, sustainable by expanding coverage to adequate levels could require lowering replacement rates from levels that are now slightly above international norms (Figure 8.2).

Regarding the pace of reforms, gradual adjustments mitigate potentially negative social effects, suggesting that pension reforms should be initiated while countries still have the fiscal space needed to make gradual change possible. Individuals also require time to adjust to pension legislation changes (through additional savings, for example), so the necessary reforms should be legislated and communicated well in advance.

Gradual increases in the retirement age combined with immediate rises in contribution rates would also be needed to increase pension adequacy in defined contribution systems. Higher contribution rates will be needed to ensure pension adequacy in countries with defined contribution systems—especially those with low current and projected replacement rates. Figure 8.3 shows that even under optimistic scenarios of high contribution density, adequacy ratios will remain or

Figure 8.4. Defined Contribution/Mixed System Adequacy under Reforms Scenarios

Source: IMF staff estimates and projections.

Note: BOL = Bolivia; CHL = Chile; DOM = Dominican Republic; MEX = Mexico; PAN = Panama; PER = Peru; SLV = El Salvador.

fall under 50 percent in all CAPDR countries with defined contribution or mixed systems, except in Costa Rica. Figure 8.4 illustrates the effect of a reform scenario on adequacy rates in Latin American countries where current defined contribution or mixed systems are more likely to produce pension benefits that are socially unacceptable. The reform involves a gradual increase in retirement ages to 67 for both genders, and an immediate rise in the contribution rate to 17 percent, which comes close to the average rate currently observed in advanced economies.⁹ A combination of both measures would increase adequacy ratios for average wage earners with a 75 percent contribution density above or very close to the threshold of 50 percent in 2065. While higher than in the baseline scenario, adequacy ratios in the Dominican Republic would still remain far below the 50 percent threshold in 2030. This suggests that unless rates of return turn out significantly higher than expected, improving the adequacy of defined contribution pensions would require important reforms, not very different from the ones needed to ensure the fiscal sustainability of PAYG systems.

⁹Such an adequacy reform scenario is meant to present the extent of reforms required to put defined contribution schemes on a (socially) sustainable footing and should not be interpreted as an exact policy recommendation. In fact, the analyzed immediate rise in defined contribution rates to 17 percent might not be politically feasible; the implementation of pension reforms essentially remains a political decision. The 17 percent contribution rate excludes administrative fees or survivor pension contributions. The retirement age is increased to 69 in Chile, which has a higher life expectancy at retirement.

On Health Care Reforms

Health care reforms should aim to manage growth in spending while preserving health outcomes and ensuring equitable access to basic services. A combination of tight budget controls and efficiency-enhancing measures will be key to health care reforms in all countries. The relative importance and desirability of reforms will vary across countries. Countries aiming to expand coverage of public health systems, such as Guatemala and Honduras, should focus first on providing the most essential health services, with greater emphasis on preventive and primary care. Given typically large informality in CAPDR countries with greater need to expand coverage, the tax-financed provision of universal basic health care may be the best starting point, with social insurance contributions playing a greater role at later stages of development consistent with greater labor market formalization. Meanwhile, countries with more extensive health care coverage, such as Costa Rica and Panama, should put greater emphasis on budget controls. In these countries, a mix of instruments to contain costs and improve efficiency can help preserve access to high-quality health care while keeping public spending in check (Clements, Coady, and Gupta 2012).¹⁰

Policies to Affect Demographics and Labor Markets

Policies aimed at promoting labor participation, particularly by females and the elderly, would help delay the impact of aging. An effective way to mitigate the fiscal consequences may be to increase the contribution base in the existing population, by bringing a larger share of the inactive population (particularly women and elderly people) into the labor force and by bringing a larger share of informal-sector workers into the formal labor sector, from which pension contributions can be collected. The gap between male and female participation is particularly large by international standards in CAPDR, suggesting a potential role for policies to promote female labor force participation (Chapter 3). Policy measures will also be needed to increase labor force participation among older people to increase contributions and reduce payouts from pension systems. Taxes, pensions, and social security benefits can be designed to provide incentives for older workers as additions to extending the formal retirement age.

Policies to promote formalization in labor markets would help achieve socially sustainable levels of coverage for the old-age population. To incentivize firms to formalize employment, policy can address the high costs of formal contracts relative to the low average productivity of labor through avoidance of excessively

¹⁰Possible control measures include: budget caps on hospitals subject to central oversight; increased public management and coordination measures to screen out unnecessary services; increased local and state government involvement in resource decisions to help tailor services to local conditions and increase responsibility over inefficiencies; greater use of market mechanisms with built-in incentives to minimize waste, including increased cost-sharing with customers, accompanied by measures to ensure access to basic health services; and restricting the supply of health inputs and outputs—for example, by rationing high-technology equipment.

high statutory minimum wages and improvements in education policies (Loayza and others 2009; Levy and Schady 2013). Since workers may also choose between formal and informal employment opportunities based on the perceived value of future benefits from formal employment relative to current contributions, pension schemes may be designed in a way that increases incentives to participate (Levy 2008; Pagés, Rigolini, and Robalino 2014).^{11, 12} Increased formalization and coverage may need to be accompanied by adequately calibrated parametric reform to ensure the long-term fiscal and social sustainability of public pensions and health care systems.

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¹¹Contributions could be linked more closely to benefits, and contributors could be given more choice in selecting their bundle of benefits. Older workers with informal employment histories, for instance, may not want to contribute to pension systems if they cannot expect to accumulate the minimum contributions required to receive a pension. In such cases, the option of receiving reduced proportional benefits for shorter contribution periods (such as implemented in Paraguay in 2011) could provide an incentive. A larger portion of social security could also be financed out of general revenues or from consumption taxes to reduce the adverse incentive from high social security contributions.

¹²Structural and demographic changes, including urbanization, may also help increase formalization of labor markets (Loayza and others 2009).

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ANNEX 8.1: METHODOLOGY TO COMPUTE FISCAL COSTS FROM POPULATION AGING

Demographic projections used in this annex are from the UN's *World Population Prospects* report of 2015, which uses a probabilistic approach for key parameters like fertility and life expectancy to determine the median trajectory of these components within statistical bounds of uncertainty. Drawing on these projections of population growth until 2100 for about 200 countries ensures the consistency and comparability of demographic projections underlying the estimated fiscal costs from population aging.

The characteristics of national systems are the other key factor in projected fiscal costs of population aging related to methodologies for assessing the funding of pensions and health care provision. The analysis examines two types of pension systems: defined benefits and defined contributions. The fiscal costs of health care services are projected assuming that the coverage and generosity of the system is unchanged.

- a. For pension systems promising defined benefits associated fiscal costs are projected using a simple expenditure identity (Clements, Coady, and Gupta 2012):¹³

$$\frac{PE}{GDP} = \underbrace{\frac{population\ 65+}{population\ 15-64}}_{\text{Old-age dependency ratio}} \cdot \underbrace{\frac{pensioners}{population\ 65+}}_{\text{Elderly coverage ratio}} \cdot \underbrace{\frac{average\ pension}{average\ wage}}_{\text{Replacement rate}} \cdot \underbrace{\frac{population\ 15-64}{workers}}_{\text{Inverse employment ratio}} \cdot \underbrace{\frac{labor\ income}{GDP}}_{\text{Labor share of GDP}} \quad (1)$$

where PE/GDP denotes the ratio of pension spending to GDP, *population 65+* is the population aged 65 years or older,¹⁴ and *population 15–64* is the population between ages of 15 and 64. The employment ratio (labor force participation) and the labor income share of GDP are typically assumed to be constant over time. Hence future pension spending growth is essentially determined by parametric changes in the system (that is, changes in the elderly coverage ratio or the replacement rate) and demographic changes captured by the old-age dependency ratio. In countries with mature systems with a given coverage ratio and replacement rate and an aging population, a rising old-age dependency ratio drives the increases in pension spending to GDP. In the absence of anticipated reforms, such as a planned increase in contribution rates or a switch from PAYG to defined contribution systems, pension system reve-

¹³In the cases of El Salvador and Panama projections obtained with this model were replaced by more accurate actuarial projections by national authorities or other international institutions, given the complexities inherent in the ongoing transitions between DB and defined contribution systems.

¹⁴The formula is adjusted as needed for country estimates based on country-specific retirement ages.

nues are assumed to represent a stable fraction of GDP. Therefore, the present discounted value (PDV) of projected increases in pension spending on public PAYG systems as a share of GDP provides a reasonable estimate of the expected fiscal gap under current policies (IMF 2016).

- b. For pension systems without defined benefits but defined contributions, the potential contingent fiscal costs relate to the concept of pension adequacy.
 - In contrast to PAYG systems, and absent an explicit minimum pension guarantee from the government, defined contribution systems do not a priori involve public expenditures as pensions are determined solely by accumulated past contributions and returns. However, fiscal costs could still arise if there are minimum pension guarantees or if replacement rates turn out to be below socially acceptable levels, giving rise to political pressures to top up pensions with public funds.¹⁵
 - While we do not quantify the potential size of such contingent fiscal costs in this chapter, we provide some indication of where such contingent costs might arise. To do this, we compute for countries with a defined contribution component in their pensions systems two indicators that help assess two key dimensions of pension adequacy: first, a *replacement rate* (relating the starting pension of a new retiree to his/her last earnings before retirement) helps assess the extent to which pension schemes smooth income over the life cycle; second, an *adequacy ratio* (which compares the starting pension of a new retiree directly to the average earnings of the working population) helps assess the extent to which pensioners can alleviate old-age poverty risk.¹⁶

Health expenditures as a share of GDP are computed using the following formula:

$$\frac{HE_t}{GDP_t} = \underbrace{\frac{HE_0}{Population_0}}_{\text{Generosity of current health system}} \cdot \left(\sum_i Population_{i,t} \cdot \underbrace{\frac{HE_{i,t}}{Population_{i,t}}}_{\text{Age spending profile}} \cdot \frac{Population_{ref,t}}{HE_{ref,t}} \right) \cdot (1 + excess_cost_growth)^t \quad (2)$$

where HE_t denote public health expenditures at time t , the subscript i corresponds to the specific age-group i , and the ref subscript indicates the age group used as reference to compute the age-spending profile (assumed to be the 40–44 year

¹⁵Projections of fiscal costs from minimum pension guarantees/non-contributory systems are included in the exercise above on projections of public expenditure from PAYG systems.

¹⁶The calculations of replacement and adequacy rates take into account projected combined benefits under existing PAYG, non-contributory and defined contribution pension systems to help assess the likely social acceptability of benefits under existing pension systems.

group). Starting from current expenditure per capita as a measure of the generosity of the existing health system, population aging drives projected health care spending as a share of GDP. *Excess_cost_growth* represents the excess growth in health spending not due to demographic changes, for instance due to costly medical innovation.¹⁷

¹⁷The changing age profile of the population drives projected changes in health expenditure due to higher health spending per capita of older age groups compared to the population in younger groups. Based on historical trends, the excess cost growth in health spending in real per capita terms over real GDP per capita not due to demographic changes is assumed to be constant over time and equal to 1 percent, also contributing significantly to long-term growth in health spending.

Fiscal Policy Reforms and Inequality: The Cases Of Honduras, Guatemala, and the Dominican Republic

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INTRODUCTION

The experience of some Central American countries shows that persistent income inequality can provoke social unrest, political instability, and macroeconomic imbalances. Pursuing higher growth, however, does not entail a tradeoff between less inequality and higher growth. In theory, less inequality can foster better social cohesion and promote political stability—essential ingredients for higher growth. Stability and social cohesion thus help promote long-lasting growth-enhancing economic reforms and avoid short-term populist policies that could threaten macroeconomic stability. Some studies have shown that countries with less income inequality have had longer growth spells than countries with wide disparities (Ostry, Berg, and Zettelmeyer 2012).

The design of fiscal policies to tackle inequality covers multiple dimensions and requires considering the unique characteristics of Central American countries. On the revenue mobilization front, for instance, efforts to improve the progressivity of taxes—a policy measure to reduce income inequality—requires analyzing the effects of informality on the potential tradeoff between making income taxes more progressive versus generating higher revenues by increasing indirect taxes. On the spending side, granting a minimum level of direct transfers to support a reduction in extreme poverty—in the rural sector, for instance—needs to be matched by plans to upgrade human and physical infrastructure capacity to support higher growth.

More generally, in the presence of fiscal imbalances, the question is how fiscal consolidation can be designed to reduce income inequality. This chapter seeks to tackle this by analyzing the experiences of fiscal policy reforms adopted in Honduras during 2014–17, and the fiscal reforms that Guatemala and the Dominican Republic have been considering since 2016. The analysis uses a

dynamic general equilibrium simulation model, where income distribution matters and agents are heterogenous. The model structure is broadly similar for the three country cases and it is calibrated for each to represent idiosyncratic features. A simulation model has the advantage of creating counterfactual scenarios to analyze the effects of policies and its dynamic feature brings up additional effects that could not be illustrated under static analysis.¹ The model is for a small open economy with multiple sectors (agriculture, manufacturing, and services), whose production is generated by rural and urban households (Annex 9.1).

Several lessons from the simulation exercises can be obtained. First, well-designed social programs are essential at the outset of the consolidation strategy. Second, greater reliance on direct taxes, which are typically progressive—in some cases through lower income thresholds to capture more high-income households in the tax net—would help mobilize tax revenues with less distributional cost. In this context, greater tax progressivity can be pursued by scaling back exemptions and preferential treatment that benefit high-income households, and combating tax avoidance by the same individuals. Third, a successful consolidation that reduces (or stabilizes) debt and reduces the risk premium could generate savings from lower interest payments not only to the public sector but also to the private sector. Using these savings to reduce social and infrastructure gaps could offset the demand drag from fiscal consolidation and reduce inequality. In other words: consolidation measures that are not progressive per se could efficiently redistribute resources if the revenues generated by those measures are spent in a progressive way.

CASE STUDIES

Honduras

In 2013, Honduras² experienced growing economic and social imbalances. The fiscal deficit rose to 7 percent of GDP and public debt reached 45 percent of GDP. Economic growth slowed, poverty increased and, crime rates skyrocketed. In 2014, when a reform program was adopted, the key consideration was to correct fiscal imbalances. The reform, among other aspects, included revenue mobilization efforts and policies to bring government spending to an optimal level of efficiency. On the revenue side, reform of value added tax (VAT) included a 3 percentage point rise in the rate to 15 percent. Since VAT increases are typically regressive, the package included a program to allocate some of the additional revenue collected to expand a targeted cash transfers program. In 2017, four years after the reform, sovereign spreads declined by about 400 basis points from their 2013 peak of 700 basis points, reducing bank lending rates, while economic growth reached 5 percent, the fiscal deficit fell to 1 percent, and the security situation improved considerably.

¹See for instance the incidence analysis in Lustig and Higgins (2013).

²The analysis draws on IMF (2016).

To quantify the impact of the fiscal reform on output, poverty, and inequality, a counterfactual exercise is conducted, tailored to the main characteristics of the Honduran economy. The model used for this exercise reproduces—qualitatively and quantitatively—key macroeconomic and distributional features of Honduras household level data, drawing on the Honduras household expenditure survey. It also captures the effective collection of VAT, personal income, and other taxes as fractions of total government revenues. To match these characteristics, the differences in total factor productivity across sectors in the economy, the sector-specific parameters of production functions, and implicit tax rates are calibrated. By simulating thousands of individual households with diverse incomes, the model produces insights into income, wealth, and consumption distributions. The persistence and variance of the households' particular income shocks are calibrated to reproduce measures of inequality (Gini of 0.55) and poverty (rates of about 60 percent) observed in Honduras' household surveys. In addition, the model is calibrated to match household consumption patterns with the objective of capturing the distributional implications of the policy changes.

The counterfactual exercise reveals a positive impact of the reform on macroeconomic fundamentals (Figure 9.1)³. On its own, an increase in VAT is potentially regressive. It may depress aggregate demand and worsen poverty and inequality. However, if the reform is combined with compensatory measures such as cash transfers, private consumption expands, and poverty is reduced. Cash transfers are assumed to have modest positive impact (1 percent) on the productivity of households that receive them. These households tend to have a large marginal propensity to consume, which boosts private consumption. Although the increase in private consumption is not large enough to compensate for the depressing effect on overall aggregate demand that results from the taxes in isolation, once a decrease in the marginal cost of capital (due to macroeconomic stability) is incorporated, private investment substantially increases. This creates a virtuous cycle that translates into higher GDP (2 percent), private consumption (1.5 percent), and private investment (9 percent), which improve household incomes and bring additional tax revenue to finance cash transfers. Urban poverty and inequality fall by more than 2 percentage points. These results are complemented by a more efficient and competitive financial sector. Productivity growth in agriculture, combined with targeted training, could increase labor mobility and further improve overall gains from the reform.

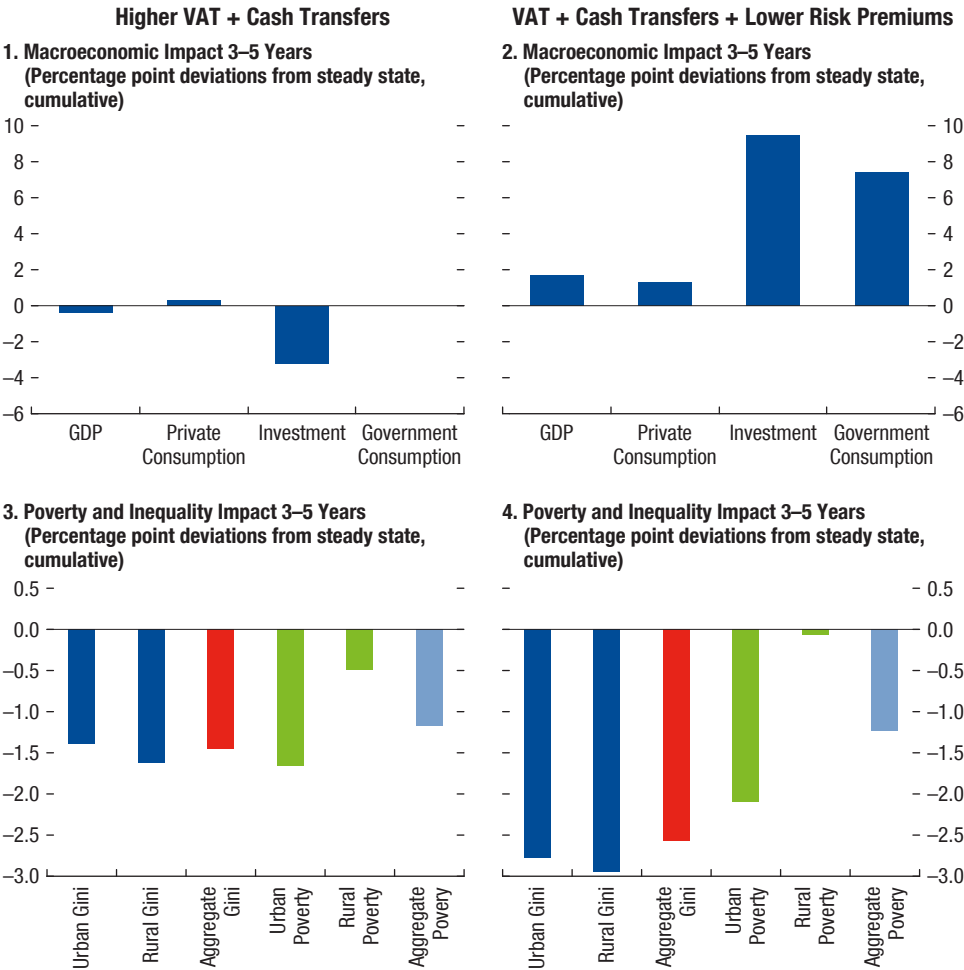
Guatemala

Guatemala⁴ has significant poverty and inequality, expressed by distinct patterns in the rural-urban and ethnic divide. At the same time, persistently low tax revenue constrains the size of the budget and limits the government's capacity to

³The ex-post counterfactual exercise consists of simulating what the effects of the policies could have been considering the initial conditions.

⁴The analysis draws on IMF (2016b).

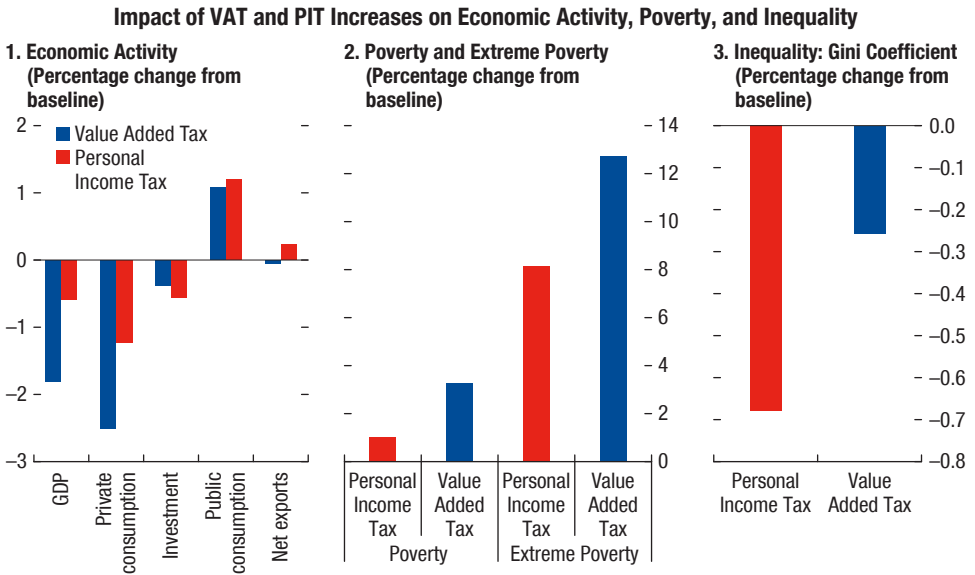
Figure 9.1. Honduras: Fiscal Reform Scenarios



Source: IMF (2016).

pursue social objectives. At 10.2 percent of GDP in 2017, tax revenues are among the lowest in the world, which limits the size of government and its spending capacity. As a result, social spending is very low, even compared to countries with similar per capita income.

In Guatemala, the modeling exercise consists of simulating the redistributive and macroeconomic effect of alternative combinations of tax and spending policies. In particular, the general equilibrium model described in Annex 9.1 is used to simulate the growth and redistributive effect of a tax increase worth 1 percent of GDP through higher VAT and personal income tax with alternative spending

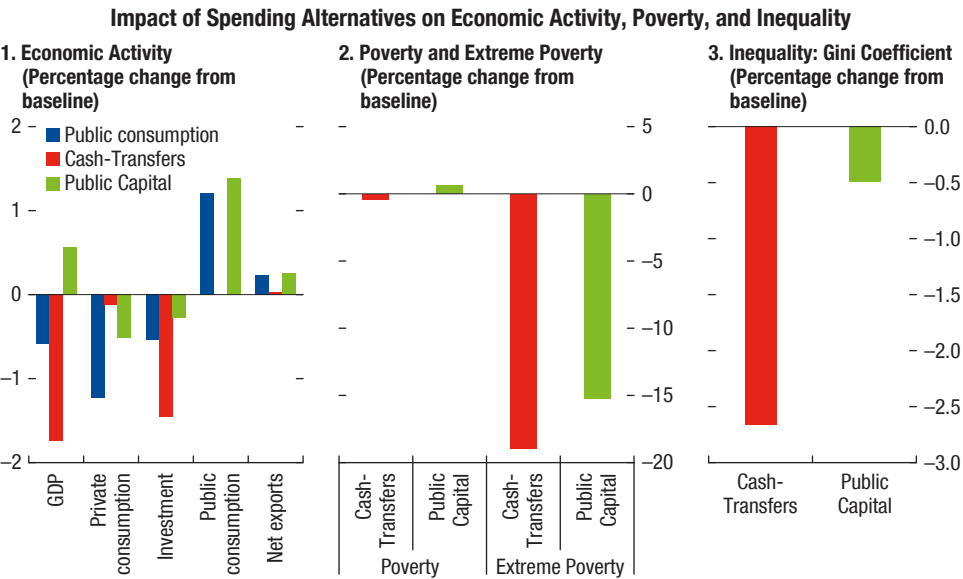
Figure 9.2. Guatemala: Fiscal Reform Scenarios

Source: IMF (2016).

options including: (1) untargeted public consumption, (2) public investment, and (3) cash transfers.

Compared to personal income tax, VAT has a stronger negative impact on consumption and GDP, and is regressive, resulting in worse overall poverty and inequality outcomes (Figure 9.2). The model results indicate that revenue mobilization through VAT would have a stronger contractionary effect on output than through taxing personal incomes. While GDP decreases by less than 1 percent compared to the baseline in the income tax scenario, it would fall by almost 2 percent if the additional revenues were raised through VAT. The effect on the GDP is unconventional. VAT is usually considered less distortionary than taxing personal income, particularly because of its neutral impact on investment. However, conventional wisdom may not apply for Guatemala due to the presence of a large informal sector. The informal sector may be able to escape taxation, including levies on intermediate goods, in part because VAT controls are weak and in part because many goods are unsophisticated and do not have multiple production stages. At the same time, many of the goods produced by the formal and informal sectors are close substitutes. Under these circumstances, VAT penalizes the consumption of goods produced in the formal sector, reduces their demand, and depresses their prices, so reducing marginal returns for firms in the formal sector. As the prices of goods shift to favor the less productive informal sector, which performs only a fraction of the formal sector's investment

Figure 9.3. Guatemala: Fiscal Reform Scenarios



Source: IMF (2016).

in the economy, VAT becomes distortive both in consumption allocations and for investment decisions. Hence, while personal income tax is always distortive with or without the informal sector, VAT can become distortive in the presence of the informal sector. This, however, does not automatically guarantee that VAT is more distortive than personal income taxation. It is the particular structure of personal income tax in Guatemala, with extremely low rates and little progressivity, along with a relatively high VAT rate that help explain the result.⁵ At the same time, VAT is regressive, and so tends to increase poverty and widen inequality more.

Given its superior growth and distributional outcomes, the focus for the analysis of spending scenarios is on increasing personal income tax. If the additional revenue was used to finance untargeted government consumption, GDP would shrink following a reduction in private consumption and investment. In addition, since government consumption is in part spent on tradable goods, some of the expenditure would leak from the economy in the form of imports, thus exacerbating the distortionary effect of higher taxation.

⁵An empirical study by Acosta-Ormaechea and Yoo (2012) also finds that in low-income countries PIT does not significantly affect growth, likely due to the low level of personal income tax collection in such countries (1.5 percent of GDP on average). This result is relevant for Guatemala, where personal income tax collection is only 0.4 percent of GDP.

Additional spending on cash transfers would significantly reduce extreme poverty and inequality but result in a more pronounced fall in GDP. The model proportionately expands cash transfers according to the distribution of the *Mi Bono Seguro* Program in the ENCOVI 2014 database, which covered 36 percent of households in extreme poverty, but leaked about 20 percent of its benefits to households that were not poor. Given the limited additional funds and imperfect targeting, the effect on poverty overall is trivial, but extreme poverty would drop by almost 20 percent, from 23 percent to 19 percent of the population. Inequality as measured by the Gini index would decrease accordingly by about 2.5 percent, to 0.52.⁶ Moreover, since cash transfers support the consumption of poor households, private consumption drops less than in the public consumption scenario. However, cash transfers shift resources away from groups that save and invest, resulting in a bigger drop in private investment. In addition, cash transfers are not treated as government consumption in the model, resulting in lower government expenditure—as the revenue becomes a transfer—which further depresses private investment. If cash transfers induce labor productivity gains from households receiving them, the effects on investment can be reduced. The reduction in poverty therefore comes at the expense of growth.

Using the additional funds to finance infrastructure would result in moderate economic expansion. The model assumes that public investment is efficient, resulting in a higher stock of public capital, which improves private sector productivity. Better infrastructure generates higher private sector productivity and a smaller decrease in private investment, which boosts total output. Higher productivity also increases demand for labor and raises wages, resulting in higher labor income for poor households. Higher productivity also makes food cheaper, further reducing extreme poverty. Therefore, both extreme poverty and inequality are reduced, although less than in the cash transfer scenario.

Dominican Republic

The Dominican Republic has been among the fastest-growing countries in the region since its 2003–04 financial crisis, but progress in improving social indicators has yielded only recent results. Amid relatively high poverty and inequality, fiscal adjustment is needed to reverse the upward debt dynamics. This ought to be designed to keep its growth and distributional effects to a minimum. An adjustment of 2½–3 percent of GDP during the next two years is estimated to be needed to reduce debt to around 45 percent of GDP over the next five years. About a third of the adjustment may need to fall on reducing generalized and regressive subsidies on electricity, with the rest on revenue mobilization. With tax rates in the Dominican Republic broadly in line with international averages, revenue mobilization should focus on broadening the tax base by streamlining tax

⁶The Gini coefficient is a measure of income inequality and ranges from 0 to 1, where 0 represents perfect equality.

exemptions and incentives, closing administrative tax loopholes, and tackling informality, among other measures.

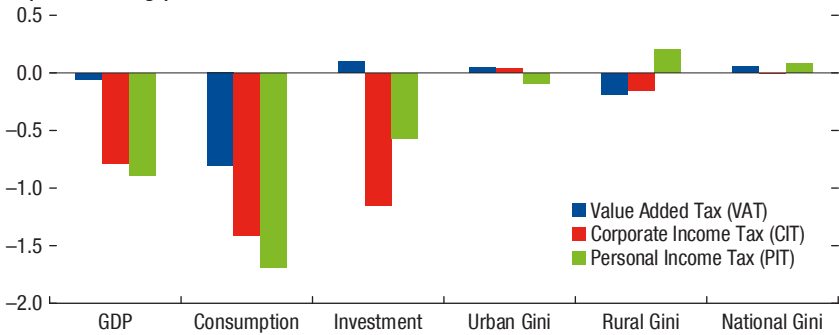
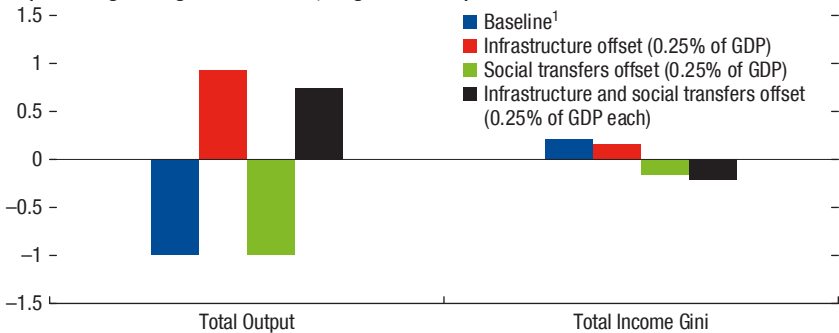
The dynamic effects of fiscal policies on macroeconomic aggregates and income distribution are explored with a general equilibrium model described in Appendix 9.1.⁷ Focusing on revenue mobilization, for which the model is well suited, the results suggest that fiscal tools show different tradeoffs between growth and equity effects. In particular, (1) VAT taxes in the model have a relatively limited cost in terms of growth and overall inequality, (2) in line with theory, personal income taxes have the least favorable effects in the model, although in practice this effect is likely to be muted by the strong progressivity of the tax in the Dominican Republic, and (3) corporate income taxes have the most benign social effects, but their impact on growth could be relatively strong.

The need to mobilize an additional 1½–2 percent of GDP in revenues would require broad contribution from all taxes. The exercise consists of simulating the effects of two packages: one with contributions from indirect (VAT) and corporate income taxes, given the theoretically less favorable effect of personal income taxes on growth and inequality, and the other as a package where all revenues contribute, in light of the small corporate income tax base. Results show that the two packages do not produce meaningful differences in growth and inequality, and therefore the second package is the most practical. In both cases, a 2 percentage point revenue mobilization could reduce output by nearly 1 percent (a fiscal multiplier of close to 0.5).

The drag on growth and social outcomes of the adjustment should be offset with a combination of higher investment and targeted transfers. It is estimated that a fiscal adjustment of 2½–3 percent of GDP would reduce the interest bill by 0.5 to 0.8 percent of GDP over the medium term. This space should be used to boost infrastructure investment and social spending. Simulations with the dynamic model suggest that investment spending is an efficient way to achieve a significant pickup in growth, thereby offsetting the demand drag from the adjustment, but it does not contribute meaningfully to better redistribution of income. Social transfers, on the other hand, may not contribute to better growth outcomes through their positive impact on human capital (at least this longer-term effect is not captured by the model) but are very potent at reducing inequality. A combination of infrastructure investment (0.25 percent of GDP) and higher targeted transfers to rural area or equivalent spending on health/education (0.25 percent of GDP), all within the envelope of fiscal resources freed by the adjustment, would provide the optimum offset to the growth and social effects of the adjustment (the gray scenario in Figure 9.4, panel 2).

In sum, considering the size of the needed fiscal adjustment, the exercise suggests there is scope to use all tax instruments. The bulk of the adjustment would rely on VAT and other indirect taxes, because (1) their size allows a larger contribution to the adjustment effort, (2) they account for a large share of exemptions,

⁷See also Peralta-Alva and others (2018).

Figure 9.4. Dominican Republic: Fiscal Reform Scenarios**1. Comparative Impact of Tax Increases
(Percent change)****2. Growth and Distributional Effects of Fiscal Consolidation Package
(Percentage change from baseline, long-term effect)**

Source: Authors' estimates.

Note: In panel 1, the effect on macrovariables of raising 0.5 percent of GDP in revenues from VAT, CIT, and PIT separately (through base broadening by 5.6, 18.8, and 23.2 percent, respectively). In panel 2, the effect on macrovariables of raising 2 percent of GDP in revenues (1.5 percent of GDP from VAT, 0.25 percent from CIT, 0.25 percent from PIT), through base broadening by 16.7, 9.4, 11.5 percent, respectively.

¹Baseline assumes mobilized revenue is used in non-productive current spending.

and (3) because they achieve a good balance between efficiency and equity. The equity effects of the adjustment package can be improved through reliance on taxing corporate income (which has good equity performance) and personal income (which in the case of the Dominican Republic is progressive). The drag on growth from such an adjustment can be fully reversed by a 0.25 percent of GDP increase in public investment, which in practice could be financed by savings on the interest bill. However, even such an expansionary adjustment would be insufficient to reduce inequality notably, given that consumption will remain depressed. Large social transfers, on the other hand, are efficient in reducing inequality but are a drag on growth, as discussed above. An overall package that

combines both infrastructure increases and social transfers (0.25 percent of GDP each) would therefore be optimal for ensuring the fiscal adjustment brings beneficial growth and social effects over the medium term.

CONCLUSION

The way resources are mobilized and spent matters. Since alternative taxes and spending strategies have different macroeconomic and redistribution impacts, careful analysis of growth and poverty effects is required when designing tax/spending policies. The analysis in this chapter suggests that in general personal income taxation would generate a larger reducing effect on inequality and less distortionary impact on growth, likely due to its current low rates and relatively neutral structure in Central America. Design, of course, matters too, and any policy measure can be designed to mitigate the negative effect on growth and people living in poverty.

When it comes to spending, there are tradeoffs between growth and redistribution objectives. While cash transfers are more efficient in reducing extreme poverty and inequality, well-targeted public investment generates better growth outcomes. Hence, both government transfers and public investment will need to rise to spur growth and reduce poverty and inequality. However, growth and social objectives are not necessarily incompatible if a virtuous cycle can be started where economic growth improves living conditions and a better-off, more productive labor force contributes to faster economic growth. In this respect, effective targeting and efficient public investment spending are key to maximizing the social and growth returns of higher tax yields.

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ANNEX 9.1. THE TOOLKIT MODEL: A SUMMARY

The toolkit model used is from Peralta-Alva and others (2018), which is a hybrid of the standard multisector neoclassical growth model and the Aiyagari (1994) heterogeneous agent model (hereinafter “the toolkit”).⁸ It features a small open economy, with four interdependent sectors (domestic and exporting agriculture, manufacturing, and services), whose production is generated by rural and urban households.

Labor markets in rural and urban areas are segmented, and migration is prohibited. The production for each type of good involves labor (measured in effective hours), capital, and land, in different combinations. The production functions include idiosyncratic productivity shocks, which capture the difference in labor productivity across households and are caused by factors that are not modeled explicitly. The shocks are modeled as AR(1) processes.

All households share the same preference, but poor households spend more of their total income on food consumption due to subsistence requirements. Each household is endowed with one unit of time, which they allocate between working in the formal labor market, where they earn wages subject to income tax, and working informally. Because different households have different realizations of idiosyncratic productivity shocks, total disposable income (which is either consumed or saved) and savings would be different, generating a nondegenerate distribution of households in the model.

The government collects revenues (VAT on domestic agricultural and manufacturing consumption, income tax on formal wages, and corporate profit taxes on manufacturing firm revenues and large farmers’ sales profits), which can be used to finance government consumption, cash transfers (targeted or universal), and/or infrastructure investment.⁹

Put together, given manufacturing goods are the numeraire, the model consists of five endogenously cleared markets: capital, domestic agricultural goods, service goods, rural labor market, and urban labor market. Demand and supply curves in these markets are characterized by the optimization problems of different economic agents, as specified above. Aggregate demand and supply curves are then constructed by integrating these individual policy functions using the stationary joint distributions of savings and current income shocks for urban and rural areas. These demand and supply curves can be solved under different prices, and the solution concept of the equilibrium is a vector of the prices that clears all the markets (equilibrium prices).

The model is calibrated by choosing the parameters of the model in a way that reduces to a minimum the difference between the values of key macro variables generated in the model and their real data counterparts. This parameterization,

⁸For a more detailed discussion of the model see Appendix 1 in Fabrizio and others (2017).

⁹Government consumption refers to expenditures like public service or national defense that are not valued directly by individuals. We use government consumption interchangeably with “nonproductive expenditure” in this section.

ANNEX 1.

The Toolkit Model: A Summary				
	Urban households		Rural households	
	High productivity	Low productivity	High productivity	Low productivity
Domestic agriculture			Informal labor (self-employed)	Formal labor (hired by large farmers)
Exporting agriculture			Formal (hired by large farmers)	
Manufacturing (and formal services)	Formal labor			
Domestic services		Informal labor		

which replicates stylized facts of the economy under current policy, is a benchmark. In using the model to evaluate the effect of different policies, the parameters of the model are changed to reflect policy features that are to be implemented (for example, increasing the tax base), with the solution of the model under this new parameterization yielding a set of prices and allocations that reflects the general equilibrium effect of the new policies.

Recent Experiences with Fiscal Responsibility Frameworks

METODIJ HADZI-VASKOV, JAVIER KAPSOLI, AND BOGDAN LISSOVOLIK

INTRODUCTION

Policy efforts to strengthen fiscal prudence, gain credibility, and ensure fiscal sustainability have long been priorities for policymakers in CAPDR countries. Some countries in the region have introduced fiscal responsibility frameworks to meet these objectives, while others are considering similar legal structures. Taking stock of the main characteristics and results so far, both in CAPDR and in other emerging market economies, reveals key challenges for countries considering embarking on the journey to fiscal responsibility.

Fiscal responsibility laws are a special type of budget system legislation.¹ They focus on three guiding principles: accountability, transparency, and stability (Lienert 2010). They cover the executive power's accountability to the legislature on fiscal policy performance and regulations to meet public desire for transparency about government fiscal responsibility and the need to ensure that annual budgets are aligned with this goal. The laws require disclosure of a country's main fiscal targets. Usually, though not necessarily, such a legal act involves setting numerical rules. The common thread in all these attributes is that they can support economic growth.

The general record of laws governing fiscal responsibility in emerging market economies is instructive for policymakers, as is a focus on specific details about CAPDR's experience with fiscal frameworks, including their rationale, key features, and the conditions that ideally should be in place for their introduction. These aspects of fiscal responsibility frameworks and laws will be examined. Hence, with a view to highlighting the particular characteristics and institutions of CAPDR economies necessary for effective fiscal responsibility frameworks, the chapter begins with a scene-setting description of their various forms and functions.

¹Following Lienert and Fainboim (2010), this chapter understands budget system law as any law defining elements of the national budget system. Some examples are organic budget laws, public debt laws, budget equilibrium laws, and public financial administration managing laws, among others.

DEFINITIONS AND CHARACTERISTICS

Van Eden and others (2013) define three types of fiscal responsibility laws: (1) regulating only principles without including specific restrictions or rules, (2) focusing on procedural rules, which often include medium-term fiscal frameworks, and (3) laws imposing restrictions on fiscal policy guided by achieving fiscal sustainability, usually using numerical rules. The first type is common in advanced economies with strong fiscal institutions and sound records of fiscal policy, such as the UK and New Zealand. Examples of the second type are Brazil and Colombia (until 2011), while Chile, Honduras, and Peru exemplify the third type.

Often fiscal responsibility laws are part of a comprehensive fiscal framework, including a medium-term macro-fiscal framework and some form of stabilization mechanism (usually a stabilization fund). In more advanced economies, the macro-fiscal is complemented by frameworks to make expenditure and the management of public investments explicit. For practical considerations, this chapter focuses on laws that codify numerical fiscal rules. These impose restrictions on one or more of the following fiscal variables: deficit, debt, borrowing, or spending. In this context, a fiscal rule is defined as “a permanent constraint on fiscal policy” (Kopits and Simansky 1998).

Fiscal responsibility laws have become increasingly popular, particularly in emerging economies. Since the seminal introduction of New Zealand’s Fiscal Responsibility Act in 1994, use of the laws has increased steadily. By November 2017, 30 countries, mostly emerging market economies, had adopted fiscal responsibility legislation (Annex 10.1).² Two regions—Latin America and eastern Europe—account for about 60 percent of them. Among emerging market economies, Peru was the first to introduce a fiscal responsibility law in 1999. The laws gained popularity after the global financial crisis of 2008. Overall, 16 new sets have been adopted in emerging markets economies since 2010.

In most cases, the laws were introduced to limit the deficit bias (the historical tendency to generate fiscal deficits), gain credibility, and improve poor fiscal records. Currently, 26 have one or more numerical fiscal rules, which generally are aimed at limiting the deficit bias. Among these, rules based on observed variables are more common (18 cases) compared with rules based on structural variables (eight cases).³

Fiscal responsibility laws often include provisions to create budgetary procedures and institutions. The most common is the obligation to include a fiscal policy paper in the annual budget bundle. In most cases, the paper introduces a medium-term view, with specific targets for the budget under preparation and

²Not including three cases where fiscal responsibility laws were enacted, but are currently repealed (Argentina, India, and Hungary).

³Structural estimations seek to separate permanent and temporary components of fiscal variables. The latter are usually related to short-term cyclical movements, one-off operations, and so on. See Bornhorst and others (2011) for details.

indicative targets for subsequent years. In some countries, the tax expenditure and contingent liabilities are disclosed. Other common institutions are fiscal stabilization funds (eight cases), pension reserve funds (Chile), or contingency funds (Mexico). Some countries have introduced fiscal councils, while others are considering them.⁴ Just a few countries include formal sanctions, with Brazil being the only case with envisaged criminal persecution. In countries where the streamlining of tax exemptions is a critical challenge, the laws incorporate provisions to handle them.⁵

BASIC PRECONDITIONS FOR IMPLEMENTING A FISCAL RESPONSIBILITY LAW

Countries considering the introduction of fiscal responsibility legislation should ideally meet some minimum preconditions for the economic/political environment, public financial management, and institutional framework. Focusing on CAPDR, critical areas are likely to include:⁶

- *A stable macroeconomic environment.* When the economy is in a downturn it is difficult to introduce adjustment measures. Nevertheless, where a fiscal responsibility law is enacted, there is high risk that the targets will be missed, with devastating effects for the credibility of the new law. That said, in some cases, the law can be used to demonstrate firm commitment to prudent fiscal policies in a fiscal crisis scenario (Peru and Honduras).
- *Sound public financial management.* The basic components are a Medium-Term Fiscal Framework (MTFF), a clear and credible budget formulation (including adequate supervision from the legislature), clear and enforceable budget execution procedures, transparent and credible reporting, and a strong and independent auditing process (Van Eden and others 2013).
- *Good monitoring, accounting, and reporting systems.* An adequate information system is especially important when the fiscal responsibility law involves rules. A regular monitoring of the fiscal targets would not be possible without comprehensive budget information. Weak reporting reduces the credibility of fiscal outturn projections, and constant revisions undermine the value of the law. An integrated financial management system is usually a good starting point to strengthen reporting. However, a quality system can only be guaranteed if enforceable regulations exist for all spending units and if the system covers a meaningful range of fiscal operations. That does not

⁴Fiscal councils are independent bodies that oversee the fulfillment of fiscal rules.

⁵That is the case of Honduras, which has one of the largest amounts of tax exemptions in the region (7 percent of GDP). See IMF (2017b).

⁶This section draws on Kapsoli (2017). For a more detailed discussion see Ter-Minassian (2010) or Van Eden and others (2013).

happen in countries with a large number of extra-budgetary operations. Commonly in the CAPDR region, these operations involve the use of special funds (Allen and Radev 2010).

- *A transparent and publicly available reporting system.* In best-practice countries, the integrated financial management system is available through the finance ministry website. Some countries even have transparency laws stating the obligation to disclose all information related to the budget. This is a powerful accountability mechanism as it allows independent researchers and other stakeholders to verify and analyze the fiscal data. Also, such practices prevent attempts to rely on creative accounting when reporting the fulfillment of the laws' targets.
- *An MTFF in place.* Implementation of an MTFF requires that finance ministry staff have the technical skills to prepare a medium-term policy scenario and an annual budget consistent with it. These skills would also be critical to determine meaningful legal parameters.⁷ Implementing the medium-term framework involves the preparation and dissemination of a fiscal policy paper for stakeholders, such as academia, think tanks, international organizations, and others to discuss the law's proposed fiscal parameters.
- *Strong institutions.* In countries with weak rule of law, whether there is a fiscal responsibility law or not makes no difference. In some cases, the law is enacted but officials do not commit and legal provisions that ensure compliance cannot be enforced. A clear discussion on how much discretion the authorities are willing to concede then becomes essential to help choose the more feasible rule. Deficit or spending rules have an immediate impact on fiscal policy, while debt rules, when not accompanied by other types of rules, could entail more discretion (depending on how far the initial debt stock is from the target).

LESSONS FROM INTERNATIONAL EXPERIENCES

Experiences over the past decade with the implementation of laws on fiscal responsibility across the world provide useful insights, but also point to potential pitfalls and key challenges for countries thinking about upgrading their fiscal frameworks. Some of these lessons have general application, while others may be relevant for specific country groups, such as the CAPDR region.

- *Fiscal responsibility laws should not be considered a substitute for prudent fiscal policy.* Laws cannot magically create institutions where absent, nor can they create accountability in countries with a tradition of weak rule of law. Econometric evidence shows that the link between their introduction and improvements in fiscal outcomes is weak (Cáceres, Corbacho, and Medina 2010). Alternatively, countries can have sound fiscal policies without a fiscal

⁷If the fiscal responsibility law is based on structural rules, additional technical skills are required.

responsibility law, or introduce one after a period of sound economic policies (Chile).

- *Fiscal responsibility laws can be used to “signal” a trend for fiscal policy.* If a country does not meet the preconditions described above, it can still benefit from the introduction of laws to govern fiscal responsibility. The literature suggests that a fiscal responsibility law could contribute to the development of fiscal institutions by promoting political consensus on prudent fiscal policies. This literature emphasizes the role of accountability to discourage the violation of rules by politicians (for example, Debrun and Kumar 2007).
- *Preconditions need to be assessed carefully before fiscal responsibility laws are introduced.* Special attention should be given to public financial management conditions, which are indispensable for implementation. Without a comprehensive and transparent information system, it would be impossible to monitor targets. Also, fiscal outturns can be misreported where information is incomplete. Where the information system is not transparent, outturns cannot be credible, which creates suspicion of manipulation or creative accounting. A comprehensive MTFF is also critical as targets in the law are usually dependent on fiscal sustainability parameters or other medium-term fiscal targets commonly stated in the fiscal policy papers that accompany MTFFs.
- *Gradual implementation is advisable.* The regional experience shows that fiscal responsibility laws have been introduced at times of weak fiscal positions, amid concerns that fiscal sustainability cannot be achieved. Under these circumstances, it is critical to preserve the credibility of the law by not targeting onerous short-term fiscal objectives. The new institutional framework embedded in the laws also requires time to mature. Budget operators in line ministries need to learn a new rationale for budget preparation, while civil society needs time to understand the implications of the new framework, the way to evaluate it, and the procedures for making policymakers accountable.
- *Structural components should be avoided at the initial stage.* Although theoretically attractive, structural targets are easy to manipulate because they involve several ad hoc adjustments, and econometric estimations that require specialized technical skills and would not be easy to discuss with legislators and stakeholders. Discussions could be jammed in methodological details instead of focusing on the targets and their implications for fiscal sustainability.
- *Appropriate escape clauses should be included.* For instance, escape clauses are needed for cases that require a countercyclical fiscal response. When introduced in line with best practices, such provisions would avoid the scenario where the law is violated or there is pressure to change it because the limits become unattainable due to a natural disaster, significant recession, or other emergencies. Box 10.1 summarizes the common structure of fiscal responsibility laws in emerging economies and low-income countries.

Box 10.1. Common Contents of a Fiscal Responsibility Law in Developing Economies

1. **Scope, coverage, and objectives**
 - a. Coverage of the law (central government, general government, NFPS, and so on).
 - b. Main principles (such as long-term sustainability, short-term budget balance).
2. **Rules**
 - a. Rules limiting one or more of the following fiscal aggregates: overall balance, debt, and spending. Some countries have limits to other variables, such as primary balance, current balance “golden rule”.
 - b. If structural targets are involved, the methodology to estimate them should be clear and transparent.
3. **Fiscal policy paper**
 - a. The fiscal policy paper is a critical part of the medium-term macro-fiscal framework, which should be part of the annual budget bundle.
 - b. Contents of the paper. For example: how many years will be included in the projection horizon; which ones will be binding and which ones indicative. In best-practice countries, the policy paper also include debt sustainability analysis (including contingencies). In some countries, it also includes the disclosure of the amount of tax exemptions, PPP guarantees, and the like.
4. **Transparency and accountability**
 - a. Provisions for regular reviews of the projections using public reports.
 - b. Statement that, in cases of significant slippage, the report should contain corrective measures.
5. **Escape clauses**
 - a. Clear rules for using escape clauses, including whether they require authorization from the legislature.
 - b. Indication of a path to return to the law’s limits after the use of escape clauses.
6. **Sanctions**
 - a. Include administrative sanctions.
7. **Other provisions**
 - a. A stabilization fund with a clear rule for the use of its resources. Some countries also have contingency funds or pension reserve funds (useful in cases where private pension funds have public guarantees).

RATIONALE AND PRECONDITIONS FOR ADOPTING FISCAL RULES IN CAPDR

Several economic similarities are relevant for the design of fiscal rules in CAPDR countries. Their economies are small. They experience frequent shocks because of limited size, susceptibility to natural disaster, and exposure to volatile commodity prices. Their economic structures are similar: net petroleum importers with significant dependence on agricultural exports and remittances (except for Costa Rica and Panama) and, like other Latin American countries, high informality and wide inequality. Partly reflecting the prevalence of the informal sector, the quality of their data and economic institutions is generally poorer than in advanced economies and other emerging markets. These similarities highlight the scope for comparison: good proposals and examples in any CAPDR country could be powerful beacons for others.

The case for legislating fiscal rules in CAPDR should be carefully weighed. Many of the common features—particularly susceptibility to shocks and their under-resourced institutions—may prompt caution over a premature adoption of fiscal rules. The risk is that fiscal rules could quickly lose credibility or even become counter-productive if poorly managed. At the same time, the risks of adopting fiscal rules should be set against their benefits in substantially upgrading fiscal discipline and fiscal policy frameworks—especially since these can improve both fiscal positions and economic growth. Policymakers in each country would have to internalize these tradeoffs, and account for the political and societal issues involved. Many of these risks can be handled through properly designed fiscal rules, including having transition phases toward full implementation.

The main rationale for introducing fiscal responsibility laws in CAPDR countries appears to be fiscal sustainability. Three economic objectives are typically behind the introduction of fiscal rules (IMF 2009): (1) achieving fiscal sustainability, (2) reducing procyclicality, and (3) optimizing government size. In CAPDR, discussions of fiscal rules were primarily motivated by fiscal sustainability. It was the key rationale in early debates about fiscal rules in Panama, El Salvador, Honduras, and Costa Rica.⁸ Issues of cyclicity and government size were less relevant, although they gained importance over time (for example, in Panama). Some CAPDR countries appear to have mitigated the problems of economic procyclicality that used to characterize much of Latin America (Klemm 2014). Costa Rica and El Salvador were judged to have shifted to countercyclical policies, while no major concerns were raised in other CAPDR countries.⁹ On the size of government, there is no clear-cut rationale for most CAPDR countries to reduce (or increase) the state's role in the economy.¹⁰

“Political procyclicality” has been a contributing factor to the fiscal sustainability problems of CAPDR countries. Comparing fiscal performance suggests that in years with elections, deficits and spending tended to be higher as a percent of GDP than in other years (Figure 10.1). In turn, this added an upward drift to public debt, other things equal.¹¹ This problem affects all Latin American countries, but is more pronounced in CAPDR countries. Fiscal rules are considered potentially beneficial in mitigating this political procyclicality bias. In this context, the larger LA countries had fiscal rules in place for the bulk of 2000–14) and

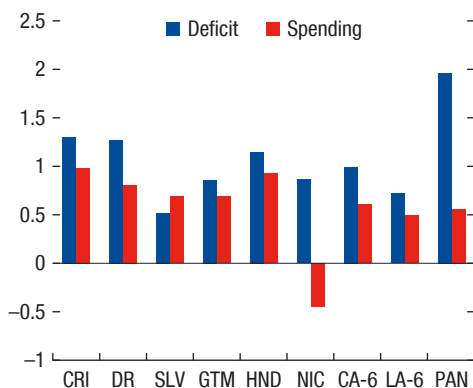
⁸While the main perceived fiscal risks in Panama and El Salvador were high public debt ratios (over 60 percent of GDP in both when the fiscal rules were adopted), in Honduras and Costa Rica it was high fiscal deficits that prompted sustainability concerns and the discussion of the fiscal rules to mitigate them.

⁹The assessment of cyclicity in Klemm (2014) is based on a purely technical analysis of fiscal policy outcomes that may not necessarily be confirmed through more detailed assessment of underlying policy drivers. For example, some CAPDR country authorities viewed their own fiscal policies as countercyclical by chance rather than by design.

¹⁰The country that truly stands out in this regard is Guatemala, which has very low public revenue and spending ratios, but where the issue of fiscal rules was relatively little debated.

¹¹A similar picture emerges if, instead of the headline fiscal outcomes, balances adjusted for the economic cycle are used.

Figure 10.1. Fiscal Outcome Differences in Election versus Non-election Years, 2000–14
(Percent of GDP)



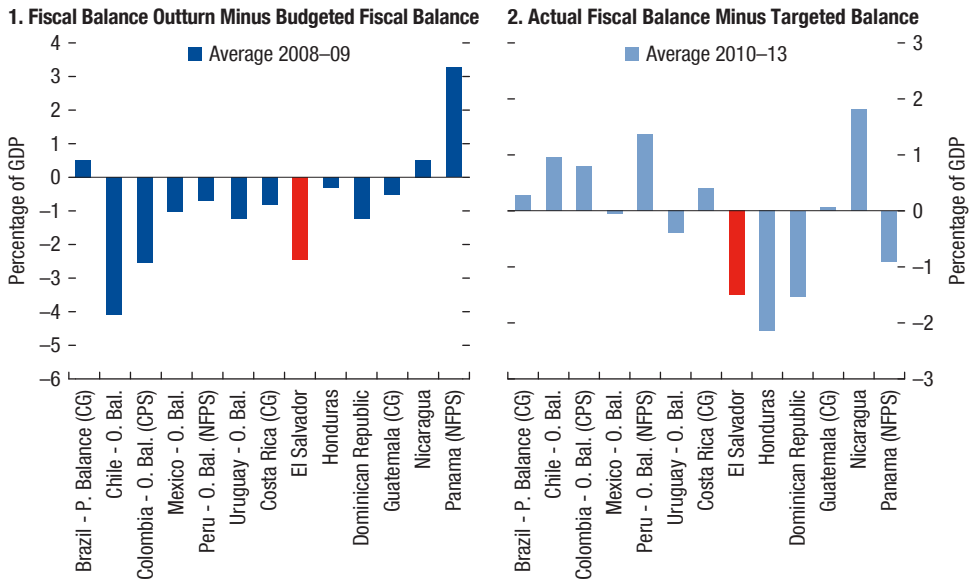
Source: IMF staff estimates.

Note: CA-6 = the 6 countries of Central America; LA-6 = Latin America 6: Brazil, Chile, Colombia, Mexico, Peru, and Uruguay; CRI = Costa Rica; DR = Dominican Republic; GTM = Guatemala; HND = Honduras; NIC = Nicaragua; PAN = Panama; SLV = El Salvador.

this may have mitigated the problem there. However, the presence of fiscal rules is not a “magic bullet” as the difference is quite small.

As discussed, key basic preconditions for adopting fiscal rules revolve around fiscal “implementation capacity.” This includes such factors as sound public financial management and strong fiscal institutions. In practice, implementation capacity is difficult to gauge in an operationally useful way: many of its elements cannot be captured by reliable data and are heavily influenced by judgment. Even in cases where data exist, it is unclear what can be deemed “sufficient” in fulfilling preconditions for implementing fiscal rules. Importantly, such preconditions cannot be fully assessed independent of the specific rule design. Therefore, it would be useful to gauge available data in assessing readiness for fiscal rules and what elements of implementation capacity should take priority in adopting them.

A useful measure of implementation capacity is achieved by comparing annual budget deficit targets and outcomes. Key advantages of this measure are that it relies on hard data and reflects objective indicators of macro-relevance. The disadvantage is that it lacks granularity and hinges on careful interpretation: for example, comparing fiscal plans to outcomes produces useful information only if proper account is made of changes in economic circumstances (for example, the economic cycle), fiscal policy plans, and (external) shocks that could not be anticipated. With these caveats, comparisons of targets and outcomes offer a useful summary measure of whether a budget law—as a key instrument of fiscal

Figure 10.2. Fiscal Balance: Targets and Outturns

Sources: Country authorities and IMF staff estimates.

Note: CG = central government; CPS = consolidated public sector; P.Balance = primary balance; O.Bal = overall balance; NFPS = nonfinancial public sector.

policy—is likely to be effective in steering macroeconomic policy and supporting the fiscal rules. To assess this, budget implementation data were assessed for Argentina, Brazil, Chile, Colombia, Mexico, and Peru (the six biggest Latin American economies) and CAPDR countries for 2008–13. While some differences in data definitions exist (for example, coverage of the level of government), comparisons of targets and outcomes are consistent across each country and are chosen to denote the most relevant measure of fiscal policy available.

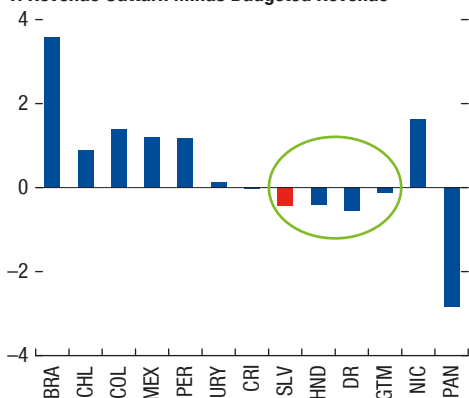
That some CAPDR countries have consistently struggled to meet budget deficit targets (Figure 10.2) helps highlight the priorities to fix in making fiscal rules effective. To adjust for the effect of changing economic circumstances, 2008–13 was split into two periods. During the first, the 2008–09 global financial crisis, most Latin American and CAPDR countries missed their headline deficit objectives.¹² Nonetheless, in 2008–09 these deviations were justifiable due

¹²It was decided to measure the deficits in headline and not structural terms given the complications of calculating real-time structural balances for several Latin American and CAPDR countries and the need for consistency in interpreting targets and outcomes.

Figure 10.3. Revenues and Expenditure: Budgets versus Outturns, 2010–13
(Percent of GDP)

Most Central American countries, except Nicaragua, saw revenue shortfalls relative to budgets.

1. Revenue Outturn Minus Budgeted Revenue



Most Central American countries, except Costa Rica and Guatemala, experienced spending overruns relative to their original budget targets.

2. Expenditure Outturn Minus Budgeted Spending



Sources: Country authorities and IMF staff estimates.

Note: BRA = Brazil; CHL = Chile; COL = Colombia; CRI = Costa Rica; DR = Dominican Republic; GTM = Guatemala; HND = Honduras; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PER = Peru; URY = Uruguay; SLV = El Salvador.

to the need for countercyclical policy responses to the crisis.¹³ The 2010–13 post-crisis period, which saw robust economic recovery, offers a better metric: in most countries in the region, postcrisis growth was broadly in line with potential growth (with the notable exception of underperforming Brazil). El Salvador, Honduras, the Dominican Republic, and to a lesser extent Panama stand out for their significant deficit slippages during 2010–13. Absent one-off or other special factors, these slippages are indicative of potential problems in fiscal rule implementation if their underlying reasons are not addressed.

The CAPDR deficit slippages can be traced through looking at revenue and spending, with expenditure issues playing the larger role. During 2010–13 El Salvador, Honduras, and the Dominican Republic experienced persistent revenue shortfalls and expenditure overruns (Figure 10.3). Other CAPDR countries avoided overspending (except Nicaragua, where overruns were offset by revenue overperformance). That larger Latin American countries avoided revenue shortfalls during the period may reflect their more conservative projections and that

¹³If anything, observance of nominal fiscal deficit targets during such a crisis would be a sign of suboptimal fiscal policy, as exemplified by Brazil, which attempted to stick to a nominal budget balance rule at the time.

revenue performance benefited from the continuing commodity super-cycle through 2013.

While the analysis of targets and outturns offers a little guidance, a more granular analysis is needed to properly assess the adequacy of implementation capacity for fiscal rules and corrective steps. Various underlying reasons may exist for budget execution problems such as revenue shortfalls (such as the independence of revenue projections from political influence) and spending overruns (such as rigidity of spending processes and incentives to underbudget). These need to be diagnosed on the basis of a deeper analysis of institutional quality, perhaps partly using indexes of institutional quality such as those in IMF (2014) and partly on country-specific conditions. Such detailed analysis for CAPDR countries is beyond the scope of this chapter but would be essential in preparation for the adoption of fiscal rules. Also, it is now considered essential to extensively test and calibrate specific fiscal rules and their parameters using counterfactual simulations and similar modeling techniques.

KEY FEATURES OF FISCAL RESPONSIBILITY FRAMEWORKS IN CAPDR

Several CAPDR countries have introduced fiscal responsibility laws and fiscal rules. Until 2015, Panama was the only economy in the region to have formally adopted a numerical fiscal rule, enacted in 2002 and substantially revamped in 2008, with several adjustments after. Honduras and El Salvador adopted fiscal responsibility laws with numerical rules in 2016. Debates about the merits of introducing frameworks are ongoing in Costa Rica and more faltering in other CAPDR countries.

The motivations and basic elements of the rule-based frameworks vary substantially among the three CAPDR (CAPDR-3) countries that enacted them. This reflects a combination of country-specific macroeconomic circumstances, idiosyncratic factors shaping rule design, and international best practices.

- In **El Salvador**, the underlying reasons for enacting fiscal rules were political. The fiscal responsibility law's adoption was a condition of the main opposition party, which threatened denying approval of sovereign financing without a commitment to fiscal responsibility. In design, the key elements of the law were influenced by Colombia's fiscal framework in place during the 2000s, which centered on achieving a debt-stabilizing primary balance over a 10-year horizon under the new Medium and Long-term Fiscal Framework.¹⁴ In the final discussions about the law several other enhancements were made, based on international best practices. These included: (1) introducing the primacy of the debt anchor, (2) increasing coverage by

¹⁴Experts who initially advised El Salvador on the fiscal rules framework were Colombian. In 2011, Colombia significantly amended its fiscal rule framework, shifting to a structural fiscal balance target.

TABLE 10.1.

Selected Features of Fiscal Responsibility Frameworks in Central America			
	El Salvador	Honduras	Panama
Time of adoption	November 2016	April 2016	May 2002, June 2008
Debt anchor	Gross debt target of 45 percent of GDP without pension debt and 65 percent of GDP with pension debt	No legislated debt anchor	Net debt target of 40 percent of GDP
Key operational target(s)	Positive primary fiscal balance Floor on tax/GDP ratio (17 percent), ceiling on current spending/GDP ratio (18.5 percent)	Non-financial public sector (NFPS) deficit cannot exceed 1 percent of GDP Nominal growth of central government (CG) current spending in the budget law limited to real growth observed over the previous 10-years, augmented for central bank's target for inflation	Limit on NFPS adjusted overall balance starting from 2015, which is gradually lowered to 0.5 percent of GDP in 2018; balance is adjusted by deviation of Canal contributions and the threshold of 3.5 percent of GDP, with shortfalls expanding the deficit target
Other numerical rules	Sub-rules limiting growth of the wage bill and goods and services spending to GDP growth Limit on short-term debt made permanent and tightened to 20 percent of current budget revenues (versus 30–40 percent in the past few years)	Limit on floating debt at 0.5 percent of GDP	
Transparency and medium-term orientation	Medium- and long-term fiscal framework (MLTFF) (10-years) submitted with all annual budgets Extensive publication requirements	Medium-term fiscal framework (MTFF) (4 years) submitted with all annual budgets Extensive periodic publication requirements Requirement of publishing ex-post analysis of compliance with the rules	5-year medium-term MT fiscal plans expected to be published Extensive publication requirements Requirement of publishing ex-post analysis of compliance with the rules
Sanctions for non-compliance	Ministry of Finance's personal responsibility and possibility of interpellation in Congress and recommendation of dismissal Ministry of Finance's statement under oath on comprehensive inclusion of all spending and compliance with fiscal rules	Need for formal declared statement of compliance with fiscal responsibility	General provision for non-compliance without specification of the sanction mechanism.

(continued)

TABLE 10.1. (Continued)

Selected Features of Fiscal Responsibility Frameworks in Central America			
Transitional provisions	Based on a 10-year horizon, consisting of 3-year initial "adjustment period" (with active measures of 3 percent of GDP) and subsequent 7-year "sustainability period"	Deficit limits gradually converging to 1 percent of GDP in 2019 and thereafter, after 1.5 percent in 2017 and 1.2 percent in 2018	Gradual convergence of the non-financial public sector (NFPS) deficit target from 2.9 percent of GDP in 2012 to 0.5 percent of GDP starting from 2018
Coverage of level of government	Non-financial public sector NFPS (there are exclusions from liabilities in the calculation of gross debt)	Non-financial public sector NFPS (central government for expenditure rule)	Non-financial public sector NFPS (there are exclusions from assets and liabilities in the calculation of net debt)
Escape clauses	Yes, significant discretion is given to the executive (for example, no predefined thresholds for economic weakness) to define extent of deviations and convergence path	Yes, with predefined thresholds and a specified gradual convergence path	Yes, with predefined thresholds and a pre-specified gradual convergence path
Stabilization mechanism	Not included	Not included	Panama' Sovereign Wealth Fund (FAP) established with double objective to: —provide a stabilization mechanism for cases of emergency or sharp economic deceleration —long-term savings fund
Fiscal council	No	No	Draft Law establishing a fiscal council under consideration by the National Assembly (since October 2017)
Key departures from best practices	Lack of full consistency between multiple rules Large executive discretion in escape clauses Some definitions ambiguous	No	Lack of enforcement mechanisms for debt Deficit bias due to a systemic shortfall of Canal contributions below the assumed threshold No corrective mechanisms (except for escape clauses)

including pension debt, (3) adding escape clauses, and (4) partially streamlining the multiple subrules. However, substantial scope remains for further aligning the law with these best practices.

- In **Honduras**, adoption was motivated by intensifying concerns that the high fiscal deficit, which reached 7.6 percent of GDP in 2013, would hurt the economy. The authorities embarked on an ambitious adjustment strategy underpinned by an IMF-supported program that helped the deficit fall by 6 percentage points over three years. The fiscal responsibility law aimed at institutionalizing prudent fiscal policy by locking in gains from the consolidation. It was closely aligned with international best practices through: (1) adoption of an expenditure-based operational target, (2) inclusion of the MTF view in budget documents, (3) modernized escape clauses envisioning a clear convergence path for returning to target, and (4) a transitional period with slightly looser fiscal deficit objectives (over 2016–17) to help smooth convergence to the rule and protect its credibility.¹⁵
- In **Panama**, the rule-based framework was largely shaped by its own long-standing experience. The original rule adopted in 2002 was prompted by concerns about high debt, and targeted a declining debt path (from 65 to 50 percent of GDP) and a fiscal deficit target of 2 percent of GDP. The framework was radically reformed in 2008, setting more prudent debt and deficit objectives to lock in the debt reduction progress and enhancing countercyclical elements through escape clauses. In 2012, the rule was strengthened with a country-specific feature designed to protect the rule from volatile contributions from the Panama Canal.

The key common building blocks (see Table 10.2) of fiscal rules in CAPDR-3 can be described along the following lines:

- **Fiscal anchors.** El Salvador's and Panama's fiscal responsibility laws include explicit debt-related targets as debt anchors (65 and 40 percent of GDP respectively). In El Salvador's case, the debt limit is higher than the estimated prudent level in a dollarized economy (IMF 2015b). However, enforcement mechanisms for these rules in both countries are weak.¹⁶ While the Honduran law does not legislate an explicit public debt objective, the 1 percent of GDP deficit operational target is consistent with prudent steady state (IMF 2017b).
- **Operational targets.** The operational frameworks vary substantially across countries, with many pros and cons. The Honduran framework appears to be relatively more in line with the most recent international best practices (a

¹⁵Although the law's targets were widely overperformed in the first two years of application.

¹⁶In Panama, the debt objective is "an indicative target" and there is no explicit corrective mechanism if it deviates. In El Salvador, while the debt target is the primary anchor, the Ministry of Finance has discretion over corrective measures while the operational targets on the primary balance and revenue and expenditure ratios do not necessarily ensure the debt target would be observed.

combination of a broad expenditure rule and an overall deficit rule), thereby compensating for the absence of an explicit debt anchor. El Salvador's operational framework—while an improvement over the initial proposal—suffers from excessive numerical fiscal rules and a still-insufficient hierarchy among them, which likely causes inconsistency problems. Panama's framework has the advantage of a single operational target, but the target has become excessively complicated and difficult to communicate and monitor, while its consistency with the debt anchor is not directly assured. Given that the contributions from the Canal are not likely to reach the threshold of 3.5 percent of GDP anytime soon, the rule would imply a higher deficit than intended earlier.¹⁷ Since no mechanism exists to correct the debt path, this could hit debt dynamics, particularly if economic growth declines from current buoyant levels.

- **Escape clauses.** On paper, Honduras and Panama appear in line with best practices on escape clauses, which are based on principles of: (1) deviations from operational target justified on the basis of predetermined thresholds for economic weakness (for example, real growth being lower than 2 percent during two consecutive quarters in Panama and being negative in Honduras) and other events (national emergencies), (2) caps on the size of deviation in the operational target (cap on the absolute maximum deficit would be 2.5 percent of GDP in Honduras and 2 percent of GDP on *additional* deficit in Panama), and (3) a return to the original path on a set horizon (three years in both countries, in most circumstances).¹⁸ By contrast, El Salvador does not have predetermined escape clauses on the extent of deviations and the path of return to target, leaving almost everything to the discretion of the executive.
- **Sanctions.** The sanctions elements are relatively weak in CAPDR-3, except possibly for El Salvador. In the latter, circumstances were quite special in that introducing substantial sanctions was a key requirement of the opposition, which had substantial financial and political leverage at the time of adoption. Honduras' fiscal responsibility law envisions only reputational sanctions, while Panama's envisages unspecified sanctions for public officials who do not comply with its provisions. Earlier drafts for El Salvador and Honduras contained substantial sanctions that were scaled down in the final version. The lack of sanctions highlights substantial implementation risks, but it also underscores their sensitive nature and the practical difficulties inherent in introducing sanctions for public servants.

¹⁷The initial estimates at the time the provision was introduced placed average annual Canal contributions at about 4 percent of GDP. However, the delays in Canal expansion, faster-than-expected GDP growth, and the upward revision with rebased national accounts imply the threshold of 3.5 percent of GDP will not be reached in the foreseeable future.

¹⁸Earlier escape clauses introduced in 2009 in Panama allowed the NFPS deficit to increase up to 3 percent of GDP in case of national emergency or a domestic growth shock and 2.5 percent of GDP in the case of a world growth shock. See Yang (2016) for details on these provisions.

- **Medium-term orientation.** Among the CAPDR-3, El Salvador has the longest framework horizon, of 10 years, which would be updated on a rolling basis. Horizons in Honduras and Panama are 4 and 5 years respectively. The 10-year horizon, which El Salvador appears to have introduced based on the Colombian experience, is preferable in offering greater transparency. However, it may be overly ambitious for the limited implementation capacity of CAPDR countries, though the difficulties can be assessed during implementation. An important element of the medium-term orientation involves examining whether the fiscal responsibility law helps to eliminate policy drift in medium-term fiscal targets. This also remains to be gauged, particularly in El Salvador and Honduras.
- **Transparency improvements.** The fiscal responsibility laws for CAPDR-3 contain extensive provisions enhancing reporting, publication, and other requirements. All seem to go in the right direction. However, the implementation record of these requirements has so far been mixed. For example, many important enhancements have not yet been introduced despite being required under existing laws (for example, submission and publication of the MTLFF together with the budget proposal in El Salvador or an ex-post analysis of compliance with the fiscal rules and fiscal targets and reasons for their deviations in Panama).

ASSESSING THE EFFECTIVENESS OF THE FRAMEWORKS

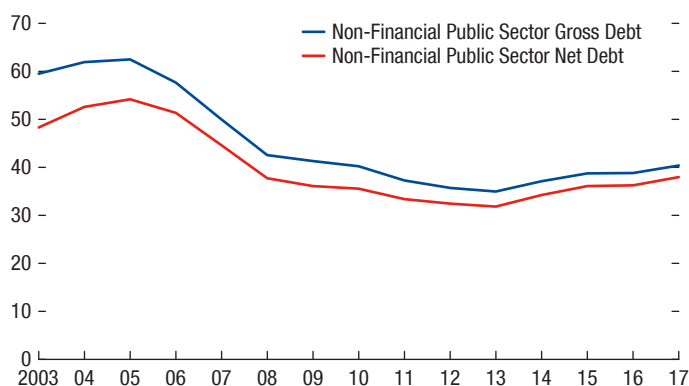
The previous section highlighted the multitude of objectives, design features, scope, and coverage of the fiscal responsibility frameworks introduced in CAPDR. This section moves on to assess their effectiveness. However, in El Salvador and Honduras they are quite recent, which considerably limits the scope to evaluate performance. Frequent changes to different elements of Panama's framework complicate any assessment of its effectiveness. With these caveats in mind, some initial insights are provided.

Panama

One of the key objectives of Panama's fiscal responsibility framework has been to lower public debt. Largely because of its stellar growth performance, Panama significantly reduced debt to below targets in the mid-2000s, despite its mixed record on achieving deficit targets before. Two large upward nominal GDP revisions helped shrink the debt ratio further. Notwithstanding some growth deceleration and fiscal slippages a few years ago, Panama has kept the non-financial public sector (NFPS) net debt-to-GDP ratio (Figure 10.4) below the 40 percent indicative target stipulated in its Social Fiscal Responsibility Law.

Multiple amendments have been made to the deficit ceilings since the current law came into force in 2009. While repeated modifications signal some weakness in both the accountability framework and the original design, it also

Figure 10.4. Panama: Non-Financial Public Sector Debt
(Percent of GDP)



Sources: Panamanian authorities and IMF staff calculations.

points to the need to adjust legal provisions to fit changing circumstances. Following the modifications of 2012, the fiscal deficit was consistently below the maximum allowed by law. For instance, the overall deficit in 2015 and 2016 was significantly smaller (Figure 10.5). Such outcomes suggest the authorities refrained from using the “deficit bias” that arose due to systemic shortfall of Canal contributions below an assumed threshold of 3.5 percent of GDP. Moreover, the fiscal rule has played an important role in guiding the authorities’ consolidation strategy, one of the key objectives of the recent modification to the Social Fiscal Responsibility Law.

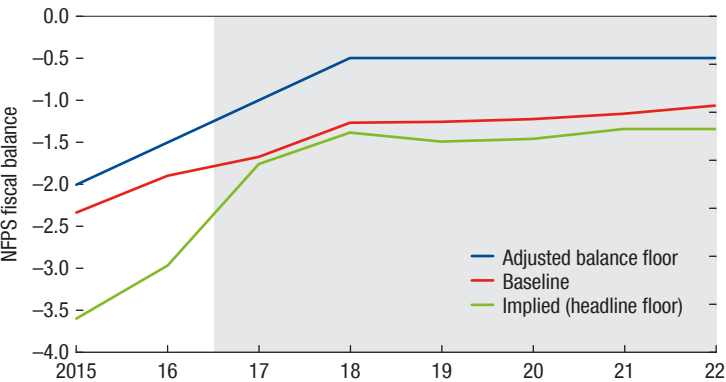
There is mixed evidence about the impact of Panama’s fiscal responsibility framework on cyclicity of fiscal policy. Figure 10.6, panel 1, shows that episodes of countercyclical fiscal policy are found around the time of introduction of the initial rule (2001–04) and in the aftermath of the global financial crisis (2009–11), while procyclicality was at least as common after the law was introduced as it was before. Countercyclicality may not have been a key policy objective in light of the Panamanian economy’s strong performance.

Fiscal policy had a slightly contractionary impact on economic activity, as the consolidation in 2015–16 coincided with a deceleration of growth and widening of the output gap (Figure 10.6, panel 2). Nonetheless, this procyclical stance demonstrates that a commitment to fiscal discipline helped strengthen the credibility of a fiscal framework that was damaged by waivers and amendments several years before (IMF 2017a).

El Salvador

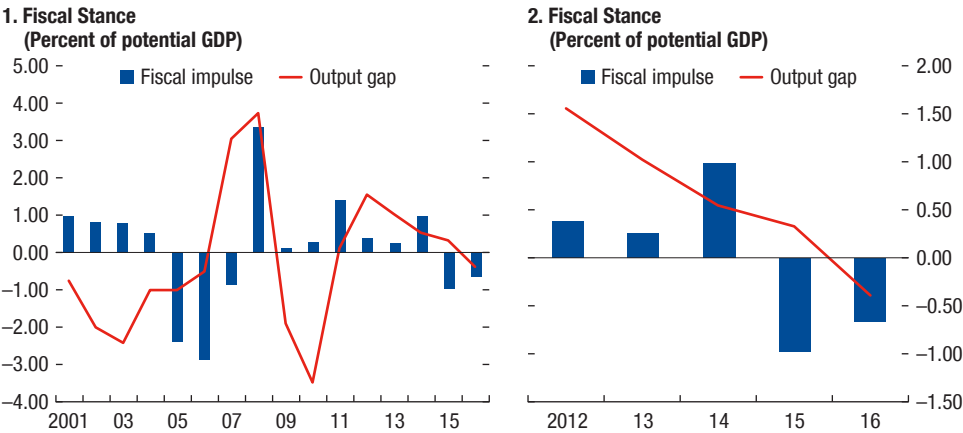
The country’s fiscal responsibility law was passed late in 2016, with 2017 its first year of application. Many of the law’s key provisions could not be tested in 2017,

Figure 10.5. Panama: Performance under the Fiscal Rule
(Percent of GDP)



Sources: Panamanian authorities and IMF staff calculations.
Note: “Adjusted balance floor” corresponds to the maximum deficit if Canal contributions equal the threshold in the fiscal rule (3.5 percent of GDP). “Implied (headline floor)” refers to the maximum fiscal deficit implied under the modified Social Fiscal Responsibility Law (SFRL) with projected Canal contributions falling below the threshold. The difference between these two lines depicts the extra fiscal space created by the over-optimistic threshold stated in the fiscal rule. The “baseline” projects that only a part of this extra space is actually used. NFPS = Non-financial public sector.

Figure 10.6. Fiscal Policy Stance



Sources: Panamanian authorities and IMF staff calculations.
Note: Fiscal impulse is calculated as the change in the cyclically adjusted primary balance of the non-financial public sector.

since the budget for that year was submitted before it was adopted. The law had no binding targets for 2017 fiscal aggregates: its numerical parameters are binding after 2019. Therefore, a comprehensive analysis of its impact is premature. At the same time, the law increased the focus on fiscal policy targets and outcomes in debates between the government and its political opponents and so had an important impact on fiscal decisions.

The fiscal responsibility law was a factor in a Supreme Court decision that September to declare the 2017 budget unconstitutional, which resulted in the government resubmitting the budget law a few weeks later with the inclusion of unbudgeted or underbudgeted outlays improving its comprehensiveness and transparency. In the context of the 2018 draft budget, the fiscal responsibility law had an impact possibly due to the sanctioning provision contained in Article 28 whereby the minister of finance could interpellate in Parliament in case the budget submission was insufficiently realistic or comprehensive, with a possibility of issuing a parliamentary recommendation to the president for his dismissal. The draft 2018 budget marked a big improvement over preceding years because its revenue projections were more realistic and it was more comprehensive since it included all appending obligations. While it is premature to say whether the fiscal responsibility law is an effective fiscal policy anchor, it incentivized the improvement of several budgetary procedures.

Honduras

The fiscal responsibility law in Honduras was introduced amid considerable effort to consolidate the fiscal position, with the NFPS deficit reduced by more than 6 percentage points of GDP over 2013–17. Beyond institutionalizing a hard-won fiscal consolidation, the law is expected to support medium-term fiscal sustainability and catalyze second-generation fiscal reforms. Fiscal performance in 2017 is estimated to have been in line with the law's targets, with NFPS deficits projected to be below its implied ceiling. In addition, aiming to support the implementation and fulfill rules limiting increases in current spending, the authorities introduced a module into their information management system that verifies compliance with the annual spending target in real time. Over the next few years, an important challenge for the Honduran authorities will be to consolidate the law as the cornerstone of macroeconomic policies. It will be essential to develop institutions, strengthen commitment, and foster transparency and accountability at all government levels to achieve that objective.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Several fiscal responsibility frameworks have been implemented recently in the CAPDR region, mainly to strengthen fiscal prudence. While their objectives are similar, their designs differ somewhat, each with its own advantages and disadvantages. This chapter has pointed out several aspects likely to be crucial for such frameworks in the region to succeed.

Given relatively weak preconditions, it is important that institutional upgrades be accelerated to improve the credibility of fiscal responsibility frameworks. Efforts to ensure compliance may end up futile if left unsupported by a strengthening of institutional structures.

Improvements in transparency and communication with the public are essential for the frameworks to raise fiscal accountability. In turn, such efforts are key to mobilizing support, increasing public scrutiny, and helping attain objectives.

In light of the local circumstances, fiscal responsibility frameworks eschew complicated elements such as structural balances. The most recent are increasingly focused on expenditure rules (for example, in Honduras and El Salvador), which appear to fit local conditions and are in line with best practices. While the current expenditure rules would be key for proper operation, powerful interest groups, weak institutions, and large social needs are likely to provide an important test.

Recent experience also suggests that further fine-tuning of the rules is necessary to tackle new policy challenges and incorporate best practices. As such, examples from other emerging markets suggest that improvements to fiscal transparency and responsibility happen in an evolving process instead of a finite term.

Finally, limited experience of the application of fiscal responsibility laws in CAPDR countries allows only for very preliminary conclusions to be drawn. So far, the three countries involved have tended to comply with their new frameworks, but this may largely reflect two of them having been adopted very recently and still enjoying “honeymoon” periods in which compliance requirements are not too onerous and the political incentives to comply are strong. The long history of fiscal profligacy in the region underscores the need for continual work to strengthen the credibility and resilience of the new fiscal frameworks.

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ANNEX 10.1.

Fiscal Responsibility Laws in the World

Country	Date	Rules	Other
1 New Zealand	1994	No rules	
2 United Kingdom	1997	Achieve balance or surplus in the cyclically adjusted current budget (excluding investment spending) during a five-year window	An independent body evaluates the fulfillment of fiscal targets
3 Australia	1998	No rules	
4 Peru	1999	Gross debt cannot be higher than 30 percent of GDP, NFPS deficit cannot be higher than 1 percent of GDP, general government real spending growth cannot be higher than the average of 20-year GDP growth	Fiscal stabilization fund, escape clause, and fiscal council
5 Colombia	2000	Structural balance of central government should be lower than 2.3 percent of GDP in 2014 converging toward 1 percent of GDP in 2022	Fiscal stabilization fund and escape clause
6 Brazil	2000	Personnel expenses should be below 50 percent of current revenues for the federal gov. and 60 percent for states and municipalities	A companion law includes administrative and criminal sanctions
7 Panama	2002	Non-financial public sector (NFPS) deficit cannot be higher than 1 percent of GDP, net debt of the NFPS should be below 40 percent of GDP	Fiscal stabilization fund and escape clause
8 Ecuador	2003	Real primary spending growth cannot be higher than 3.5 percent, and fiscal deficit (not including oil revenues) should be reduced annually by 0.2 percent of GDP until it reaches zero	Fiscal stabilization fund and sanctions (fines)
9 Sri Lanka	2003	Fiscal deficit should be lower than 5 percent of GDP, and debt should be below 60 percent of GDP	
10 Pakistan	2005	Fiscal deficit should be reduced by at least 2.5 percent of GDP per year until the debt-to-GDP ratio reaches 60 percent	
11 Mexico	2006	Central government should be balanced on cash basis. Budget oil price equals the average of historic prices and futures with a prudence factor	Stabilization and contingency funds, escape clause
12 Chile	2006	No rules	Stabilization and pension reserve funds
13 Nigeria	2007	Fiscal deficit should be lower than 3 percent of GDP	Escape clause in case of security emergencies
14 Liberia	2009	No rules	
15 Romania	2010	State personnel expenditure limits as a percent of GDP in the medium-term fiscal framework (MTFF). Nominal growth of spending should be below nominal GDP growth	Escape clause
16 Jamaica	2010	Debt should be lower than 60 percent of GDP in 2026	
17 Mongolia	2010	Expenditure growth cannot exceed the growth of non-mineral GDP, structural deficit cannot exceed 2 percent of GDP, net present value (NPV) of public debt cannot exceed 40 percent of GDP	

ANNEX 10.1. (Continued)

Fiscal Responsibility Laws in the World			
Country	Date	Rules	Other
18 Serbia	2010	Deficit-to-GDP ratio is equal to $d(t) = d(t-1) - 0.3[d(t-1) - d^*] - 0.4[g(t) - g^*]$ where d^* is the medium-term deficit (1 percent of GDP), g is the real GDP growth rate, and g^* is the medium-term GDP growth (4 percent)	
19 Croatia	2012	The general government cyclically adjusted primary balance should be in equilibrium or in surplus	
20 Spain	2012	All public administrations cannot generate structural deficit, debt should be below 60 percent in 2020, and spending growth rate should be below the medium-term growth rate.	
21 Maldives	2013	Debt should be lower than 60 percent of GDP in 2026	
22 Bulgaria	2013	Structural deficit of the general government should not exceed 0.5 percent of GDP	
23 Russia	2013	Fiscal deficit should be lower than 4.7 percent of GDP	Fiscal stabilization and sovereign wealth funds
24 Kosovo	2013	Deficit cannot be higher than 2 percent of GDP	Escape clause
25 Malta	2014	General government balance is in surplus or balance and debt should be lower than 60 percent	Independent fiscal council
26 Latvia	2014	Structural general government balance lower than 0.5 percent of GDP	Escape clause
27 Grenada	2015	Real spending capped at 2 percent, primary surplus target of 2.5 percent until debt reaches 55 percent of GDP, wage bill targets 9 percent of GDP, and public-private partnerships (PPP)-related contingencies are capped at 5 percent of GDP	Escape clause in emergency cases
28 Lithuania	2015	Structural general government balance positive; if not growth of public spending should be capped at half of the growth rate of revenues	Escape clause in emergency cases
29 Honduras	2016	NFPS deficit cannot be higher than 1 percent of GDP, nominal current spending growth cannot be higher than the average of the 10-year GDP growth plus the inflation projection	Escape clause
30 El Salvador	2016	In 2019, NFPS primary balance should be positive, tax burden should be at least 18.5 percent of GDP, and current spending should be below 18.5 percent of GDP. NFPS debt should be below 65 percent of GDP	Escape clause

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Monetary Transmission: Effectiveness and Policy Implications

CRISTHIAN VERA, PRACHI MISHRA, AND ROGELIO MORALES

Economists have devoted a lot of attention to monetary transmission in economies with sophisticated and well-functioning financial markets. Much less is known about monetary transmission in economies with more rudimentary financial systems—not just quantitatively, but qualitatively too. This is particularly true in Central America,¹ a region characterized by financial environments that tend to confound conventional wisdom about the mechanisms of monetary transmission.

Since the economies of emerging markets and low-income countries have the same reasons to value rules-based monetary policy credibility as high-income economies, and since the optimal design of rules depends critically on the strength and reliability of monetary transmission, understanding the characteristics of monetary transmission in Central America is important.

Countries in the region have introduced changes to their monetary policy frameworks, including commitments to inflation targets from Costa Rica, the Dominican Republic, and Guatemala. These seem to have contributed to progress with disinflation and to have countered weaknesses in the financial structure of most Central America, Panama, and the Dominican Republic (CAPDR) countries—high bank concentration, underdeveloped financial and credit markets, and the prevalence of dollarization—that hamper traditional monetary transmission through market interest rates and market-determined asset prices.

Indeed, the empirical country-specific analysis in this chapter suggests there is evidence of moderate monetary policy transmission of policy rates to market rates in CAPDR. This in turn tentatively indicates that most of the region's central banks can influence aggregate demand, with different lags and some partially of effect. Consolidation of improvements in the region's monetary policy

The views expressed in this chapter are those of the authors and do not necessarily represent those of the IMF or its Board of Directors. This chapter represents an application of Mishra, Montiel, and Spilimbergo (2012) to the Central America, Panama, and the Dominican Republic (CAPDR) countries.

¹Central America, unless otherwise stated, refers to the IMF region of Central America, Panama, and the Dominican Republic (CAPDR).

frameworks should contribute to more effective monetary transmission, which has important implications for the conduct of monetary policy.

This chapter compares the monetary transmission mechanism in CAPDR with advanced, emerging market, and low-income countries. Not surprisingly, strong reasons exist for believing that the monetary transmission mechanism in CAPDR countries differs fundamentally from that in economies with more sophisticated financial systems. More important, there are strong reasons for believing that monetary transmission may be weak and unreliable in CAPDR countries. This chapter provides some empirical evidence consistent with this view. However, this state of affairs should not stop central banks in Central America from further modernizing their conduct of discretionary monetary policy, giving more weight to forward-looking considerations in their monetary policy design.

The chapter finds evidence suggesting that the relationship between central bank policy rates and bank lending rates in CAPDR is both weaker and less systematic than in the high-income country groups (although information to assess recent progress in monetary policy frameworks in CAPDR countries is scant). Moreover, there are important differences between countries in the region, with two still relying on exchange rate pegs.

The chapter starts with an overview of recent progress in upgrading monetary frameworks in CAPDR, and it goes on to compare typical monetary transmission channels across economies at different stages of development and document differences in financial structure that point to bank lending as the dominant channel for monetary transmission in CAPDR.

PROGRESS IN MODERNIZING CAPDR MONETARY POLICY FRAMEWORKS

In recent years, inflation in CAPDR countries has been below other Latin American countries, reversing a trend from the early 2000s when it was more volatile than the rest of the region (Figure 11.1).² This reflects the impact on domestic prices of declining oil prices, relatively low levels of currency depreciation, and the softening of economic activity in some CAPDR economies. However, it also stemmed from policy efforts to strengthen monetary policy frameworks and tackle structural problems, with Costa Rica, the Dominican Republic, and Guatemala implementing full-fledged inflation targeting and Nicaragua and Honduras introducing market-friendly features in their monetary operations framework. The region should take advantage of this opportunity to cement upgrades to monetary policy and operations framework to consolidate

²The discussion excludes Panama and El Salvador, both of which officially use the US dollar as their legal tender. The CAPDR central banks with some degree of monetary policy independence are in Costa Rica, the Dominican Republic, Guatemala, Honduras (which recently reestablished a crawling band), and Nicaragua (which has a crawling peg regime).

disinflation gains and better prepare for an end to favorable global trends. Convergence toward lower inflation may also favor further financial integration, which will impact regional growth (Eyraud, Singh, and Sutton 2017).

Most central banks in the Central American region increasingly rely on their policy rates as an instrument to implement monetary policy, but they all still give high weight to exchange rate considerations. Over the years, CAPDR countries started to move away from monetary targeting in the face of instability in the relationships between monetary aggregates, economic activity, and prices. Some countries opted for officially targeting inflation and others for targeting the exchange rate (Box 11.1). Even in inflation-targeting countries, policy decisions account for the level and volatility of the exchange rate, to protect against private sector balance sheet mismatches and maintain external competitiveness. Still, in recent years all countries have managed to converge toward their inflation target range, with trends showing a relatively stable real effective exchange rate, while Guatemala shows appreciation pressures in the past few years.

Central banks in the region have experienced increasing degrees of autonomy, which has translated into higher credibility (Figure 11.1, panel 6). They have been helped by stronger financial positions generally supportive of inflation commitments. At the end of 2012, all central banks in the region held assets lower in value than their liabilities, but all could keep inflation at below 5 percent while generating profit (Swiston and others 2014). In recent years, the situation in the region has improved further because of lower inflation, the accumulation of international reserves (especially Guatemala), the absence of banking crises, the dismantling of most quasi-fiscal activities, and the prevalence of unremunerated reserve requirements. However, in some cases recapitalization plans are still needed to deal with legacy problems of capital erosion.

Global, Cyclical, and Policy Factors Affecting Monetary Stances

CAPDR countries benefited from the end of the commodity cycle and were largely able to avert initial volatility after the 2008 global financial crises. This allowed countries of the region to focus on domestic activity, to make more use of policy interest rates (Box 11.1), and to strengthen their institutional arrangements for monetary policy.³

Cyclical factors may have also played a role. Figure 11.1, panels 1 and 2, show that the region has had several years of disinflation accompanied by higher growth in recent times. If these trends were reversed, the challenge would be to maintain the consistency of monetary policy amid increasing inflation pressures and declining output growth. These regional trends are relevant at the national level, given empirical evidence of commonalities across countries in the region in the magnitude, frequency, and synchronization of cycles, in part driven by trade with the

³Policy rates are linked to daily central bank operations in Costa Rica, Guatemala, Honduras, and the Dominican Republic.

BOX 11.1. CAPDR MONETARY POLICY AND OPERATIONS FRAMEWORKS

Monetary policy and operations frameworks have been upgraded in CAPDR, although at different speeds. The improvements have helped the region's central banks maintain consistency in monetary policies and boosted their credibility. Price stability is generally accepted as the main objective of monetary policy in the region, and central banks' independence over the use of policy instruments has become increasingly ingrained. Consistent with the adoption of inflation targeting in Costa Rica, Guatemala, and the Dominican Republic, and with the intention to move to a forward-looking framework for monetary policy in Honduras and Nicaragua, central banks have also been working toward improving communications with the market.

Status of Monetary Policy and Operations Frameworks in CAPDR

The main developments in monetary policy and operations frameworks in CAPDR countries can be succinctly listed as:

- **Legal reforms:** No major central bank legislation changes have been introduced, however the region compares well with the rest of Latin America. That said, only Guatemala and the Dominican Republic have an explicit mandate to pursue price stability, while other countries' legislation refers to "currency stability." Central banks are not allowed to lend to the government.
- **Foreign exchange markets:** The central bank of Costa Rica has taken measures to deepen its foreign exchange market, including moving toward managed floating since 2015 and introducing a single-price foreign exchange auction among authorized intermediaries in June 2017. This is expected to improve liquidity and price discovery, and to lower uncertainty and volatility. Honduras reduced surrender requirements for foreign exchange earnings to 90 percent, allowing 10 percent to be traded in the interbank market, consistent with gradual liberalization of the foreign exchange market. By contrast, foreign exchange transactions in the Dominican Republic are still conducted over the phone because traders do not trust the electronic platform for foreign exchange trading (*Mercado Electronico de Negociación de Divisas*), reflecting long-standing problems with market transparency. This has prevented the central bank from gathering information in real time about developments in the interbank foreign exchange market. Guatemala has managed to limit its participation in the foreign exchange market in its bid to accumulate international reserve buffers. The central bank of Nicaragua fully supports a crawling peg regime through purchases and sales of foreign exchange.
- **Money markets:** Further steps have been taken to streamline money market transactions in CAPDR countries, again at different speeds. The central banks of Guatemala and the Dominican Republic manage liquidity by way of auctions and a deposit standing facility, and they have functional interbank repurchasing (repo) markets. The central bank of Honduras introduced different maturities for its securities to help build a short-term yield curve (of up to two weeks for its bills and up to two years for its bonds) and has issued regulations to improve the functioning of the interbank money market. However, the use of marketable securities to sterilize structural liquidity is still limited, and the introduction of repo and reverse repo transactions that would support the development of interbank markets has been delayed. In Costa Rica, central bank securities dominate the short-term market, but auctions still rely on "reference prices," preventing the establishment of benchmarks to help price discovery along the yield curve. Secondary markets remain underdeveloped because issuance has not been standardized. Nicaragua is introducing measures to strengthen liquidity management by introducing shorter-term liquidity management tools.

BOX 11.1. CAPDR MONETARY POLICY AND OPERATIONS FRAMEWORKS *(continued)*

BOX TABLE 11.1.

Key Features of Central Bank Legislation in Latin America as of 2016

	Primary mandate		Political independence	Credit to the government		Accountability
	Price stability	Also economic development	Years of tenure board members	Banned or restricted	Weak limitations	Formal report to Congress
Argentina	×	×	6		×	×
Bolivia	×		6/5		×	
Brazil		×	Open	×		×
Chile	×		5/10	×		×
Colombia	×		4	×		×
Costa Rica	×		4/8.5	×		
Dominican Rep.	×		2	×		
Guatemala	×	×	4	×		×
Honduras	×		4	×		
Mexico	×		6/8	×		×
Nicaragua	×		4	×		
Paraguay	×		5	×		×
Peru	×		5	×		×
Uruguay	×		5	×		
Venezuela	×	×	7		×	

Source: Central bank legislation.

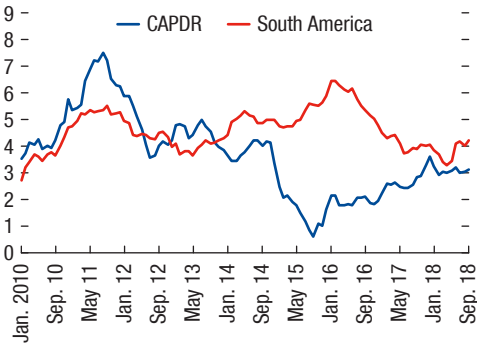
Note: When they differ, the tenures are for president and board members, respectively.

- Communications and transparency: Central banks push on with efforts to improve communications with the public. Costa Rica publishes an inflation report twice a year, while Guatemala publishes a quarterly monetary policy report. All countries have periodic reports on economic developments. However, minutes from central bank board meetings are not published. Guatemala, Honduras, and the Dominican Republic conduct publicly available monthly surveys. Costa Rica, Guatemala, and Honduras announce the dates for monetary policy decisions at the beginning of the year.
- Macprudential frameworks: Central banks are introducing different arrangements to monitor financial systemic risk, although they all could benefit from better coordination and collaboration with banking supervision authorities. In Costa Rica, the Financial Stability Department reports directly to central bank management. In the Dominican Republic and Guatemala, the central bank has a department devoted to financial stability analysis. Generally, central banks are compiling information to set up a battery of indicators to monitor systemic risk. These could inform the use of macroprudential policies in the future. Currently, macroprudential regulations in Costa Rica and Guatemala aim at containing currency risk by unhedged bank borrowers. Improvements of the macroprudential framework would eventually help central banks to focus on monetary conditions when making monetary policy decisions, as macroprudential tools tackle systemic vulnerabilities.

Figure 11.1. CAPDR Inflation, Exchange Rate, International Reserves, and Interest Rates

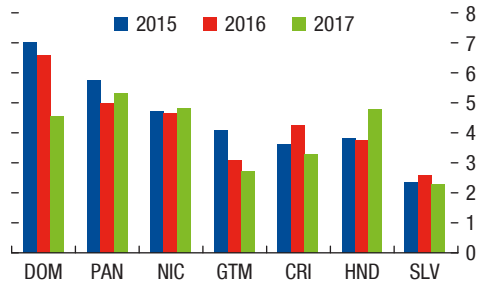
Inflation has declined below major countries in the region ...

1. Inflation (Percent)



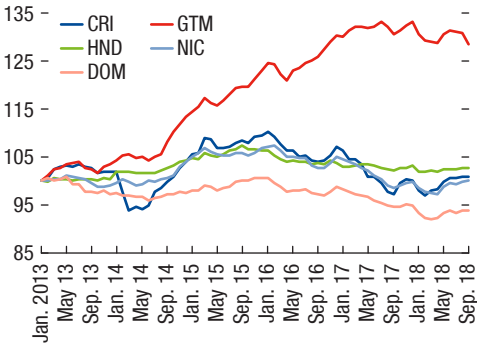
Accompanied by higher growth rates in the last years ...

2. CAPDR: Real GDP Growth (Year-over-year percent change)



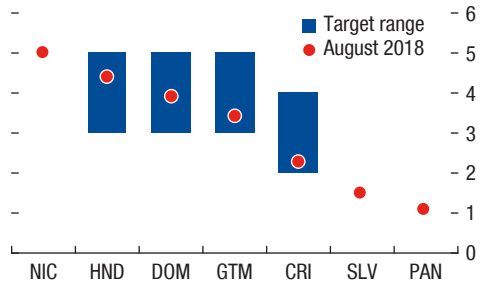
And the exchange rate has been largely stable ...

3. Real Effective Exchange Rate (2013 = 100, + = Appreciation)



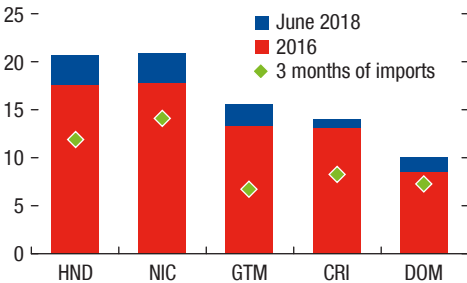
Policies have kept inflation within target ...

4. CAPDR: Inflation (12-month percentage change)



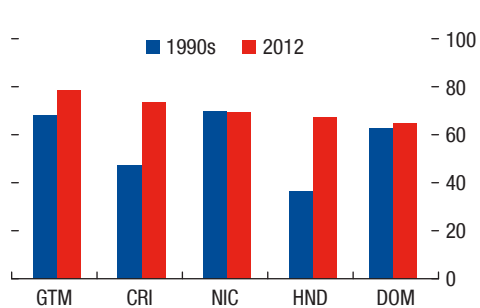
While central banks accumulate international reserves ...

5. Gross International Reserves (Percent of GDP)



Central bank independence has improved in most countries.

6. Central Bank Independence



Sources: IMF, World Economic Outlook database; Haver Analytics; national authorities; Garriga, Ana, 2016, "Central Bank Independence in the World: A New Data Set"; and IMF staff calculations.

Note: CAPDR = Central America, Panama and the Dominican Republic; CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras; NIC = Nicaragua; PAN = Panama; SLV = El Salvador.

United States (Johnson 2013). This means an opportunity exists to benefit from a regional approach to monitor cyclical developments, which would enrich policy analysis for each country.

MONETARY TRANSMISSION: AN OVERVIEW

Monetary policy is usually taken to be formulated by an independent or quasi-independent central bank pursuing broad macroeconomic objectives unconnected with a government's financing needs. The central bank conducts monetary policy by buying and selling short-term government securities in a well-functioning *secondary* market. Its objective is to meet an intermediate target through controlling the value of a financial market variable such as the interbank interest rate, the stock of unborrowed reserves, the monetary base, or the money stock. The value of this intermediate target is assumed to influence aggregate demand through the transmission mechanism, and therefore to affect the central bank's ultimate macroeconomic objectives—typically, price stability and/or full employment.

The Transmission Mechanism

The transmission mechanism from a central bank's transactions in the open market to influencing aggregate demand can be described through the example of a central bank purchase of government securities:

From central bank intervention in the market for short-term government securities to interest rates in the interbank market for reserves. Sellers of short-term government securities to the central bank hold the proceeds in commercial banks (these sellers are often the commercial banks themselves), thereby increasing commercial banks' free reserves. The increased stock of reserves causes the interbank rate to fall.

From interest rates in the interbank market to interest rates on short-term government securities. Arbitrage in commercial bank portfolios between the interbank market and bank holdings of very short-term government securities creates an equilibrium relationship between the return on those securities and the interbank rate. When the interbank rate is lower than the prevailing rate on short-term government securities, banks reallocate their asset portfolios away from reserves, which can be used for lending in the interbank market, and into purchasing short-term Treasury bills, which lowers the rate of return on those bills (and vice versa when the interbank rate is high).

From the interbank rate to bank lending rates. In principle, an increase in the size of banks' deposit base should increase the resources for banks to intermediate (but see below), therefore increasing their supply of loanable funds. Competition among banks would cause this increased supply of funds to reduce their lending rates and to increase loan volumes, which induces a second-round effect on aggregate demand through an increase in spending by bank-dependent agents. This second channel of monetary transmission is referred to as the *bank lending channel*, one component of a broader *credit channel*. Its effectiveness depends on the

extent to which an expansion of reserves increases the supply of bank loans—and to which an increase in the supply of bank loans reduces the cost and/or availability of finance for the nonbank sector.⁴

From short-term government securities to the exchange rate. Under floating exchange rates and perfect capital mobility, arbitrage between domestic and foreign short-term government securities causes incipient capital flows that change the equilibrium value of the exchange rate required to sustain uncovered interest parity. This triggers a third channel of transmission, the exchange rate channel. With sticky prices, change in the nominal exchange rate is reflected in a real exchange rate depreciation that induces expenditure switching between domestic and foreign goods. The effectiveness of this channel depends on the central bank's willingness to allow the exchange rate to move (which may be constrained by "fear of floating"), on the degree of actual capital mobility (for a given change in domestic short-term interest rates, exchange rates will move in line with the degree of capital mobility freedom or restriction), on the strength of expenditure-switching effects (this depends on the commodity composition of production and consumption), on the importance of currency mismatches (because adverse balance sheet effects could create negative expenditure-reducing effects that may offset or even dominate expenditure-switching effects on aggregate demand), and on the degree of exchange rate pass-through (because expenditure switching is induced by a change in the real exchange rate, which is less likely to follow from a change in the nominal exchange rate when pass-through is large).

From interest rates on short-term government securities to interest rates on long-term government securities. An expectation mechanism operating on the term structure ties interest rates on short-term securities to the rates on longer-term securities. The effectiveness of this mechanism depends, among other things, on the perceived permanence of the change in short-term rates. Changes in long-term interest rates in turn give rise to two additional channels. The long-term interest rate channel operates through the effects of changes in long-term interest rates, which have a particular effect on firms' capital investments and on spending on consumer durables.^{5,6}

⁴The bank lending channel may operate whether or not banks ration credit to bank-dependent customers. To the extent that they do, the channel would operate through the availability of credit to rationed borrowers. But even if banks do not ration credit, the channel would operate through the cost of credit to bank-dependent borrowers.

⁵Why does central bank independence matter from the perspective of monetary *transmission* as opposed to that of policy *formulation*? The answer is that the transmission from short-term interest rates to longer-term rates depends on agents' interpretation of what an unanticipated change in monetary policy indicates about future monetary policy. This in turn depends on their understanding of the central bank's "true" policy reaction function—that is, it depends on the central bank's credibility. Because the degree of central bank independence affects its policy reaction function, it may be expected to also affect agents' interpretation of the implications of a central bank's current monetary policy actions for its future actions.

⁶Given the significant role of expectations about future monetary policy in this channel, it is sometimes referred to as the *expectations channel*.

From long-term interest rates to asset values. Changes in long-term interest rates affect the discount factors applied to future income streams, including from long-maturity bonds, equity investments, and real assets. The asset channel operates through the implications of changes in long-term interest rates for the prices of such assets, which exert wealth effects on private consumption. The effectiveness of this channel depends on the sensitivity of asset values to changes in long-term rates, on the ratio of these components of wealth to household incomes, and possibly on the distribution of these assets among households if the marginal propensity to consume when wealth increases varies across households.

From asset values to external finance premiums. Changes in asset values affect the collateralizable net worth of firms and households. Because the availability of collateral reduces the severity of the moral hazard problem associated with their external financing, it reduces the premium lenders charge over the risk-free interest rate (the external finance premium). Fluctuations in asset values are therefore negatively correlated with fluctuations in the external finance premium. This reinforces the effects of changes in interest rates on the cost of external financing: higher interest rates reduce asset values and therefore increase the external finance premium. This financial accelerator is a manifestation of a distinct component of the channel for monetary transmission, the balance sheet channel.

Institutional Frameworks

Ideally, the following institutional setup would contribute to an optimal environment for better monetary policy transmission, which is typically taken for granted in discussions of monetary transmission in OECD countries:

- A strong institutional environment, so that loan contracts are protected and financial intermediation is conducted through formal financial markets.
- An independent central bank.
- A well-functioning and highly liquid interbank market for reserves.
- A well-functioning and highly liquid secondary market for government securities with a broad range of maturities.
- Well-functioning and highly liquid markets for equities and real estate.
- A high degree of international capital mobility.
- A floating exchange rate.

THE MONETARY POLICY ENVIRONMENT IN CAPDR

To the extent that financial structures and institutional frameworks in CAPDR depart from the assumptions listed above, the transmission mechanism in the region's economies should be expected to differ from the standard description.

However, many CAPDR countries are moving to a forward-looking framework for monetary policy because of the poor performance of monetary aggregates and exchange rate anchors in guiding monetary policy decisions. The challenges CAPDR economies must overcome in modernizing their monetary policy

frameworks are not substantially different from those faced by emerging market economies in the last two decades, but they may be different than advanced economies, and standard methodologies may fail to capture the details, especially as policy consistency improves over time. Actually, monetary policy has been largely inconsistent for many years in these countries, and this may explain the weak empirical evidence found by traditional methods of assessing the effectiveness of monetary policy transmission. On the other hand, time series are not sufficiently long to assess the benefits from this “regime switch” in low-income countries, including in CAPDR. However, authorities in several low-income countries are finding that a forward-looking approach to monetary policy is already helping them gain more certainty about how monetary transmission works.

With this important caveat, this section examines the extent to which the conditions listed above are satisfied in CAPDR, and considers the implications for the channels of monetary transmission that are likely to be dominant in CAPDR and their likely effectiveness of those channels.

Monetary Policy Frameworks and Exchange Rate Regimes

The main monetary policy objective in Costa Rica, Dominican Republic, and Guatemala is price stability (Table 11.1). The three countries have adopted inflation targeting frameworks in recent years. In Honduras and Nicaragua, the objective is to preserve the stability of the currency. El Salvador and Panama do not have monetary policy as they are fully dollarized.

It is expected that the exchange rate may play an important role in the transmission mechanism as it is one of the main channels through which central bank actions affect aggregate demand and inflation in the region. As a result, the central bank accounts for developments in the foreign exchange rate, since they influence inflation directly through their effects on traded goods prices, and indirectly through their effects on aggregate demand and expectations.

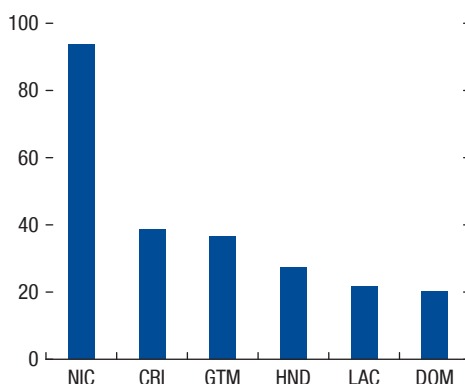
The channels through which monetary policy is transmitted to interest rates would depend on the flexibility of the exchange rate. CAPDR countries tend to restrict exchange rate flexibility to a much greater extent than do either advanced or emerging economies. This reduced exchange rate flexibility leaves relatively limited scope for an exchange rate channel.

TABLE 11.1.
Monetary and Exchange Rate Frameworks in CAPDR

	Monetary Policy Framework	Exchange Rate Arrangement	Policy Rate
Costa Rica	Inflation targeting	Managed floating	Yes
Dominican Republic	Inflation targeting	Managed floating	Yes
El Salvador	Exchange rate anchor	Fully dollarized	No
Guatemala	Inflation targeting	Floating	Yes
Honduras	Exchange rate anchor	Crawling peg	Yes
Nicaragua	Monetary targeting	Crawling peg	No
Panama	Exchange rate anchor	Fully dollarized	No

Sources: IMF staff and AREAER database.
¹ As of September 2018.

Figure 11.2. Dollarization Ratio: Total Credit
(Percent)



Sources: IMF Integrated Monetary Database and IMF staff calculations.

Note: CRI = Costa Rica; DOM = Dominican Republic;
GTM = Guatemala; HND = Honduras; NIC = Nicaragua;
LAC = Latin America and the Caribbean.

Financial Dollarization

High levels of financial dollarization may reduce the monetary transmission of interest rates. In this situation, the central bank may have only limited control over interest rates denominated in both foreign and domestic currency, since interest rates in foreign currency are mainly determined by external factors mostly outside the control of the central bank (Acosta-Ormaechea and Coble 2011). As shown in Figure 11.2, CAPDR countries have higher dollarization rates than the Latin American average, measured by the share of foreign currency loans in total loans. However, the dollarization for a typical country in the region is about 40 percent, which is not that different from many emerging market economies, several of which are inflation targeters (Peru, Poland, Turkey). Still, high credit dollarization in CAPDR may discourage central banks from allowing for further exchange rate flexibility.

Size of the Formal Financial Sector

Panel A of Table 11.2 shows that the size of the financial sector in CAPDR countries is larger than for low-income countries. However, relative to advanced and emerging market economies, CAPDR exhibits substantially smaller ratios of deposit money bank assets to GDP. However, the difference is smaller than for other Latin American countries. How should this be expected to affect monetary transmission? The transmission mechanism can be decomposed into two steps: from central bank actions to financial variables such as those described earlier in the chapter, and from financial variables to aggregate demand. When the formal financial sector is small, much of the economy does not interact with the formal

TABLE 11.2.

Financial Environment: Comparison of CAPDR with Other Countries									
Groups	1. Size of banking sector		2. Central Bank Independence	3. Governance Indicators 2008					
	Deposit money bank assets/GDP	Other financial institutions assets/GDP		Voice and accountability	Political Stability & Absence of Violence/Terrorism	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Advanced									
Mean	1.24	0.55	0.96	1.08	0.92	1.44	1.34	1.47	1.54
# countries	28	5	28	29	29	29	29	29	29
Emerging									
Mean	0.63	0.17	0.60	−0.03	−0.35	0.40	0.37	0.09	0.07
# countries	26	11	26	28	28	28	28	28	28
LIC									
Mean	0.32	0.06	0.33	−0.34	−0.30	−0.52	−0.45	−0.51	−0.49
# countries	91	18	91	118	118	118	118	118	118
CAPDR									
Mean	0.42	0.01	0.37	0.15	−0.07	−0.29	0.06	−0.55	−0.41
# countries	6	2	6	7	7	7	7	7	7
Total									
Mean	0.55	0.17	0.50	−0.06	−0.10	−0.05	−0.02	−0.09	−0.06
# countries	145	34	145	175	175	175	175	175	175

(continued)

TABLE 11.2. (Continued)

Financial Environment: Comparison of CAPDR with Other Countries								
Groups	4. Securities market				5. Bank competition		6. Degree of financial repression	
	Arnone, Laurens, and Segalotto 2003	Private bond market capitalization/GDP: Thorsten-Beck	Public bond market capitalization/GDP: Thorsten-Beck	Security Markets Index	Net interest margin	Bank concentration	Entry barriers/pro-competition measures index: SR Database	Interest rate controls index
Advanced								
Mean	0.73	0.51	0.46	1.00	0.02	0.67	1.00	1.00
# countries	29	22	22	21	28	28	21	21
Emerging								
Mean	0.58	0.12	0.29	0.86	0.05	0.57	0.87	0.96
# countries	27	24	24	28	28	28	28	28
LIC								
Mean	0.55	0.00	0.43	0.56	0.06	0.73	0.89	0.83
# countries	89	3	3	42	85	87	42	42
CAPDR								
Mean	0.59	-	-	0.33	0.07	0.61	0.80	0.93
# countries	7	-	-	5	7	7	5	5
Total								
Mean	0.59	0.28	0.38	0.75	0.05	0.69	0.91	0.91
# countries	145	49	49	91	141	143	91	91

financial sector. Consequently, any effects of monetary policy on formal financial sector variables (for example, on bank loan rates) tend to have weaker effects on aggregate demand than where formal financial intermediation is extensive. Still, changes in financial variables, especially the exchange rate, would affect inflation expectations and real asset prices, which, although less than in emerging market economies, may still be significant.

Central Bank Independence

Arnone, Laurens, and Segalotto (2006) constructed a measure of central bank independence for a group of 145 advanced, emerging, and low-income countries. Panel B of Table 11.2 provides a comparison of this measure for groups of countries classified into each of these categories. The key observation is that central banks in both emerging and low-income countries appear to be significantly less independent than those in advanced economies, with CAPDR central banks less than half as independent by this measure as those in emerging market economies, and closer to low-income countries. This affects not only the scope for the exercise of monetary policy, but also the effects of that policy, because it influences the perceived implications of any current monetary policy action for future monetary policy. However, significant progress in recent years may suggest the actual degree of central bank independence in CAPDR may be understated. The index is influenced by multiple objectives in the legislation, which in practice may not be as relevant as they once were.

Quality of the Institutional and Regulatory Environment

As indicated in panel C of Table 11.2, CAPDR economies score substantially lower than both advanced and emerging market economies, and are comparable to low-income countries on most of the governance indicators of Kaufmann, Kraay, and Mastruzzi (2009). The poor institutional environment affects not just the overall size of the formal financial sector, but also the environment in which it operates. Political instability, poor accounting and disclosure standards, weak property rights, limited government accountability, a weak regulatory environment, a poorly functioning legal system, and the prevalence of corruption all tend to contribute to the high cost of financial intermediation.

Money and Interbank Market Development

Substantial case study evidence suggests that money and interbank markets are not well developed in many CAPDR economies, as is true in most low-income countries. The poor institutional environment is a plausible reason. Regulatory and supervisory structures still show weaknesses that, paired with the occasional inability to enforce contracts and mutual distrust, cause banks to avoid lending to each other, raising the cost of lending to the nonbank sector.

Secondary Market for Government Securities

The secondary markets for government securities are poorly developed in CAPDR countries, mostly because of partial standardization of securities and lack

of incentives for the development of secondary markets. Table 11.2, panel D shows that the index of securities market development reaches only one-third of its average advanced economy value in CAPDR and is worse than the average for lower-income countries.⁷ The implication of poor securities market development is that central banks cannot conduct monetary policy through open market transactions in liquid secondary markets. Instead, monetary policy instruments tend to consist of purchases of Treasury bills in primary auctions (which effectively give the central bank control over the share of new Treasury issues that must be held by the public) and of the amounts and terms of credit extended by the central bank to the commercial banking system (rediscounts).⁸

Banking Sector Competition

Banking sectors in CAPDR tend to be only imperfectly competitive, partly because the industry is characterized by a small number of banks and by an important role for government-owned banks, but also because nonbank financial intermediaries are too small to compete with them. As shown in Table 11.2, panel E banking sectors in CAPDR on average have larger net interest margins than in advanced and emerging market economies, and low-income countries. Bank concentration is high in CAPDR compared with emerging markets, but not as high as in low-income countries. As shown in panel A, the nonbank financial sector is much smaller than in advanced and emerging market economies—not only in absolute terms, but also relative to the size of the banking sector.

Summary

The evidence presented above has important implications for the channels of monetary transmission in a “typical” CAPDR country. First, the complete absence or poor development of domestic securities markets suggests that both the short-term and long-term interest rate channels should be weak. Second, small and illiquid markets for assets such as equities and real estate would tend to weaken the asset channel. By contrast, the exchange rate channel should be important in small open economies such as countries in CAPDR, despite weak integration with international financial markets, and in fact episodes of rapid depreciation reportedly have a significant impact on inflation expectations. The

⁷The index is drawn from the IMF structural reform database. It relates to securities markets and covers policies to develop domestic bond and equity markets.

⁸In contrast to advanced economies, discount credit is used very commonly as a monetary policy instrument in low-income countries. As a rough indicator, approximately three-quarters of our LIC sample of 109 countries report at least five years of monthly data on discount rates, and there is significant variation in discount rates over time. A simple variance decomposition exercise suggests that 95 percent of the variation in discount rates in our sample is within countries (as opposed to across countries). Buzeneca and Maino (2007) report that, while no advanced economies in the IMF’s Information Systems for Instruments of Monetary Policy (ISIMP) database used discount credit as a monetary policy instrument, 69 percent of low-income countries did so.

bank lending channel remains the most viable general mode for monetary transmission in CAPDR.⁹

Since the bank lending channel is likely dominant for monetary transmission in CAPDR, cross-country evidence on the effectiveness of various bank lending steps in countries at different income levels is explored in the following empirical analysis. Specifically, broad cross-country differences in the links between central bank policy actions and bank lending rates are examined through simple correlations, rather than causal relationships, among relevant financial variables in advanced, emerging, low-income, and CAPDR economies.¹⁰

The implications of this detailed analysis are that in a setting in which domestic monetary policy becomes stronger and more reliable, the central bank should be more proactive, both in ensuring policy consistency and strengthening the financial and institutional environment for monetary policy. In addition, this setting strengthens the arguments favoring more flexible exchange rate arrangements as upgrades to the CAPDR monetary policy frameworks make progress.

THE BANK LENDING CHANNEL IN CAPDR: SOME EVIDENCE

This section presents cross-country empirical evidence of the effectiveness of the bank lending channel in CAPDR and comparing it to other advanced, emerging, and low-income economies. In particular, by computing correlations among the different interest rate indicators, we present the association between central bank policy rates and money market rates, and that between money market and bank lending rates. This approach seeks to unearth suggestive empirical regularities, rather than to identify causal relationships.

Policy and Money Market Rates

The first step of the transmission mechanism relates changes in policy rates to changes in money market rates. The correlation between policy rates and money market rates across alternative country groups is therefore under the spotlight.

Since direct central bank lending to commercial banks is more often used as a policy instrument in CAPDR than in countries with more sophisticated financial systems, we would expect changes in discount rates to be more closely associated with changes in money market rates in CAPDRs (where such markets exist) than in advanced and emerging market economies. Table 11.3 shows the relationship between discount rates and money market rates in advanced, emerging, low-income, and CAPDR countries, where rates are available.¹¹ The

⁹The strength of this channel may be influenced by balance sheet effects on the cost and availability of bank credit—that is, by the operation of the balance sheet channel.

¹⁰Annex 11.1 provides details of the data sources used in this section.

¹¹Only countries with at least 60 observations are included in the sample. For simplicity we use the same specification for all countries. Similar results are obtained if different specifications, including different lag structures, are used.

TABLE 11.3.

Correlation between Changes in Discount Rate and Changes in Money Market Rate					
	Contemporaneous Correlation	Short-term Effect	Long-term Effect	R-squared	Number of countries
Advanced	0.28	0.82	0.95	0.32	25
Emerging	0.31	0.66	0.61	0.93	26
LICs	0.29	0.28	0.33	0.03	37
CAPDR	0.26	0.38	0.51	0.39	5

Note: the discount rate corresponds to IFS line 60 and the money market rate to IFS line 60b. The data are monthly from January 1960 to December 2017, where available. The second through the fifth columns report the average of each variable for the number of countries reported in the last column. Discount rates for CAPDR countries include Dominican Republic, Costa Rica, and Honduras (policy rate). For Nicaragua central bank bonds were used. For Panama the one-year LIBOR plus the EMBI spread were used.

sample is limited for CAPDR countries, nevertheless the comparison can be illustrative.

The second column of the table reports the average contemporaneous correlations between changes in discount rates and changes in money market rates in all types of economies. This correlation actually turns out to be not much *lower* on average in CAPDR countries than in advanced and emerging economies and low-income countries.

Columns (3) and (4) report the average short- and long-term correlations between the policy rate and money market rates. These correlations are calculated by estimating the equation $y_{it} = \alpha_i y_{it-1} + \beta_i y_{it-2} + \gamma_i x_{it} + \delta_i x_{it-1} + \eta_i x_{it-2} + \epsilon_{it}$ (where y is change in the money market rate and x the change in the discount rate) for each country. The short-term effect reported in column (3) is the average estimated γ ; the long-term effect reported in column (4) is calculated as the average $\frac{\gamma_i + \delta_i + \eta_i}{1 - \alpha_i - \beta_i}$. If interpreted causally, these results would suggest that an increase in the policy rate by 1 percentage point would be associated with a 0.82 percentage point increase in the money market rate in advanced economies within one month. Although the impact is only a 0.38 percentage point increase in CAPDR, it is not a negligible result given the relatively short experience with flexible interest rates. In the long term, the increase in the discount rate would be fully transmitted to an increase in the money market rate in advanced economies, partially transmitted (0.51) in CAPDRs, which includes two countries that operate explicitly with an exchange rate anchor. With this in mind, the strengths of the correlates between discount and money market rates are not excessively below that for emerging markets.

Money Market and Bank Lending Rates

The second step in the bank lending channel is the link between the money market rate and bank lending rates. A condition for the channel to be operative is that the lending rate charged by banks must be responsive to the money market rate, where that rate exists. Table 11.4, which follows the same structure as Table 11.3, shows a strong contemporaneous correlation between money market rates and bank lending rates in advanced and emerging market economies, but a relatively

TABLE 11.4.

Correlation between Changes in Money Market rate and Changes in Lending Rate					
	Contemporaneous Correlation	Short-term Effect	Long-term Effect	R-squared	Number of countries
Advanced	0.33	0.19	0.34	0.42	26
Emerging	0.35	0.39	0.61	0.60	27
LICs	0.11	0.10	0.23	0.25	46
CAPDR	0.27	0.15	0.35	0.53	6

Note: the discount rate corresponds to IFS line 60 and the money market rate to IFS line 60b. The data are monthly from January 1960 to December 2017, where available. The second through the fifth columns report the average of each variable for the number of countries reported in the last column. Discount rates for CAPDR countries include Dominican Republic, Costa Rica, and Honduras (policy rate). For Nicaragua central bank bonds were used. For Panama the one-year LIBOR plus the EMBI Spread were used.

weaker correlation in CAPDR countries. The results show surprisingly high significance, with long-term elasticities similar to those in advanced economies, although below those of emerging markets. Overall, this suggests inconclusive results that are explored by allowing a richer lag structure in the relation between policy and lending rates using a VAR approach.

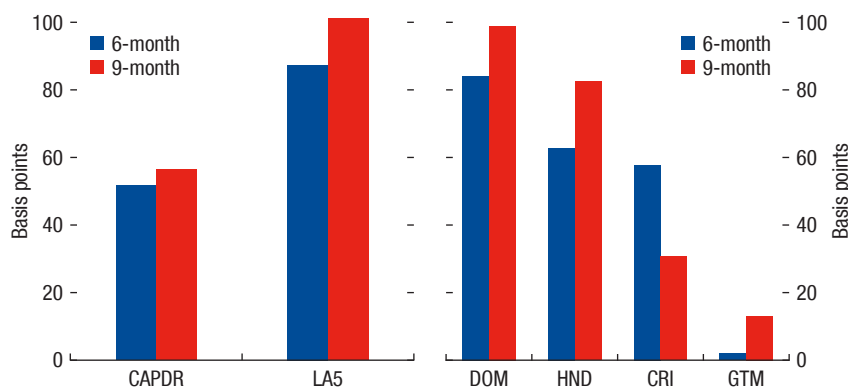
VAR Analysis

How are changes in monetary policy rates transmitted to lending rates in CAPDR countries? This is explored by estimating a set of country-specific vector autoregression (VAR) models using monthly data since the mid-2000s, when most countries started using policy rates as their main instrument of monetary policy.¹² This would allow us to quantify the reaction of lending rates to changes in the policy rate. However, these *pass-throughs* should be interpreted as correlations, and should provide a sense of the strength of the comovement of these rates without implying causality. The VAR allows formal evaluation of the relationship between the policy and lending rates. The analysis is conducted with a standard VAR model:

$$Y_t = \alpha + \sum_{i=1}^n \beta_i Y_{t-i} + \delta X_{t-1} + \varepsilon_t$$

where Y_t denotes the vector of endogenous variables, which includes the levels of the policy and lending rates, X_t is an exogenous variable to account for terms of trade proxied by oil prices, and ε_t is the white noise component. The two endogenous variables are a combination of non-stationary I(1) series and are found to be cointegrated. The cointegration means that the VAR in levels is a well-specified model of the nonstationary variables. Therefore, we estimate a VAR model in levels without imposing cointegration restrictions. This VAR model with integrated variables yields least squares and maximum likelihood estimators that are consistent and asymptotically normal under general conditions, and the estimators may be used as in the stationary case (Kilian and Lütkepohl 2016).

¹²The sample of countries includes Costa Rica, Dominican Republic, Guatemala, and Honduras.

Figure 11.3. Interest Rates Pass-through from Policy to Lending Rates Estimates

Sources: IMF Monetary and Financial Statistics (MFS), and authors' calculations.

Note: Six and nine month responses in basis points following a 100 basis point increase in the policy rate. CAPDR = Costa Rica, Dominican Republic, Guatemala, and Honduras; LA5 = Brazil, Chile, Colombia, Mexico, and Peru; CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras.

Estimating a VAR in levels facilitates the construction of impulse responses at the different periods we are interested in. The identification strategy is satisfied by a Cholesky decomposition in which the policy rate is ordered first, since we are interested in the reaction of the lending rates as a function of a tightening of monetary policy. Therefore, our pass-through estimates will be impulse responses of lending rates after six and nine months to a shock to the policy rate that leaves it 100 basis points higher.

Figure 11.3 presents estimates of the interest rate pass-through in CAPDR countries and compares them to the five biggest economies in Latin America (LA).¹³ It shows the three- as well as the six-month response of the lending rate after a shock that raises the monetary policy rate by 100 basis points. The results suggest that the interest rate pass-through is on average weaker in CAPDR than in LA. The average three- and six-month response of the set of CAPDR countries is 51 and 57 basis points, while the average response for LA is 87 and 101 basis points. These averages are quite heterogeneous, and the magnitude of their responses varies greatly. For instance, a 100 basis point hike in the policy rate may be associated with a large cumulative six-month increase in lending rates in the Dominican Republic, Costa Rica, and Honduras (84, 62, and 58 basis points, respectively), while the same shock in Guatemala lifts lending rates by about 2 basis points in the same period. These estimates suggest that the central banks are indeed able to affect lending rates in most of these countries. However, the pass-through from the policy to the bank lending rates is still weak in Guatemala.

¹³LA includes Brazil, Chile, Colombia, Mexico, and Peru.

Cross-Country Transmission: Empirical Evidence

To explore the role of institutional limitations on monetary transmission in CAPDR, panel regressions are first run, with monthly changes in bank lending rates regressed on changes in discount rates, a measure of bank concentration, and interaction terms between changes in discount rates and the index of bank concentration for the full sample of countries. The first column of Table 11.5 shows that a 1 percentage point increase in the policy rate is associated on average with a contemporaneous 0.45 increase in the lending rate. The second column shows that the partial correlation between policy and lending rates indeed appears to be affected by bank concentration (this index is equal to 1 if the index of bank concentration is higher than the median and 0 otherwise). The third column shows that bank concentration weakens transmission in CAPDR, even more than it does on average.

As shown in column (4), improved transparency increases the correlation of changes in policy rates with lending rates, suggesting that institutional deficiencies that discourage bank lending may explain the limited pass-through from policy rates to lending rates in CAPDR more than bank concentration does. However, the specification in column (5) shows that a dummy variable for CAPDR countries interacted with changes in the policy rate is highly significant in explaining the weak correlation between the policy rate and the lending rate, even after controlling for measures of bank concentration and institutional quality. Therefore, although bank concentration and transparency appear part of the story, unidentified factors may play a key role in the difference between CAPDR and other countries. That is probably because of the heterogeneous nature of this group, which includes fully dollarized economies, countries committed to exchange rate pegs, and inflation targeters.¹⁴

The last three columns in Table 11.5 assess the robustness of these results. Column (6) reports regression results using the same specification as in column (5) but restricting the sample to observations in the period after 2000. This is done to allow for the possibility that the persistence of financial repression in earlier years may have affected our results. The results confirm that, even without pervasive financial repression, the “CAPDR dummy” continues to play a relevant role in explaining the link between the policy and lending rates. The same results hold when high-inflation countries and emerging market economies are dropped from the post-2000 sample. The motivation for doing so is that correlations between lending rates and policy rates may be contaminated by the large swings in nominal interest rates associated with inflation stabilization, or with stabilizing exchange rates in the face of speculative attacks (arising either endogenously or as contagion from crises in other emerging market economies). Note particularly that transparency is statistically significant in column (8), but it does not eliminate the significance of the CAPDR dummy.

¹⁴As suggested below, such factors may include limited central bank credibility and informal dollarization.

TABLE 11.5.

Transmission Mechanisms and Bank Concentration								
Dependent variable: monthly changes in lending rate								
	[1]	[2]	[3]	[4]	[5]	[6] After 2000	[7] After 2000 + drop high inflation countries	[8] After 2000 + drop emerging markets
Change in discount rate	0.454*** [0.031]	0.331*** [0.068]	0.327*** [0.074]	0.115 [0.132]	0.141 [0.134]	0.156 [0.200]	0.184 [0.198]	−0.087 [0.210]
Concentration *		−0.246** [0.120]	−0.229* [0.134]	−0.01 [0.163]	−0.03 [0.161]	−0.057 [0.245]	0.117 [0.228]	0.238 [0.264]
Change in discount rate Concentration		−0.093 [0.107]	−0.092 [0.107]	−0.12 [0.088]	−0.118 [0.088]	−0.142 [0.089]	−0.042 [0.067]	−0.089 [0.109]
Concentration *			−0.226*** [0.043]					
Change in discount rate * CAPDR				0.097** [0.042]	0.083* [0.046]	0.086 [0.068]	−0.035 [0.077]	0.136** [0.059]
Transparency * Change in discount rate								
CAPDR * Change in discount rate					−0.122*** [0.033]	−0.118*** [0.033]	−0.268*** [0.042]	−0.089*** [0.028]
Country fixed effects	×	×	×	×	×	×	×	×
Number of observations	16,719	13,718	13,718	12,244	12,244	11,722	10,458	7,876
R squared	0.28	0.06	0.06	0.06	0.06	0.06	0.08	0.02

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors clustered by country are in brackets. The index of bank concentration is 1 if banks are highly concentrated. The index of transparency is from Transparency International. CAPDR countries include Dominican Republic, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

As another robustness check, Table 11.6 restricts the sample to countries with flexible exchange rate regimes, to allow for the possibility that the weak relationship between policy rates and bank lending rates in CAPDRs may in part reflect the greater prevalence of fixed exchange rates among those countries. As can be verified by a comparison of Tables 11.4 and 11.5, this does not seem to be the case. The results in this table are qualitatively very similar to those of Table 11.6. However, the sample is much lower and statistical precision is lost, which prevents us from making strong conclusions.

POLICY IMPLICATIONS

The findings presented in this chapter suggest evidence of a moderate monetary policy transmission of policy to market rates in CAPDR, although lower than its LA5 peers. This may suggest that further improvements in the region's monetary policy frameworks should contribute to more effective monetary transmission, which may in turn allow central banks to affect more effectively aggregate demand. However, in recent years many CAPDR countries have introduced important modifications to their monetary policy frameworks, which may further enhance the strength of monetary transmission. The implications of these changes are now reviewed. They concern the discretionary use of monetary policy for stabilization purposes, the desirability and design of inflation targeting regimes, and the choice between fixed or floating exchange rates.

Stabilization Policy

Consider a simple policy model, based on Blinder's 1998 adaptation of Brainard (1967). The structure of the economy is given by:

$$y = y_0 + \alpha m + \varepsilon \quad (3)$$

where y denotes aggregate demand, m is a monetary policy instrument, α is a parameter that captures the effect of monetary policy on aggregate demand, and ε is a shock to aggregate demand. It is assumed that α is a random variable with $E(\alpha) = \mu_\alpha$ and $Var(\alpha) = \sigma_\alpha^2$. When monetary policy is "weak and uncertain," as suggested by previous finding, μ_α is small and σ_α^2 is large. Similarly, ε is a random variable with $E(\varepsilon) = 0$ and $Var(\varepsilon) = \sigma^2$. It is assumed that α and ε are uncorrelated, so $E(\alpha - \mu_\alpha) \varepsilon = 0$. The expected value of y is given by $E(y) = y_0 + \mu_\alpha m$ and its variance by $E(y - E(y))^2 = \sigma_\alpha^2 m^2 + \sigma^2$.

The central bank has to set monetary policy before it observes the realized values of α and ε . Its objective is to stabilize aggregate demand around a desired value y^* —that is, to minimize $E(y - y^*)^2$. Using (1), the central bank's loss function can be written as:

$$\begin{aligned} L(m) &= E(y - y^*)^2 = E\{y_0 + \alpha m + \varepsilon - y^*\}^2 \\ &= E\{(y_0 + \alpha m + \varepsilon) - y^*\}^2 = E\{(y_0 + \alpha m + \varepsilon) - y^*\}^2 \\ &= E(y_0 + \alpha m + \varepsilon)^2 - 2y^* E(y_0 + \alpha m + \varepsilon) + y^{*2} \end{aligned} \quad (4)$$

TABLE 11.6.

Transmission Mechanisms and Bank Concentration: Flexible Exchange Rate Regimes								
Dependent variable: monthly changes in lending rate								
	[1]	[2]	[3]	[4]	[5]	[6] After 2000	[7] After 2000 + drop high inflation countries	[8] After 2000 + drop emerging markets
Change in discount rate	0.306*** [0.076]	0.352*** [0.067]	0.345*** [0.074]	0.128 [0.127]	0.152 [0.127]	0.149 [0.191]	0.159 [0.193]	−0.063 [0.215]
Concentration *		−0.278** [0.115]	−0.260** [0.129]	−0.032 [0.159]	−0.05 [0.156]	−0.049 [0.234]	0.14 [0.227]	0.208 [0.271]
Change in discount rate Concentration		−0.095 [0.131]	−0.093 [0.130]	−0.127 [0.095]	−0.124 [0.095]	−0.16 [0.103]	−0.031 [0.082]	−0.108 [0.139]
Concentration *			−0.221*** [0.040]					
Change in discount rate * CAPDR Transparency *				0.096** [0.038]	0.083** [0.041]	0.089 [0.064]	−0.022 [0.073]	0.132* [0.074]
Change in discount rate CAPDR *					−0.121*** [0.028]	−0.119*** [0.030]	−0.263*** [0.039]	−0.095*** [0.027]
Change in discount rate								
Country fixed effects	×	×		×	×	×	×	×
Number of observations	10,457	9,446	9,446	8,642	8,642	8,185	7,389	5,142
R squared	0.17	0.07	0.07	0.06	0.07	0.06	0.09	0.02

Note: * significant at 10%; ** significant at 5%, *** significant at 1%. Robust standard errors clustered by country are in brackets. The index of bank concentration is 1 if banks are highly concentrated. The index of transparency is from Transparency International. CAPDR countries include Dominican Republic, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

Minimizing (4) with respect to m , the optimal value of m with stochastic α can be derived, which is denoted as m_s^* :

$$m_s^* = (y^* - y_0) / (\mu_\alpha + \sigma_\alpha^2 / \mu_\alpha) \quad (5)$$

Notice that if α is nonstochastic (that is, if it has a degenerate distribution around $E(\alpha) = \mu_\alpha$, so that $\sigma_\alpha^2 = 0$), meaning that the effects of monetary policy on aggregate demand are *not* uncertain, we would have

$$m_N^* = (y^* - y_0) / \mu_\alpha$$

where m_N^* is the optimal value of m in the nonstochastic case. That is, monetary policy would be used to stabilize the economy by adjusting the monetary policy instrument so as to set $E(y) = y^*$. In this case, weaker monetary policy (smaller μ_α) implies more policy activism (larger m_N^*). When the effects of monetary policy are uncertain, however, optimal monetary policy is *less* activist, closing only part of the gap between $E(y)$ and the target y^* . This can be verified by noting that:

$$m_s^* / m_N^* = 1 / (1 + (\sigma_\alpha^2 / \mu_\alpha^2)) < 1 \quad (6)$$

The reason for this result is that when α is stochastic, higher values of m —more aggressive monetary policy—increase the future variability of aggregate demand. This cost of activist policy has to be traded off against its benefit in the form of closing the gap between actual and desired aggregate demand. This tradeoff suggests less activist use of monetary policy the weaker monetary policy is (the smaller μ_α) and the more uncertain it is (the larger σ_α^2). To see the intuition, consider first the effect of smaller μ_α . Note that we can express the monetary authority's loss function as:

$$E(y - y^*)^2 = \sigma_\alpha^2 m^2 + \sigma^2 + (y_0 + \mu_\alpha m - y^*)^2 \quad (7)$$

This expression shows that the central bank's loss function can be expressed as the sum of the variance of y and the square of the gap between the expected and target values of y . Notice that changes in m play two roles in equation (7): they affect the variance of y (the first term on the right-hand side of (7)) as well as the gap between the expected and target values of y (the third term on the right-hand side). The marginal benefit of increasing m after a reduction in μ_α is given by $2(y_0 + \mu_\alpha m - y^*)\mu_\alpha$, which captures the effect of higher m in reducing the larger negative gap between expected y and target y , that would be created by a reduction in μ_α . This marginal benefit depends on the size of the gap, which is decreasing in m . The marginal cost, on the other hand, is given by $2\sigma_\alpha^2 m$, which captures the effect of higher m in increasing the variance of y , and is increasing in m . It is precisely because increases in m are subject to increasing marginal costs through their effects on the variance of y that it would not be optimal for the central bank to pursue such increases to the point where their marginal benefit is zero—that is, where they would fully eliminate the gap between the expected and targeted values of aggregate demand. The upshot is that weaker monetary policy encourages less activist policy when the effects of policy are uncertain. Similarly, for a given value of μ_α , an increase in σ_α^2 increases the uncertainty penalty associated

with each unit increase in the value of the monetary policy instrument, which is the first term on the right-hand side of (7), and so discourages monetary activism.

In short, weak and uncertain monetary policy transmission calls for less activism in monetary policy. However, this also means that improvements in the financial environment will increase significantly the impact of monetary policy consistency on the effectiveness of monetary transmission.

Inflation Targeting and the Exchange Rate Regime

The adoption of formal inflation targeting involves the central bank putting its reputation on the line by making a public announcement of its objectives and being held accountable for achieving them. The desired result is for the private sector to form inflation expectations that are consistent with the central bank's inflation target. Weak and uncertain monetary transmission may undermine this objective in two ways.

First, unreliable transmission can undermine the effectiveness of public announcement and central bank accountability as a commitment device, because the probability that the central bank would miss its mark would create uncertainty if it is trying to manipulate monetary policy or is genuinely missing the mark—that is, unreliable transmission gives plausible cover to the central bank for deviating from its announced intentions without being caught, which undermines the credibility of future monetary policy measures. Again, this highlights the importance of policy consistency, such that the credibility of the commitment devices also increases.

Second, if the commitment device associated with the public announcement and central bank accountability is effective, questions may arise about its ability to attain that objective where monetary transmission is uncertain. This may loosen the link between the central bank's announcement and the inflation outcome that the private sector would be led to expect, thereby reducing the benefits expected from adopting inflation targeting. However, since CAPDR countries in recent times have managed to keep inflation below historical averages and below the average for Latin American countries, this suggests that expectations are not as dependent on the strength of monetary policy transmission channels.

Therefore, the adoption of inflation targeting is best accompanied by improvements in the institutional and financial environment to overcome the weakness of monetary transmission. In turn, the central bank would become more and more confident in hitting its target, avoiding the additional social loss associated with a loss of reputation.

Improvements in policy consistency and the financial and institutional environment would also allow CAPDR countries to abandon reliance on the exchange rate as an anchor, when capital mobility is high, increasing monetary autonomy, which would make exchange rate anchoring less necessary. When a country is subject to asymmetric shocks, when domestic wages and prices are sticky, when fiscal policy is inflexible, and when it does not enjoy a migration safety valve, this sacrifice of monetary autonomy can be costly, because it deprives the economy of

its only available stabilization policy tool. If monetary policy becomes more reliable, the case for floating exchange rates would become stronger over time.

The value of monetary autonomy can be interpreted as the reduction in the central bank's loss function that can be achieved by setting monetary policy optimally, compared to eschewing the use of monetary policy altogether. The latter can be derived by setting $m = 0$ in equation (7), while the former is determined by setting $m = m_s^*$. The gain from monetary autonomy, therefore, given by $L(0) - L(m_s^*)$, is:

$$L(0) - L(m_s^*) = [\sigma^2 + (y_0 - y^*)^2] - [\sigma_\alpha^2 m_s^{*2} + \sigma^2 + (y_0 + \mu_\alpha m_s^* - y^*)^2].$$

After some algebra this can be written as:

$$L(0) - L(m_s^*) = (y_0 - y^*)^2 / (1 + (\sigma_\alpha / \mu_\alpha)^2) \quad (8)$$

Notice that without uncertainty about monetary transmission ($\sigma_\alpha = 0$), the gain from monetary autonomy would be given by $(y_0 - y^*)^2$, since monetary autonomy would allow the entire gap between the actual and target levels of aggregate demand to be eliminated.

CONCLUSIONS

It has long been recognized that, while the general outlines of monetary transmission share many common features across economies, specific channels of transmission are highly country-specific, and depend among other things on each economy's financial structure. There are significant differences across economies in financial structure, even among those at very advanced stages of financial development. These differences are even more pronounced between economies at advanced stages of financial development and those—such as many CAPDR countries—that have long suffered from financial repression and have only recently liberalized their financial systems, and have a high degree of dollarization.

This chapter shows that recent progress in upgrading monetary policy frameworks in the region are an important step to support strengthening of monetary transmission in CAPDR countries. It has been argued that at lower levels of financial development, the transmission mechanism is likely to be dominated by the bank lending channel. There is some evidence of this in several CAPDR countries, despite institutional deficiencies that restrict bank lending, such as large bank concentration, high dollarization, and weak secondary markets. Therefore, the agenda should include efforts to overcome these limitations at the same time that monetary policy takes further steps to move to a more forward-looking setting.

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ANNEX 11.1. DATA AND SOURCES

A monthly panel dataset covers 105 countries that include 26 advanced, 27 emerging and 52 low-income countries for 1960–2017. The panel data set is unbalanced, with the number of observations varying across countries. Various sources were used to construct the monthly series on lending, discount, and money market rates. The IMF's *International Financial Statistics* contains data on interest rates for most member countries. In addition, some series with interest rate data come from Haver Analytics, and the national statistics are from central banks.

Transparency International's Corruption Perception Index was also used. This aggregates data from different sources that provide the perceptions of business-people and country experts concerning the level of corruption in the public sector. The index is available for 190 countries and it is measured on a scale of 0–100 where a 0 signifies the highest level of perceived corruption and 100 the lowest. Data for banking concentration come from the World Bank's Global Financial Development Indicators data set, constructed from Bankscope data. It is defined as the assets of the three largest commercial banks as a share of total commercial banking assets.

Financial Development and Inclusion

JOYCE WONG

INTRODUCTION

Financial development can unleash new growth sources by helping countries reap the benefits of globalization and make the transition to higher incomes. A recent focus has been on ensuring that gains from financial development can spread across the population. Central America, Panama, and the Dominican Republic have made significant strides in financial inclusion and development, with several countries having surpassed other non-Asian and Latin American emerging market and developing economies in boosting the enabling environment for financial inclusion.

While Figure 12.1 shows a simple correlation between incomes and growth, an extensive literature has documented the mostly positive impact from countries' financial development. Efficient financial systems help channel funds to productive uses, provide insurance against shocks, reduce information asymmetries, and can alleviate poverty and inequality (Beck, Demirgüç-Kunt, and Levine 2004). Sound financial systems can foster innovation and entrepreneurship through risk diversification (King and Levine 1993).

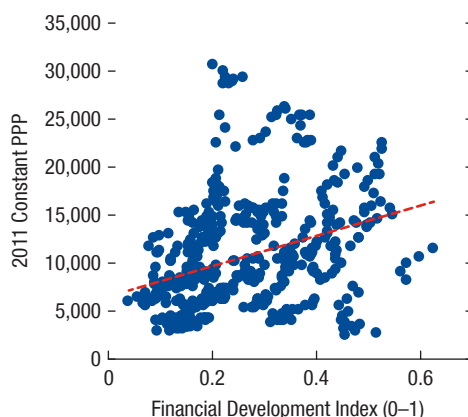
Developments in financial services highlight the promise of financial inclusion in boosting growth while reducing poverty and inequality (Beck, Demirgüç-Kunt, and Levine 2007, Clarke, Xu, and Zou 2006). Financial inclusion helps mobilize savings and provides households and firms with greater access to the resources needed to finance consumption and investment, and so helps guard against income shocks. Financial inclusion also fosters labor and firm formalization—that is, it helps reduce informality—and has been positively linked with job creation, growth, and innovation (Beck, Demirgüç-Kunt, and Maksimovic 2005; Aiyagari, Demirgüç-Kunt, and Maksimovic, 2007). These, in turn, boost government revenues and strengthen social safety nets.

Advances in financial development and inclusion have not been broad-based in most CAPDR countries. While some countries stand out in certain areas (for example, Panama in financial development and Costa Rica for household

The material included in this chapter is largely drawn from Dabla-Norris and others (2015) and Heng and others (2016).

Figure 12.1. Financial Development and PPP GDP per capita

(Emerging Asia and Latin America and Caribbean countries, 1995–2013)



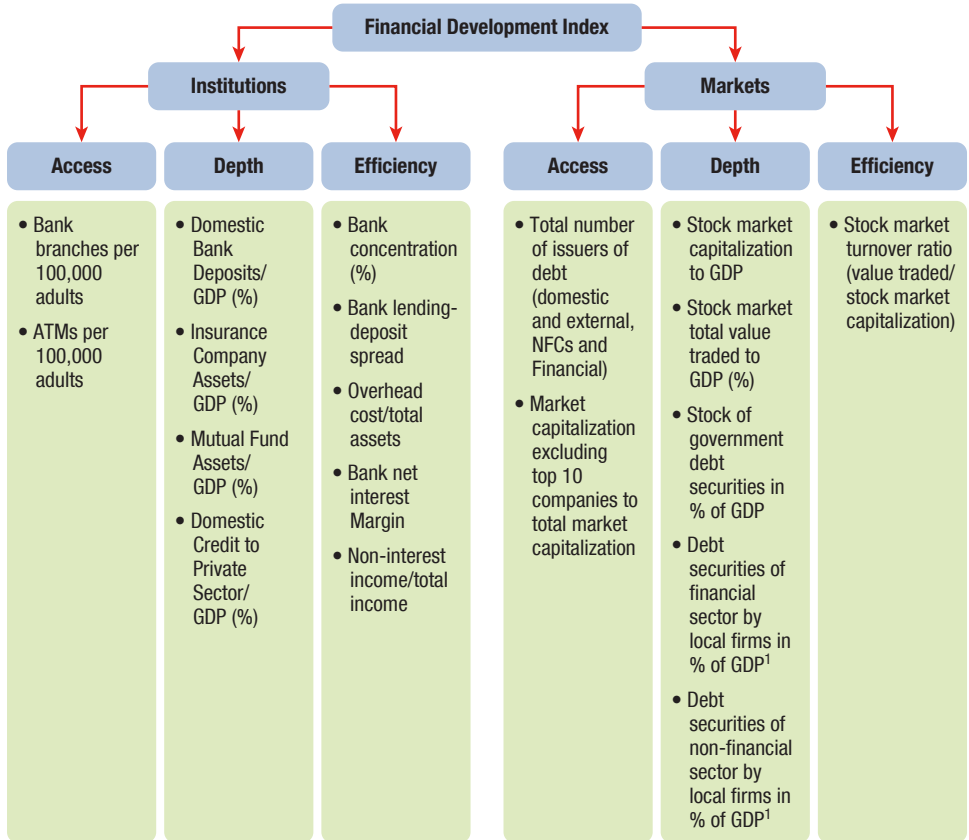
Sources: World Development Indicators, Heng and others (2016), and IMF staff calculations.

inclusion), severe constraints remain in other areas (low household inclusion in Panama and high spreads and collateral requirements in Costa Rica). Thus, CAPDR has no clear champion for performing well on all aspects.

Given the region's challenges with poverty and structural impediments to growth (such as crime and gender inequality discussed in Chapters 3 and 6), a careful deepening of financial systems and expansion of financial inclusion could help generate sustained and inclusive growth (Holden and Howell 2009; Aghion and others 2005). Such deepening could also bring insurance benefits by helping the countries (at the aggregate level) and households (at the micro level) cope with income shocks (Bhattacharya and Patnaik 2015). Deeper financial systems promote diversification and growth and have been found to be linked to financial stability (Sahay and others 2015; Heng and others 2016).

This chapter examines the current state of financial deepening and inclusion in CAPDR from several perspectives:

- Use of the financial development index developed in Heng and others (2016) to examine financial market and institution development in the region compared with the rest of Latin America and Caribbean (LAC). This new approach uses a broad-based index that improves on narrower measures of financial deepening such as the private-credit-to-GDP ratio, the ratio of liquid liabilities of the financial system to GDP, stock market capitalization as a share of GDP, and the market turnover ratio (Levine 1997, 2005).
- An examination of financial inclusion for households and small and medium enterprises (SMEs) in the region, including through a multidimensional financial inclusion index for households, SMEs, and access to financial services.

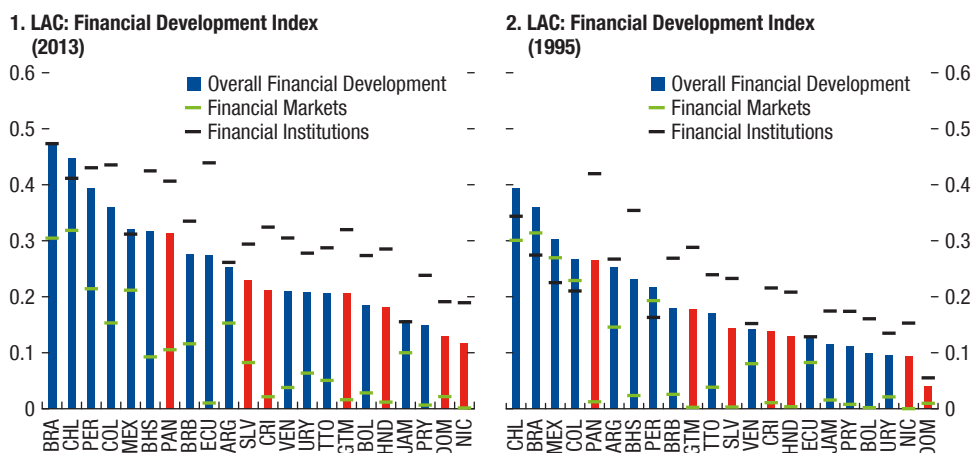
Figure 12.2. Financial Development Index

Source: Heng and others (2016).

- Trade-offs are then examined between inequality and growth when constraints to financial inclusion are loosened for enterprises using a quantitative model based on Dabla-Norris and others (2015), calibrated for CAPDR countries.
- Finally, as a case study two CAPDR countries, Guatemala and Honduras, are examined in depth to illustrate potential policy considerations in countries where several financial constraints are significantly binding.

STYLIZED FACTS ON FINANCIAL DEVELOPMENT

Using the broad-based index developed in Heng and others (2016), the analysis examines financial development of the CAPDR countries through two main pillars: financial institutions and financial markets. Each component is broken down into access, depth, and efficiency subcomponents (Figure 12.2). These

Figure 12.3. Financial Development Index, 2013 versus 1995

Source: Based on index developed in IMF WP/16/81.

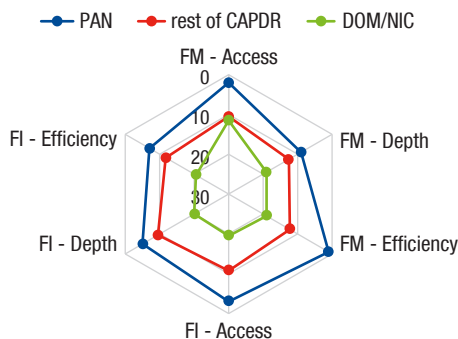
Note: ARG = Argentina; BHS = The Bahamas; BOL = Bolivia; BRA = Brazil; BRB = Barbados; CHL = Chile; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; GTM = Guatemala; HND = Honduras; JAM = Jamaica; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PRY = Paraguay; PER = Peru; SLV = El Salvador; TTO = Trinidad and Tobago; URY = Uruguay; VEN = Venezuela. LAC = Latin America and the Caribbean.

subcomponents, in turn, are constructed based on several underlying variables that track development in each area.

The overall financial development index shows that all CAPDR countries improved in absolute terms between 1995 and 2013 (Figure 12.3). Their relative positions changed somewhat, with Guatemala going from second place in CAPDR to fourth place (behind El Salvador and Costa Rica) and significant gains from the Dominican Republic (which was in last place in 1995 at a much lower level than Nicaragua). Panama's development levels reflect its role as a financial hub, and although the offshore sector is not directly measured in this index, the spillovers of technology and human capital have likely supported domestic development. El Salvador's strong performance in the index is largely explained by strong market development, supported by debt markets, including for government debt. While Nicaragua appears as the least-developed LAC country for financial development, it is worth noting that two large regional banking groups are of Nicaraguan capital (Proamerica and Lafise).

Zooming in on the components of the index, CAPDR countries are broadly divided into three: (1) Panama, which leads the group, (2) Costa Rica, Guatemala, El Salvador, and Honduras in the middle, and (3) Nicaragua and the Dominican Republic, which lag (Figure 12.4). Each of these groups lags the previous one in nearly all categories, except for the Dominican Republic and Nicaragua in financial markets access, which are in line with the rest of CAPDR.

**Figure 12.4. Financial Development Index:
Ranking across Components**



Sources: Heng and others (2016) and IMF staff calculations.
Note: CAPDR = Central America, Panama, and the Dominican Republic; PAN = Panama; DOM = Dominican Republic; NIC = Nicaragua.

The region's strong performance in institutions is partly explained by the prevalence of:

- Large and successful conglomerates—with Guatemala, Honduras, and Nicaragua having home-grown conglomerates
- ATMs and other access points, especially for Costa Rica (which has strong state banks) and Guatemala (with its strong presence of Banrural, a rural development bank)
- Robust growth in credit to GDP and insurance markets (such as in Costa Rica).

Nevertheless, the region's performance in financial institution efficiency could be improved, especially the high administration costs than have widened spreads. Past bank failures have also contributed to market consolidation, with different outcomes in Honduras and Guatemala. In Honduras, less efficient banks disappeared, leaving the market more competitive, while in Guatemala market concentration generated efficiency losses.

The region exhibits similar patterns in financial markets as in institutions. Panama again is the clear leader in CAPDR and the second-ranked LAC country for market depth, supported by financial, corporate, and public debt. El Salvador also ranks quite high due to its large public debt. When it comes to market access, the entire region (including Panama) ranks quite low, due to few issuers and small market capitalization for firms not ranked among the 10 biggest.

In general, financial markets in CAPDR appear somewhat underdeveloped compared to similar countries where financial institutions have reached comparable levels of development. For instance, for countries that score between

Figure 12.5. Financial Inclusion Indices

Households (FINDEX)	Firms/SMEs (Enterprise Survey, <100 employees)	Access to financial infrastructure (FAS, WDI)
<ul style="list-style-type: none"> • Account at a formal financial institution (% age 15+) • ATM is main mode of withdrawal (% with an account, age 15+) • Debit card (% age 15+) • Loan from a financial institution in the past year (% age 15+) • Saved at a financial institution in the past year (% age 15+) • Credit card (% age 15+) 	<ul style="list-style-type: none"> • % of firms/SMEs with a checking or savings account • % of firms/SMEs with bank loans/line of credit • % of firms/SMEs using banks to finance investments • Working capital bank financing (%) • Value of collateral needed for a loan (% of the loan amount) • % of firms/SMEs not needing a loan • % of firms/SMEs identifying access/cost of finance as a major constraint 	<ul style="list-style-type: none"> • Number of ATMs per 1,000 sq km • Number of branches of other depository corporations per 1,000 sq km • Number of branches per 100,000 adults • Number of ATMs per 100,000 adults

Source: Dabla-Norris and others (2015).

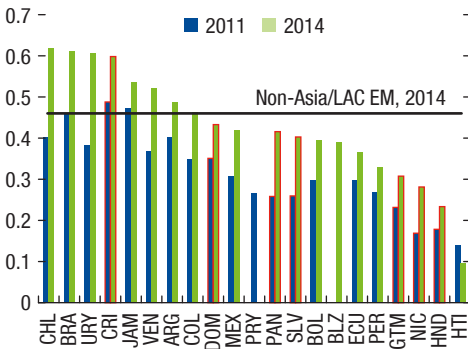
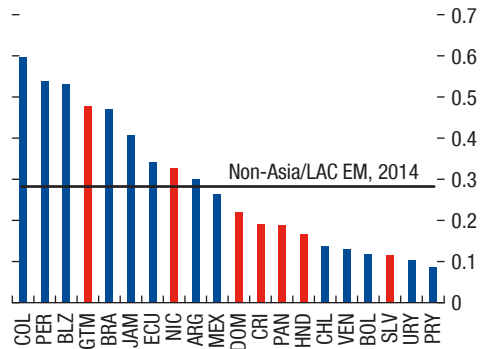
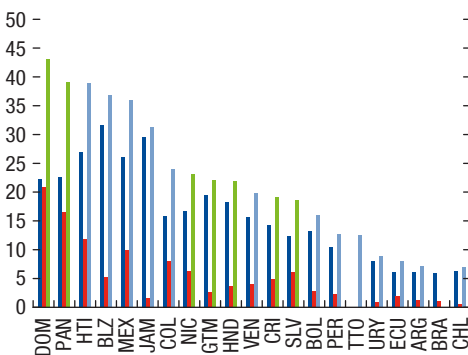
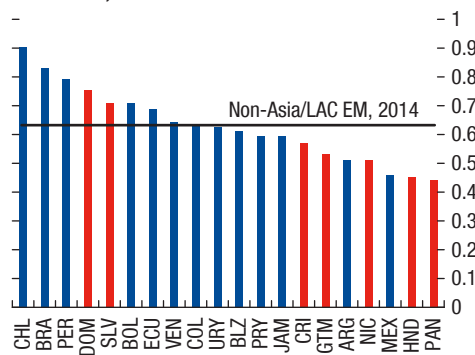
Note: FAS = Financial Access Survey; SME = small and medium enterprise; WDI = World Development Indicators.

0.29–0.41 in the Financial Institutions subindex (which lists CAPDR countries except Nicaragua and the Dominican Republic), the average Financial Markets subindex is 0.17, compared to only 0.04 in CAPDR. This is partly because the productive sector remains relatively small in CAPDR when compared to banks (which are large regional entities) and because large corporations in some countries are family owned, which hinders public listings. Debt and insurance markets remain nascent throughout the region, and in some countries (for example, Guatemala) the government can only place as much debt as needed to finance the budget, restricting its ability to maintain market presence.

ZOOMING-IN: HOUSEHOLDS AND SMES

Using the multidimensional indexes of Dabla-Norris and others (2015), the chapter next examines financial inclusion from three angles: (1) usage of financial services by households (Findex), (2) usage of financial services by SMEs (Enterprise Survey), and (3) access to financial institutions (Financial Access Survey). Figure 12.5 illustrates the indicators included in each of the indexes.

Despite notable improvements between 2011 and 2014, most of CAPDR continues to lag emerging markets on financial inclusion of households (Figure 12.6). The notable exception to this is Costa Rica, which in both 2011 and 2014 had surpassed the levels seen in other emerging markets. This large financial inclusion

Figure 12.6. Financial Inclusion of Households and SMEs**1. Latin America: Index of Household Use of Financial Services, 2011–14****2. Latin America: Index of Access to Financial Infrastructure****3. Latin America: Borrowed from Informal Channels****4. Latin America: Index of SME Use of Financial Services, Latest Year Available**

Source: Indices constructed in Dabla-Norris and others (2015).

Note: ARG = Argentina; BLZ = Belize; BOL = Bolivia; BRA = Brazil; CHL = Chile; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; GTM = Guatemala; HTI = Haiti; HND = Honduras; JAM = Jamaica; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PER = Peru; PRY = Paraguay; SLV = El Salvador; TTO = Trinidad and Tobago; URY = Uruguay; VEN = Venezuela. EM = emerging market economies; LAC = Latin America and the Caribbean; SME = small and medium enterprises.

reflects, in part (1) the country's higher levels of income per capita and education and much lower crime rates, which foster the use of ATMs and financial services, and (2) a long history of considering banking services a public good, supported by strong state banks that focus on access rather than profits.

On average, CAPDR lags non-Asia/LAC EM in all subcategories of the index except for having a loan at a financial institution and saved at a financial institution. Particularly, only 41 percent in CAPDR report having an account at a formal institution versus 55 percent in non-Asia/LAC EM, with only 24 percent having a debit card (versus 40 percent). A key exception to this is, once again Costa Rica, where 65 percent of people have an account and 54 percent of them

have a debit card. The reasons for gaps in other CAPDR countries could reflect a combination of factors, including lower levels of income and/or education. Indeed, surveys conducted in other LAC countries have found that the main reason cited for not having a bank account is often low income and the lack of need. Physical access is seldom cited as a constraint, as can be seen from Guatemala and Nicaragua having good access to financial infrastructure while scoring quite low in overall household use.

Reliance on nontraditional financing sources is quite high in CAPDR. In 2014, between 20 percent and nearly 45 percent of the population reported borrowing from informal channels, including family and friends. The banking correspondent model, however, has been making strides at “formalizing” financial services for many. This approach is helping to bridge the gap by allowing accessible retailers (food stores, gas stations, pharmacies) to act as an intermediary for basic financial transactions (deposits, withdrawal, and bill payments)¹.

CAPDR on average performs much better in terms of financial inclusion of SMEs. Nearly 43 percent of firms have a loan or a credit line from banks (compared to 37 percent for non-Asia/LAC emerging market economies) and only 25 percent of firms report that financial access is a major constraint (contrast with 29 percent for non-Asia/LAC emerging market economies). However, only 20 percent of firms use banks to finance investments (versus 28 percent) and collateral amounts to 223 percent of the loan, in striking contrast with non-Asia/LAC emerging market economies, where the corresponding number is only 135 percent. Reflecting their strong positions on the overall index, both El Salvador and the Dominican Republic have higher than non-Asia/LAC emerging market rates of firms using banks to finance investments and working capital, and more than half of firms report they have a bank loan or credit line.

GROWTH-INEQUALITY TRADE-OFFS

A micro-founded structural model borrowed from Dabla-Norris and others (2015) is used to examine the implications of relaxing various constraints to firms’ financial inclusion on growth and inequality. This model features agents born with different wealth and abilities who make choices between being workers or entrepreneurs. Agents can save without extra cost, but borrowing entails a fixed “participation cost” (see below). Once that cost is paid, the total amount that the agent can borrow will depend on the collateral posted. The “price” of borrowing will be determined by the economy’s spread between deposit and loan interest rates.²

¹Banking correspondents refer to nonfinancial commercial establishments that offer basic financial services under the name of a financial services provider, becoming access points to the formal financial system. This differs from correspondent banks, which are financial institutions that provide services on behalf of other banks, mostly located in a different country.

²For more details, please see Dabla-Norris and others 2015.

The model is calibrated for each of the CAPDR countries. In the model, constraints to firms' financial inclusion are grouped into three:

- *Participation costs*, typically reflecting high documentation requirements by banks that impede access to finance (for example, for opening, maintaining, and closing accounts, and for loan applications). Other barriers can also be captured such as red tape and the need for guarantors. These are modelled as fixed costs, capturing that documentation requirements, while somewhat more onerous for very large scale projects, do not directly grow with loan or firm size.
- *Borrowing constraints* are proxied by collateral requirements which regulate the leverage of firms in the credit system. These depend on factors such as creditors' rights, information disclosure requirements, and contract enforcement procedures.
- *Intermediation costs* (for example, high interest rates and fees) can reflect information asymmetries between banks and borrowers and limited competition in the banking system.

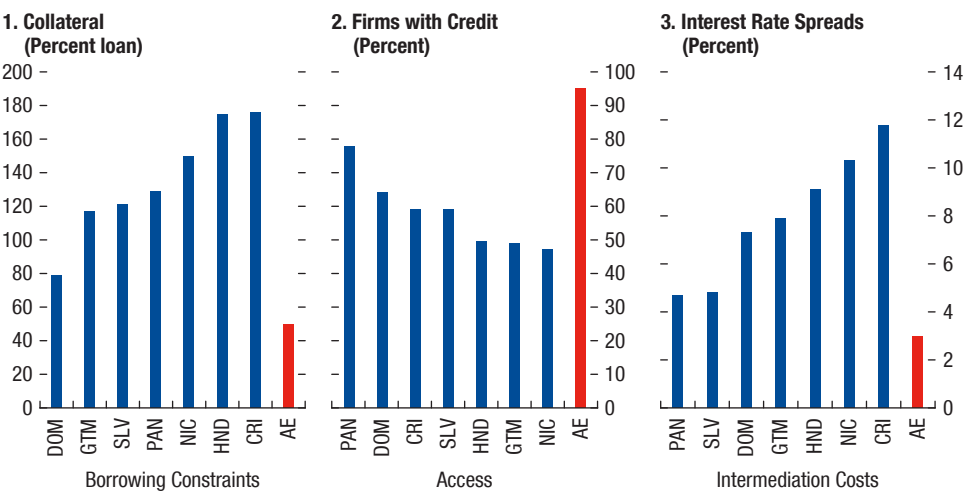
Key parameters are calibrated to match the moments of firm distribution, such as the percent of firms with credit and the firm employment distribution, as well as the economy-wide nonperforming loan ratio, and interest rate spread. As seen from Figure 12.7, when compared with advanced economies (which serve as proxies for the frontier), all countries in CAPDR lag in these indicators. For example, the percent of firms with access to credit in CAPDR is only 58 percent on average, about half of the 95 percent average in advanced economies. There are also significant differences across countries.

- Constraints are most severe in Nicaragua, with the lowest proportion of firms with credit, the second highest interest spreads in the region, and the third highest level of collateral.
- Two notable cases are those of the Dominican Republic and Guatemala, with the two lowest collateral requirements in the region. Interestingly, while interest rate spreads are relatively similar across the countries, the proportion of firms with credit is 64 percent in Dominican Republic versus 50 percent in Guatemala. As can be seen in the Guatemala case study, the low rates of access could be one of the drivers of the country's low collateral and intermediation costs.
- By contrast, Costa Rica has very high collateral and high interest rate spreads but relatively high levels rates of access with 60 percent of firms having credit.

What are the effects to GDP and inequality from "removing" each of these constraints? To answer this question, three policy experiments are conducted:

1. relaxing collateral requirements to the world minimum,
2. reducing the participation cost to zero, and
3. reducing interest rate spreads to zero.

Figure 12.7. Country-Specific Financial Constraints



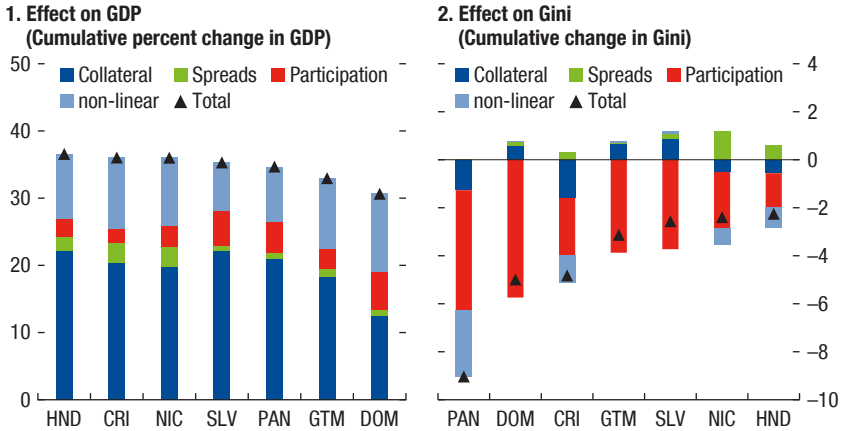
Sources: World Bank Enterprise Surveys and author’s calculations.
Note: AE = United Arab Emirates; ARG = Argentina; BLZ = Belize; BOL = Bolivia; BRA = Brazil; CHL = Chile; COL = Colombia; CRI = Costa Rica; DOM = Dominican Republic; ECU = Ecuador; GTM = Guatemala; HTI = Haiti; HND = Honduras; JAM = Jamaica; MEX = Mexico; NIC = Nicaragua; PAN = Panama; PRY = Paraguay; PER = Peru; SLV = El Salvador; TTO = Trinidad and Tobago; URY = Uruguay; VEN = Venezuela.

These policy changes are, of course, quite significant and would take time to phase-in.³ For ease of comparison, each of the economies is modeled before and after the full transition—that is, “steady states” are examined. The numbers presented below should therefore be interpreted as cumulative changes to GDP and Gini across several years, driven by the implementation of each of these policies alone. Across all CAPDR countries, the loosening of any of the three constraints increases GDP (Figure 12.8), while the loosening of participation costs reduces inequality for all but the lowering of collateral constraints generates mixed results. Each of these aspects is now discussed in detail.

RELAXING BORROWING CONSTRAINTS

The largest GDP gains accrue from lowering collateral requirements. The model predicts that the total cumulative expansion of the CAPDR countries’ GDP could range between 13 and 22 percent if all collateral requirements were lowered to 50 percent, which is the lowest average collateral across countries in the World Enterprise Surveys. However, the size of GDP gains across countries depends on the other constraints. For instance, Honduras and El Salvador post significant

³The lowering of spreads and participation costs to zero should be interpreted as an idealized frontier for ease of comparison. In reality, it is not likely that all barriers to credit are eliminated nor that there would be a zero margin to financial intermediation services.

Figure 12.8. Effects on GDP and Gini from Relaxing Constraints

Source: IMF staff calculations.

Note: CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras; NIC = Nicaragua; PAN = Panama; SLV = El Salvador.

gains driven by a combination of currently relatively large collateral and medium-sized constraints in other areas. When collateral constraints are loosened, firms can take full advantage since the other constraints are relatively benign.

Lowering collateral constraints will exacerbate inequality for some countries. While everybody benefits from borrowing more against the same level of collateral, productive firms in the economy benefit more because they have the most to gain from expanding the scale of their operations. Higher leverage leads to more investment for larger firms, which generates higher scale of production therefore boosting growth. These gains, however, accrue more to the top of the distribution (larger, wealthier firms), therefore worsening inequality. The countries for which lower levels of collateral lead to an improved level of inequality are the ones where collateral levels are already low—the larger (and more productive firms) are already near optimal levels so the expansion benefits smaller firms.

LOWERING PARTICIPATION COSTS

Reducing participation costs to zero has smaller positive effects on GDP, ranging from about 2 to 6 percent. These gains tend to be higher for countries where small enterprises account for a larger portion of the economy. For example, in the Dominican Republic, El Salvador, and Panama, which gain more than 5 percent, the top 20 percent of largest firms account only for 69 percent of employment versus the case in Guatemala and Honduras (which gain about 3 percent), where the top 20 percent of firms account for 82 percent of employment. Moreover, these gains are also supported by relatively low spreads and collateral requirements which allows the smaller firms to fully take advantage of the credit market once they enter.

The participation cost, which is a fixed cost reflecting regulatory requirements, documentation, and red tape, is a more binding constraint for smaller firms (Krešić and others 2017) and therefore unambiguously improves inequality when lowered. In a sense, this is the most binding constraint on an extensive margin, as it largely determines how many firms have credit access but not directly how much credit. The size of the impact on inequality, once again, depends on how country-specific factors interact with financial sector characteristics. Once again, the large impact on inequality reduction for the Dominican Republic and Panama is partly driven by the dominance of small firms.

LOWERING INTERMEDIATION COSTS

Both growth and inequality in CAPDR are the least responsive to lowering the interest rate spread. Just as for collateral requirements, loosening this constraint mostly benefits those firms that already have access to credit, generating a positive impact on growth but a worsening in inequality. Contrary to collateral requirements, however, lower spreads make credit cheaper without directly expanding leverage; the impact is strongest among medium-sized firms for which these credit costs represent a larger proportion of their overall costs. A loosening of this constraint does little to help small firms excluded from credit markets for other reasons (for example, participation constraints), and it does not significantly hurt the most productive firms, which were already bearing the higher spreads in their borrowing. Hence, reducing interest rates has a smaller impact on growth and may actually widen inequality.

COMBINED EFFECT OF ALL CONSTRAINTS

The analysis above, based on relaxing individual constraints, shows that the benefits come with trade-offs. While the model suggests that the relaxation of the collateral requirement will generate the highest increase in growth, it could also *exacerbate* inequality; lowering participation costs will also boost growth but by a little less and will *reduce* inequality.

So what happens when all three constraints are loosened concurrently? There are interactions between the various constraints; therefore, the joint effect on GDP is more than the additive effect of loosening each constraint in isolation. With regard to inequality, it also declines on net for all CAPDR countries. Note however that in this case the nonlinear effect may worsen inequality, especially for countries where loosening collateral constraints and spreads both worsened inequality (their joint effect is stronger than the sum of their isolated effects).

Last, and while not directly included in the model, stability factors should inform the decision on which constraints to loosen. Policies such as reducing collateral constraints and lowering participation costs, while beneficial for growth and inequality, could also expose the economy to instability. For example, high leverage levels and the entry of lower-productivity/higher-risk firms into the credit market could increase nonperforming loans, which are already high in some

countries. A strong regulatory environment will be paramount to ensure continued financial stability as inclusion policies move along.

CASE STUDIES

As the model demonstrated, there is no “one-size-fits-all” solution to improving financial inclusion; the most binding constraints and drivers vary by country. This subsection examines the situation in two CAPDR countries to help shed light on the different constraints to financial inclusion and potential policies.

GUATEMALA

Guatemala's income distribution is one of the most unequal in the world, with a Gini coefficient of 52 in 2011. One-tenth of the population receives about half of total income while nearly one-third of the population lives on less than \$2 a day. Literacy rates are low (at 70 percent) and there is a strong urban-rural divide, both partly reflecting low infrastructure and social and education spending. Although GDP growth since the global financial crisis of 2008 has been robust, PPP GDP per capita remains low, at about \$7,500.

As in many other countries in LAC, gross national savings are low, at about 12 percent of GDP on average. Banking penetration is shallow, with only 40 percent of the population having an account at a financial institution in 2014. In a country where labor informality exceeds 70 percent, the use of savings clubs reached 12 percent in 2014, and while one-fifth of the population reports borrowing from family and friends, just 12 percent borrow from financial institutions.

Among SMEs, access is relatively low, with 60 percent of firms reporting having a checking/saving account (compared to a LAC average of 92 percent) and 45 percent having lines of credit with a bank (LAC average of 46 percent). However, this low access does not appear to be driven by high costs or large collateral; deposit-lending spreads are about 8 percentage points, and collateral averages 117 percent of the loan (versus 201 percent in the wider region). Relatively low collateral and spreads reflect the high concentration of credit among a small number of large clients. Since a large part of banks' business is with a small group of clients who are well known to them, risks remain low and informational asymmetries are greatly reduced.

According to the comparative statics results of the model, the loosening of any of the three constraints will generate an improvement in growth but the lowering of spreads and collateral requirements would worsen inequality. Intuitively, this is because, due to their already relatively low levels, the loosening of these two constraints generates much larger marginal benefits for those at the top of the talent and wealth piles than those at the bottom. In this situation, very talented or very wealthy entrepreneurs can significantly increase their leverage and their production.

Given large income inequality in Guatemala, policies that focus on loosening participation constraints should be a key first step. Increasing social spending, especially on education, and implementing a national plan for financial inclusion

aimed at fostering financial literacy, would help bridge entry barriers for those who remain outside of the financial system. As demand-side barriers are addressed, regulators should also examine financial institutions' lending practices and credit concentration limits. While basic regulation is in place, there are instances where the ultimate beneficiary of loans is not clear since firms are registered under several names. Finally, as participation barriers are relaxed and previously unbanked businesses enter the financial system, credit bureau implementation should be improved to lower information costs (and collateral requirements), especially for new clients. At the same time, increased competition in the banking sector should be promoted to improve efficiency and maintain low spreads.

EL SALVADOR

In recent years, El Salvador has made significant strides in reducing inequality as evidenced by the decline in its Gini index from 53 in 2000 to 42 in 2012. However, economic growth has been anemic, averaging under 2 percent for the past decade. The country is also plagued by emigration to the United States, as the young seek better economic opportunities and an escape from violence—in 2014, there were 68.6 homicides per 100,000 people, making it one of the most violent countries in the world (see Chapter 6).

Gross national savings at only 9.5 percent are even lower than in Guatemala. Despite a history of lending through large national banks with a regional presence, banking penetration is low, with only 35 percent of the population having a bank account at a financial institution in 2014. The proportion of people who save either at a financial institution or a savings club is also lower than in Guatemala (only 7 percent used the latter in 2014). Nevertheless, the proportion of those who borrow from banks is much higher in El Salvador (17 percent versus 12 percent in Guatemala).

Financial inclusion of enterprises appears well developed, with both low cost of funds, low collateral requirements, and significant usage. Loan-deposit spreads are among the lowest in the region (at under 5 percentage points) and collateral requirements are at about 120 percent, below the LAC average of 138 percent. Over 90 percent of firms report having a bank account and about half of them have a line of credit. Contrary to Guatemala, low collateral and spreads in El Salvador likely reflect a banking sector that has had a history of large domestic banks with regional presence, which were bought first by global banks and then by Colombian conglomerates, which own nearly two-thirds of the current banking system assets. The credit bureau system is relatively well developed in El Salvador, covering over 80 percent of the adult population. Furthermore, the microfinance sector is quite well developed, with a significant presence of savings and loan societies and cooperative banks, although they remain mostly unregulated.

Comparative statics results from the model point to a significant positive effect on growth from lowering collateral levels, which is coupled with a worsening of inequality. In the case of Guatemala, this is because the marginal benefits of such a move benefit the wealthy and those who have higher productivity. In a country

whose main goal would be to raise growth, policymakers need to evaluate to what extent the trade-off with worsening inequality in the short term would be worthwhile. In the case of El Salvador, where a focus on improving growth is warranted, relaxing collateral requirements and lowering spreads could have significant positive effects for firms at the top of the productivity distribution—the marginal gains for these firms are larger. However, a relaxation of already-low collateral constraints could have significant effects on financial system stability.⁴ For this reason, it would be important to couple reforms to promote growth through lower collateral requirements with measures to strengthen regulation and supervision (Sahay and others 2015). Given that El Salvador is a fully dollarized economy without a lender of last resort, a strong crisis management and resolution framework should also be implemented.

CONCLUSION AND POLICY IMPLICATIONS

Wide variation across CAPDR countries exists for financial systems development and inclusion. While Panama leads in financial development, financial inclusion of households and SMEs lags that of other countries in the region. In contrast, the Dominican Republic performs quite well both in inclusion of households and SMEs but lags in overall development.

Financial development could be improved. The financial development CAPDR countries (except for Panama) remains in the lower range of LAC. There is scope for improvement, but care should be taken to safeguard financial stability. Policies that may be pertinent for these countries include strengthening institutional and legal frameworks related to property rights and collateral registries, and improving the credibility of financial systems and deposit insurance, enhancing capital and liquidity buffers, and addressing balance sheet mismatches.

Policies to support SMEs are warranted. Key support measures include understanding the determinants of bank fees and charges, examining the existence of and eliminating predatory practices, and reviewing the adequacy of banking sector competition (including the framework for entry). As financial inclusion improves and more users enter the market, measures to reduce information costs (strong credit bureaus), efforts to reduce operational costs (using mobile networks and correspondent banking), and measures to improve the efficiency of courts and collateral recovery systems are necessary.

There is no silver bullet for easing financial constraints. There are trade-offs between growth, inequality, and financial stability; all should be considered when policies are designed. For example, even though policies aimed at lowering collateral requirements (such as strengthening the legal framework for managing and seizing collateral, reducing the size of collateral requirements, and creating modern collateral registries) are mostly beneficial for growth, they may also lead to

⁴Given the model's assumption of a closed economy, interest rate spreads automatically adjust when nonperforming loans begin rising and thus function as a stabilizer. Thus, bad debt does not rise excessively in model simulations.

higher inequality as marginal benefits accrue to the top of the distribution. In contrast, policies aimed at reducing participation costs (for example, lowering documentation requirements and reducing red tape and the need for informal guarantors to access finance) could help reduce inequality but may not yield comparable growth benefits.

There are synergies from a multipronged approach. The joint loosening of multiple constraints is likely to yield larger returns (higher growth and lower inequality) than the sum of loosening several constraints sequentially. However, the transition to that final state may also entail temporary increases in inequality. Tailored policies require a clear understanding of country-specific constraints, priorities, and timelines. Last, significant care should be taken to ensure that a strong framework for financial regulation and consumer protection is in place to safeguard the benefits of expanded financial inclusion without jeopardizing financial stability.

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Safeguarding Financial Stability: The Role of Macprudential Policy

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INTRODUCTION

Financial stability is key to inclusive and sustained growth. Financial crises frequently result in large output and wealth losses, and they tend to affect people in middle- and lower-middle classes harder than the wealthy, sapping broad-based economic growth. Without remedies against the often severe consequences of financial crises, prevention is better than cures that deal with their impact after the event. To mitigate the financial stability risks that emanate from financial institutions, countries have traditionally relied on prudential regulations and more recently on risk-based supervision to buffer financial shocks. However, risks to systemic stability can also stem from real sector shocks. As seen during the global financial crisis of 2008, cross-border and cross-sector spillovers can intensify both.

The bursting of asset market bubbles, such as in housing and equities, can impact financial sector stability through a deterioration of asset quality, resulting in credit crunches and bank failures. Should public funds be required to head off bank runs, such shocks could, in turn, worsen fiscal imbalances and require austerity measures—further reducing economic growth and worsening bank asset quality. After the global financial crisis, many countries deployed a new set of macroprudential policies, focused on mitigating systemic risks associated with these macro-financial links, with the aim to prevent negative feedback loops between financial and real sector shocks.

This chapter analyzes the institutional and operational macroprudential policy framework in the seven CAPDR countries and draws some conclusions regarding the effectiveness of macroprudential instruments. After a brief overview of the nature of systemic risks embedded in the structural characteristics of CAPDR's financial system, it compares the existing institutional frameworks for macroprudential policies in CAPDR and discusses implications for the effectiveness of its macroprudential policies to reduce the main systemic risks identified. Next, drawing on an innovative new survey, the chapter details the macroprudential policy toolbox in the region, compared to both other emerging markets and the

broader Latin American region. Finally, to deepen understanding of the effectiveness of existing tools in reducing systemic risk in CAPDR, the chapter explores the impact of these policies on various indicators of systemic risk.

MACROPRUDENTIAL INSTITUTIONAL AND OPERATIONAL SETTINGS

Systemic Risks in CAPDR's Financial System

What are the sources of systemic risk in CAPDR, linked to the structure of the financial system, that determine the institutional macroprudential policy framework and its corresponding toolbox?¹ In CAPDR, the financial system is dominated by the banking sector. As of the end of 2017, the banking sector held over 80 percent of the region's total financial sector assets. The main risks to the region's financial stability are therefore associated with the specific characteristics of its banks, such as high market concentration,² highly concentrated portfolios and risks,³ and large dollarization (Figure 13.1).

The financial sources of systemic risk are intimately linked to the structural characteristics of the region's economies, which are also potential sources of systemic risk. The relatively small size of the region's economy and high concentration of economic activity in relatively few economic conglomerates explain to a large extent the concentration of banks' lending and risks, while open current accounts and strong links with the United States have contributed to high dollarization (Table 13.1). On the fiscal front, weak revenue mobilization capacity, constrained fiscal space, and debt sustainability considerations constrain bank resolution frameworks in most countries. On the monetary side, the transition to inflation targeting is still ongoing in most countries, while dollar-denominated deposits establish a tight connection between liquidity support and official reserves, and official dollarization limits the availability and flexibility of lender-of-last-resort facilities in El Salvador and Panama. Underdeveloped debt and money markets further complicate liquidity management and increase banks' credit risk concentration.

These structural characteristics and resulting risks have shaped prudential regulation and supervision in the region and, more recently, macroprudential

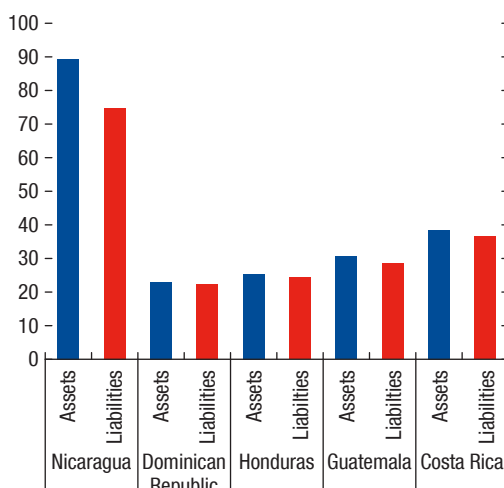
¹This chapter uses the definition of systemic risk as "the risk of widespread disruption to the provision of financial services that is caused by an impairment of all or parts of the financial system," as featured in a 2009 report to the G20 from the International Monetary Fund, the Financial Stability Board, and the Bank for International Settlements.

²On average, the three largest banks account for 56.2 percent of total banking sector's balance sheet, ranging from 31.3 percent in Panama to 77.2 percent in the Dominican Republic.

³In many cases, banks belong to or are associated with large domestic or regional economic groups and, while consumption credit and mortgages have increased with improvements in per capita income and the entry of foreign banks over the last decades, corporate credit portfolios tend to be concentrated in a few economic sectors derived from historical links with specific family-based economic groups.

Figure 13.1. Foreign Currency Share in Central American Bank Balance Sheets

(April 2018, percent)



Source: Central American Monetary Council.

Note: Excludes Panama and El Salvador as both economies are fully dollarized. For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

policies. Over the past two decades, risk-based supervision has largely replaced compliance-based supervision, with a focus on addressing the specific risks of banks in the region. With the assistance of IMF capacity development, the Regional Council of Financial Superintendents set up a Coordination Committee in charge of developing and implementing cross-border consolidated banking

TABLE 13.1.

Central America: Economic Size and Trade Openness			
Country	World GDP share (%)	Trade Openness (%)	Export to US to total export (%)
Panama	0.08	44.64	18.91
Dominican Republic	0.09	26.74	50.23
Nicaragua	0.02	48.53	57.11
Costa Rica	0.07	33.60	40.87
El Salvador	0.04	32.52	45.70
Honduras	0.03	50.54	34.54
Guatemala	0.09	22.74	33.83

Source: *World Economic Outlook, Direction of Trade Statistics*, and IMF staff estimates.

Note: Data correspond to 2017.

For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

supervision. This was based on a common set of accounting principles and memorandums of understanding for the exchange of information and joint audits to regional groups. However, gaps remain in data, resources, and implementation capacity. Moreover, risk-based supervision is still in its infancy for nonbank financial institutions. The institutional macroprudential framework started to develop in earnest only after the global financial crisis, and most macroprudential instruments surveyed in this study were applied with prudential, monetary, or liquidity objectives before the institutional macroprudential policy frameworks described in this chapter were developed.

Institutional Framework for Macroprudential Policies

What components of a macroprudential policy institutional framework are critical to ensure its effectiveness in reducing systemic risk? An effective institutional framework requires: (1) a clear objective, (2) the willingness and ability to act, (3) information collection powers, (4) coordination mechanisms across multiple agencies involved in systemic risk mitigation and resolution, and (5) an accountability framework that includes a range of communication tools (IMF 2013). This section provides a comparative analysis of the institutional and operational settings of macroprudential policy among CAPDR countries.

In practice, two models of macroprudential policymaking prevail worldwide. The first model assigns the leading role in macroprudential policymaking to the central bank given its expertise in systemic risk identification.⁴ In the second model, macroprudential authority is vested in a committee or council or supervisory agency outside the central bank, typically with the central bank participating in the macroprudential committee (MPC). The second model can accommodate a stronger role of the Ministry of Finance, whose help is needed to provide resources and/or expand the macroprudential toolkit. How the model is adopted in any given country reflects monetary and supervisory policy responsibilities, legal constraints, and political economy criteria (Table 13.2).

In CAPDR, macroprudential authority has generally been entrusted to the central bank directly or in consultation with an interagency MPC. In Honduras, the MPC is headed by the Banking and Insurance Commission (with the central bank a member of the Financial Stability Committee), while in Panama, which is without a central bank, the Financial Coordination Council is responsible for coordination of financial sector supervision and regulation across supervision agencies, but does not have a formal role in systemic risk oversight or macroprudential policies. Across the region, the banking supervision institution and the central bank (where relevant) belong to the interagency MPC, while other

⁴See IMF (2011), Nier and others (2011), and IMF (2013). IMF (2014) suggests that three models have prevailed as it differentiates between two types of models, with the central bank being assigned the macroprudential policy mandate. In one model, the mandate is assigned to the central bank and in the other it is assigned to a dedicated committee within the central bank structure. We consider these models jointly.

TABLE 13.2.

Structure of Macprudential Decision-Making in Central America					
	Arrangement	Composition	Legal Macprudential Mandate	Decision-making Power	Financial Stability Report
CRI	CONASSIF (1997 with oversight over the Superintendencies of Financial entities, Securities, and Insurance) Working group on macroprudential issues	President of the Central Bank Minister of Finance Five private sector members	Implicit	Recommendations to the boards of the central bank and CONASSIF Non-binding	Yes Central Bank
DOM	Monetary Board (MB, 1947) Responsible for monetary, exchange and credit policy, banking and financial supervision and regulations Macprudential and Financial Stability Committee (2017) guided by MB	MB is chaired by Central Bank Governor, includes Minister of Finance, Bank Supervisor, and six private sector members Directed by senior officials of the central bank and one from Superintendency of Banks	Central bank and bank supervisor have legal mandate to promote financial stability	Yes. MB can set up ad hoc commissions for specific issues, including systemic risk	No
SLV	Systemic Risk Committee (2013)	Central Bank (coordinator) Integrated financial regulator/supervisor Ministry of Finance Deposit Insurance Agency	Yes	Risk monitoring and information sharing only	Yes Central Bank
GTM	Monetary Board (1993) Responsible for monetary, exchange and credit policy, banking and financial supervision and regulations	Chaired by CB Governor (1 vote) Three Ministries: Finance, Economy, Agriculture (3 votes) Two private sector members (1 vote each)	Implicit	Yes. In context of Monetary Board power	Yes. Prepared jointly by Central Bank and Superintendency of Banks
HND	Financial Stability Committee (2017)	Commissioner from the National Commission of banks and Insurance (Coordinator) Central Bank (Secretariat), Ministry of Finance, Deposit Insurance Agency	Yes	Yes. Voting system to be determined	Yes. Central Bank

(continued)

TABLE 13.2. (Continued)

Structure of Macroprudential Decision-Making in Central America					
	Arrangement	Composition	Legal Macroprudential Mandate	Decision-making Power	Financial Stability Report
NIC	Financial Stability Committee (FSC 2016)	Two representatives of Central Bank and two from the Superintendency of Banks and other financial Institutions (SIBOIF) rotate to chair FSC	Central bank and bank supervisor have legal mandate to promote financial stability	No	No
PAN	Council of Financial Coordination (2011)	Superintendency of Banks (chair) Four other supervisory authorities Ministry of Commerce and Industries	No	No. Information Exchange based on MoUs	Yes. Prepared by Banking Supervisory Authority

Source: National authorities.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

TABLE 13.3.

		Macroprudential Authority and Inter-Agency Coordination in Central America						
		CRI	Dominican Republic	GTM	SLV	HND	NIC	PAN
I.A.	Designated macroprudential authority	yes	yes	yes	yes	yes	yes	no
I.A.1.	Central bank	yes	no	yes	no	no	no	no
I.A.2.	Committee within the central bank	no	no	no	yes	no	no	no
I.A.3.	Committee outside the central bank	no	no	no	no	no	no	no
I.A.4.	Supervisory agency (other than the central bank)	yes	no	no	no	yes	yes	no
I.A.5.	Other	n.a.	yes	no	no	yes	yes	no
I.B.	Macroprudential authority's powers	yes	yes	yes	yes	yes	n.a.	n.a.
I.B.1.	Hard powers	no	yes	yes	yes	yes	n.a.	n.a.
I.B.2.	Semi-hard powers	yes	n.a.	no	n.a.	yes	n.a.	n.a.
I.B.3.	Soft powers	n.a.	yes	no	n.a.	n.a.	yes	n.a.
I.C.	Interagency coordination mechanism	yes	yes	n.a.	yes	yes	yes	yes

Source: National authorities; n.a. not available.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

frequent members are the Ministry of Finance, the Deposit Insurance Agency, and other financial supervision agencies. Other public institutions participate in the MPC in two cases (Table 13.3).⁵

The strength of legal powers to guide and implement macroprudential policies varies. In some cases, the macroprudential authority has direct control over macroprudential instruments as, for instance, in Guatemala and the Dominican Republic. In others, policy formulation and execution lie with different institutions. In Honduras and Costa Rica, the leading macroprudential entity is limited to issuing formal recommendations to other agencies. Regardless of the overall macroprudential institutional setting, all central banks in the region employ monetary policy tools such as reserve requirements and foreign exchange regulations; for example, constraints on open foreign currency positions, which are also part of their macroprudential toolkit.

To improve the effectiveness of the institutional arrangements, all CAPDR countries have reinforced coordination mechanisms. These are important given that central banks generally have responsibility over macroprudential objectives, but decision-making powers over critical tools are controlled by another regulatory agency, such as the banking supervisor, as also observed in emerging market economies throughout the world (BIS 2017). The central bank of Guatemala holds weekly meetings with the Superintendency of Banks to enhance interagency coordination, while there is no formal MPC. In Honduras, the Financial Stability Council has an inter-agency operational committee legally entitled to request information to identify potential risks and propose emergency measures to deal with threats to financial stability. In Panama, the Financial Coordination Council

⁵In Guatemala and Panama some ministries, including Agriculture, Commerce, and Industry participate in MPCs.

coordinates regulatory guidelines across financial sector regulators with mostly a microprudential focus.

In all CAPDR countries, macroprudential authorities seek to identify vulnerabilities to adopt preventive measures at an early stage. Consistent with their macroprudential mandates, central banks have taken the lead on systemic risk assessment, in some cases in coordination with the Superintendency of Banks. Systemic risk analysis is gradually being deepened, with analysis of financial soundness indicators increasingly supplemented by econometric models, and financial stability maps aiming to capture the interaction between the real and financial sector and domestic and cross-border flows. All countries in the region closely monitor the foreign currency operations and maturity mismatches that could threaten the payments system. Despite some progress, data gaps hamper adequate monitoring of sectoral risks, particularly in relation to debt service to income ratios and total indebtedness in the household sector.

Macroprudential analysis dissemination as embodied in the Financial Stability Reports (FSR) has become common practice. Honduras, El Salvador, Nicaragua, and Guatemala (until 2012) published their reports, while it remains an internal document in the other countries. Lim and others (2017) evaluated financial stability reports in Latin America and the Caribbean based on 26 criteria covering, among others, clarity of aims, coverage of issues, assumptions and tools, and structure, consistency, and inclusion of key topics. They found the top reports were in Brazil, Chile, Colombia, and Mexico, while Honduras was in a middle group and the remaining countries in Central America with published reports ranked in the bottom group. The analysis focused on historical trends in macroeconomic and financial performance with little emphasis on forward-looking prospects. Currently, all countries conduct stress testing analysis, and they are moving forward to assess risks arising from banks of systemic relevance identified with Basel guidelines criteria of size, substitutability, interconnectedness, and complexity, holding periodic regional training workshops.

Macroprudential Policy Instruments in CAPDR

How have macroprudential policy instruments been used to mitigate systemic risks to financial stability in CAPDR? This section draws on results from a survey of country authorities in late 2017 to document the use of macroprudential policy instruments in the region. The section first reviews the design of the survey and the methodology used to summarize the results of the survey into indexes of the use of macroprudential policies in CAPDR. It then provides an overview of the use of macroprudential policies in CAPDR based on the survey results.

Survey Design and Methodology for Macroprudential Policy Indexes

The survey is annual, covering 2000 to 2017, and updates and extends the survey conducted by Delgado and Meza (2011).⁶ Compared to other surveys of

⁶Results were cross-checked with those from Delgado and Meza (2011), Cerutti and others (2015), and IMF (2018), with IMF country economists and, if needed, were clarified with the authorities.

TABLE 13.4.

Macroprudential Policy Measures in Central America Survey		
Type of Measure	Measure	
Broad-based		
	<ul style="list-style-type: none">Counter-cyclical capital bufferLeverage ratioDynamic loan-loss provisioning	<ul style="list-style-type: none">Caps on credit growthCredit ceilingsLoan-to-deposit limits
Sector-specific		
	<ul style="list-style-type: none">Sectoral capital requirements (risk-weights)Maximum loan-to-value ratiosMaximum debt and/or debt-service-to-income ratiosCaps on sectoral credit growthGeneric provisions for foreign currency loans to unhedged borrowers in specific sectors	<ul style="list-style-type: none">Specific capital requirements for foreign currency loans to unhedged borrowers in specific sectorsMandatory provisions on exposures to specified sectorsLimits on credit concentration to specific sectors
Liquidity		
	<ul style="list-style-type: none">Liquidity buffer requirementsStable funding requirementsLiquidity chargesReserve requirements on domestic currency and/or foreign currency depositsConstraints on open foreign currency positionsSpecific capital requirements for net open foreign currency positionsConstraints on foreign currency funding	<ul style="list-style-type: none">Limits on maturity mismatches on bank balance sheetsLimits on net non-core funding dependence ratioMinimum core funding ratioReserve requirements on external credit lines to banksLimits to foreign investment by domestic pension fundsTax on capital inflows
Structural		
	<ul style="list-style-type: none">Limits on exposures between financial institutionsCapital surchargeSectoral capital requirements	<ul style="list-style-type: none">Liquidity toolsMinimum margin requirementsChanges to market infrastructure

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

macroprudential policy that include CAPDR countries, this survey has more extensive instrument and calibration coverage. It has more recent data than Cerutti and others (2015) and similar instrument coverage to the IMF's Macroprudential Policy Survey (IMF 2018). However, unlike IMF (2018), which includes information for only 2017, this survey includes time series information on the use and calibration of each specific instrument.

The comprehensive survey includes macroprudential policy measures designed to tackle both the time and cross-sectional dimensions of systemic risk. Macroprudential policy instruments are categorized into four broad categories (see Table 13.4), similar to the characterization in IMF (2014a, 2014b), and consistent with the underlying aspects of systemic risk they seek to address: (1) broad-based tools to enhance the resilience of the overall financial system and

reduce the procyclicality of lending, (2) sector-specific tools to address risks associated with lending to specific sectors (tools directed toward households and corporates were surveyed separately), (3) liquidity tools to mitigate systemic liquidity and currency risks, and (4) structural tools to reduce risks associated with interconnections in the financial sector. Across those four broad categories, the survey includes information on the use of about 45 distinct macroprudential policy instruments. Also included are measures targeted toward nonbank financial institutions and an “other” category for the authorities to describe measures in use to mitigate systemic risk but not explicitly included in the instruments surveyed.⁷ This structure is broadly consistent with that of IMF (2018).

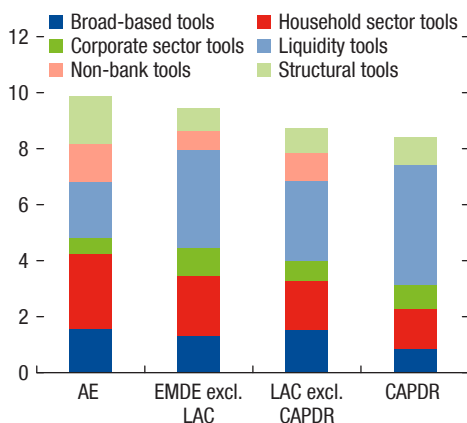
The survey requested information on the use and calibration of each macroprudential instrument. CAPDR countries were asked for each year of the sample period whether a given instrument was in use, its precise definition and calibration, and for detailed information on the design of the instrument, including references to underlying legislation.

Survey results were used to calculate indexes on the use of macroprudential policies in each country. For each instrument, a binary index was constructed, set equal to 1 if the policy was in use and 0 otherwise. These were then aggregated into distinct indexes for each of the four broad categories of macroprudential tools, with each index calculated as the simple sum of the scores on each of the instruments included in a category. Given that the number of possible policy instruments differs across the four categories, the indexes are not directly comparable across categories, but are useful to provide a sense of the use of macroprudential policy instruments across CAPDR countries. Following Cerutti and others (2015), an aggregate index is constructed for tools targeted toward borrowers and another is built for tools targeted toward financial institutions. The borrower-oriented index includes maximum loan-to-value ratios, debt-to-income, and debt-service-to-income ratios targeted to either households or firms. All other measures are assumed to be targeted toward financial institutions. Finally, an overall Macroprudential Policy Index (MPI) is constructed as the simple sum of the scores on all policies included in the survey.

Intensity-based indexes were also calculated for each macroprudential instrument in the survey. These indexes take advantage of detailed information on the calibration of each macroprudential measure. For each instrument, the intensity index is assigned a value of 0 if its calibration has not changed, -1 if it was loosened, and +1 if it was tightened in a given period. This follows the approach in Akinci and Olmstead-Rumsey (2015). Similar to the binary indexes, the individual indexes are then aggregated for each category of macroprudential instrument and overall by summing over the instruments included in the given category to have intensity-based measures. Given that some measures may be loosening and others tightening at a given time, these intensity-based measures give an idea of the net stance of macroprudential policies.

⁷No responses were provided on these categories and hence the results are not discussed.

Figure 13.2. Number of Instruments Implemented
(Average number per region per type of instrument)



Source: IMF 2017 macroprudential survey.

Note: CAPDR result is based on independent macroprudential survey on CAPDR countries.

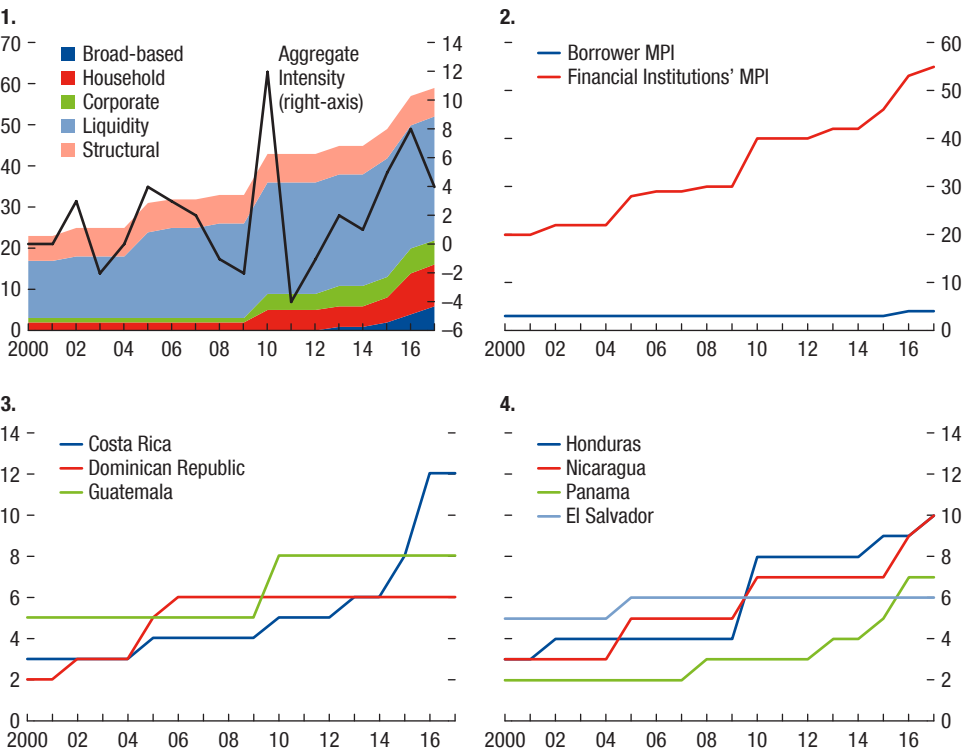
CAPDR = Central America, Panama, and the Dominican Republic; AE = advanced economies; EMDE = emerging market and developing economies; LAC = Latin America and the Caribbean.

Results

CAPDR countries are increasing their use of macroprudential policies. The number of macroprudential policies measures used in the region increased from 23 in 2000 to 59 in 2017, according to the survey (Figure 13.2). The use of macroprudential policies accelerated after the global financial crisis, when the first broad-based measures in the region were introduced (Figure 13.3). On average, eight tools were in place in 2017 in each CAPDR country, from three in 2000. This compares to an average of 9.9 tools employed by advanced economies and 9.1 for all emerging market and developing economies in 2017 (IMF 2018). Based on the number of new macroprudential policies introduced, Costa Rica, Honduras, and Nicaragua and, to a lesser extent, Panama have been the most active countries in expanding their toolkits after the crisis (Figure 13.3). Policies in the Dominican Republic, Guatemala, and El Salvador have remained relatively stable (based on the number of instruments in use). Policies remain primarily directed toward financial institutions rather than borrowers, as evidenced by the borrower-oriented and financial institution MPis.

Consistent with the greater number of tools in the region after the global financial crisis, the tendency has been toward a net tightening of macroprudential policies. While some instances of net loosening have happened in some countries,

Figure 13.3. Central America: Macroprudential Policy Index
(Number of active macroprudential policy tools)



Sources: Country authorities, author calculations, and IMF staff estimates.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

these have been associated primarily with reductions in reserve requirements, which remain an important monetary policy tool in many countries. This is discussed further when assessing the use of liquidity tools in the region.

Broad-based Macroprudential Policy Tools

Broad-based macroprudential policy tools are designed to ensure that financial systems build enough capital buffers in stable periods to absorb losses in downturns and avoid procyclical lending. The CAPDR region has focused on strengthening microprudential regulation to build capital buffers. Such strengthening is an important precursor to the use of broad-based macroprudential policy tools, which have only recently been deployed in the region. The focus has primarily been on strengthening capital and leverage requirements and in some cases,

dynamic provisioning requirements (DPR), while caps on credit growth or credit ceilings and limits on loan-to-deposit ratios have not been used:

- **Capital:** The transition toward Basel III capital requirements is at the early stages, with the region yet to implement capital conservation and/or countercyclical capital buffers. Such buffers are designed to cover unexpected losses that occur in times of financial stress, by providing additional capital to be drawn on.⁸ In contrast, the capital conservation buffer is in use in 76 countries, including 46 emerging market and developing economies and six countries in the broader Latin America and Caribbean region. Countercyclical capital buffers have also therefore so far played a limited role globally, with only seven countries with active positive buffer requirements as of 2018, despite 35 countries with a framework in place (IMF 2018). Looking ahead, the priority will be for the region to continue strengthening microprudential regulation by completing the transition toward Basel III capital requirements. Capital conservation and/or countercyclical capital buffers could then be considered together in the context of existing DPR frameworks (see below).
- **Leverage ratio:** Leverage ratios complement risk-based capital requirements by containing the buildup of systemic risk through excessive leverage of financial institutions in a boom period.⁹ Three CAPDR countries have recently introduced leverage ratios (Honduras in 2017, Nicaragua in 2016, and Panama in 2015), among 35 countries globally with limits on leverage ratios (IMF 2018). The minimum leverage ratio is broadly defined by these countries as primary (or Tier 1) capital over the sum of total non-risk-weighted assets (consistent with the Basel III accord), but Honduras and Nicaragua include contingent assets in their calculations. Honduras and Nicaragua set the minimum leverage requirement at a stricter 3.75 percent, while Panama sets it at 3 percent, in line with the minimum leverage ratio requirement of 3 percent under Basel III. As the transition toward Basel III continues, the rest of the countries in the region are expected to adopt leverage ratio requirements.
- **Dynamic loan-loss provisioning requirements:** DPR is complementary to countercyclical capital buffers. It requires loan-loss provisioning to cover expected losses over an average economic cycle and is therefore more countercyclical than specific provisions based on incurred asset quality deterio-

⁸Basel III has introduced two types of capital buffers: the capital conservation buffer is fixed at 2.5 percent in common equity Tier 1 (CET1), while the level of the countercyclical capital buffer is raised when a boom in the credit cycle is observed and lowered in the bust phase (that is, in a countercyclical manner) within the range of 0 to 2.5 percent. See BCBS (2010) for the Basel III framework. While these capital buffers are not considered a “regulatory minimum,” a bank needs to restrict payout of its earnings (hence conserving its capital) where there is a breach of the required buffer level.

⁹The leverage ratio is also required under Basel III (see BCBS 2010).

ration. Panama introduced DPR in 2013 (with application starting in 2014), followed by Costa Rica in 2016 and Nicaragua in 2017 (with a three-year phased implementation). The popularity of DPR in the CAPDR region largely matches the broader Latin American and Caribbean region, where 10 countries have put in place DPR frameworks (including those in CAPDR), with the region on average utilizing this tool more than any other in the world (IMF 2018). While the precise design of each CAPDR countries' DPR differs, it is consistent with the underlying motivation of smoothing provisioning requirements over the cycle; the specifications broadly resemble the "through-the-cycle accumulations systems" in Wezel and others (2012).^{10,11} Banks are required to maintain their DPR in addition to the minimum regulatory capital requirement. Thus, DPR in the region bear some similarity with capital buffers, besides their role in loan-loss provisioning.

The additional provisions accumulated during the expansionary phase of the cycle are then available to be drawn down in the contractionary phase. In Panama, the Superintendency of Banks decides when the draw-down phase starts, while in Nicaragua that is based on the moving average of quarterly GDP growth in the last four quarters relative to the historical average. In Costa Rica it is automatic and derived from the formula used to calculate the DPR.¹² Given that DPR use in the region is in its infancy and has coincided with a period of credit expansion, it remains to be seen if DPR will work in a countercyclical manner in downturn periods. This is particularly true in countries (such as in Panama) where the effectiveness of the DPR frameworks in place relies on the ability of policymakers to determine an appropriate start for the draw-down phase.

Sector-Specific Tools

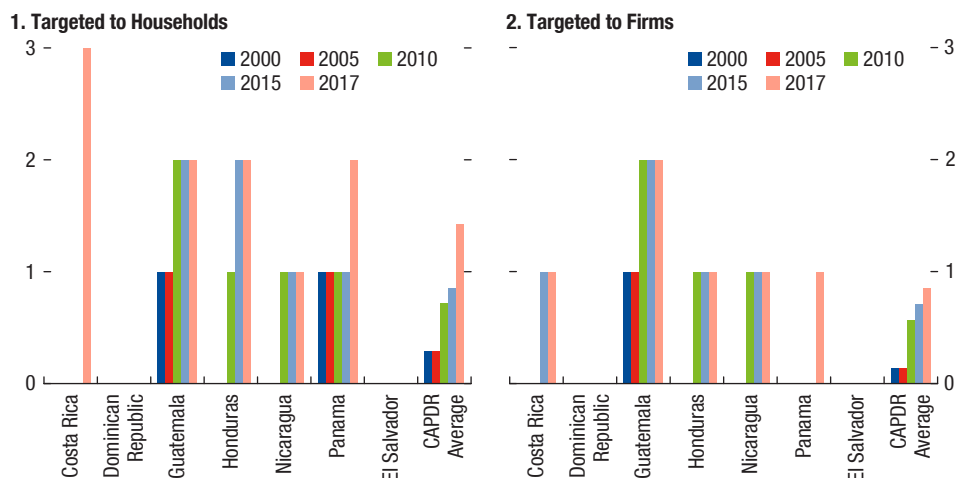
Sector-specific macroprudential policy tools to address the procyclical buildup of risks in specific sectors, usually the household (Figure 13.4) or corporate sectors, are in the early stages of development in CAPDR. Existing measures are focused

¹⁰In Panama, the level of DPR for each bank is calculated every quarter based on loans outstanding (risk-weighted assets-based) and the quarterly change in the amount of risk-weighted loan exposures, and quarterly variation in specific provisions. In Nicaragua, the level of DPR is based on a comparison between banks' specific provisions and the average latent loss in their loan portfolios. In Costa Rica, DPR remain in a transitory period until the level reaches the desired threshold and beyond that it will depend on the level of specific provisions, a minimum DPR requirement, the riskiness of the credit portfolio, and banks' capital adequacy. Each bank must provision 7 percent of the positive difference between income and expenses before taxes on a monthly basis as a transitory measure until the DPR has reached its intended level. The percent was chosen to achieve the desired level of dynamic provisions over a 9–10-year horizon.

¹¹With some important differences. For example, the draw-down phase in Panama's DPR framework is restricted and subject to the decision of the bank superintendent, and the use of RWA is not a common feature of DPR.

¹²Specifically, if the moving average of quarterly real GDP growth is lower than the historical average of the annual average quarterly growth of real GDP since the first quarter of 2006.

Figure 13.4. Central America: Macroprudential Policy Tools
(Number of active measures)



Sources: Country authorities and author calculations.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

primarily on reducing risks associated with foreign currency lending, particularly to unhedged borrowers, and more generally, dollarization in some of the region's highly dollarized economies. For example, in 2016 Costa Rica introduced both generic provisions and specific capital requirements for foreign currency loans to unhedged household borrowers. These complement existing capital requirements for foreign currency lending to unhedged corporate borrowers. Guatemala, Honduras, and Nicaragua also have specific capital requirements for foreign currency loans to unhedged borrowers, both household and corporate.¹³ However, even existing sector-specific tools have yet to be used in a countercyclical manner in the region.

Sectoral capital requirements (or risk-weights) that vary depending on the underlying loan-to-value ratio have also been used by Guatemala and Panama to mitigate household-related credit risks. These measures help to discourage rapid credit growth by raising the cost of capital while increasing the resilience of lenders by requiring additional buffers against negative shocks stemming from those sectors.^{14,15}

¹³Such policies are not applicable in the region's dollarized economies (El Salvador and Panama).

¹⁴Sectoral requirements can also be imposed on a segment of household or corporate borrowing.

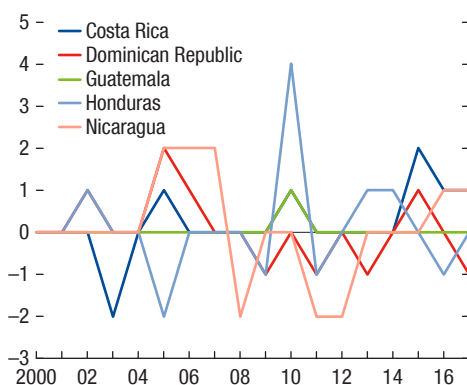
¹⁵Mandatory provisions on banks' exposures to specified sectors, detached from the borrowers' intrinsic risk, would have a similar effect.

Quantitative caps on new credit, using measures of borrowers' creditworthiness have been used more selectively. Measures of creditor quality include the loan-to-value ratio, debt-to-income ratio, or debt-service-income ratio. These can directly restrict credit supply to excessively leveraged or indebted borrowers, while improving financial resilience by lowering the probability of default or loss given default by restricting high-risk credit. Guatemala is the only country with a maximum loan-to-value ratio (for both households and firms), while Costa Rica and Panama are the only countries with limits on debt-service-to-income ratios (for households). This is consistent with broader trends in the Latin American and Caribbean region, where only about a quarter of countries in the region have utilized these types of tools targeted toward households in particular, compared to about half of countries in Asia, Europe, and the Middle East (IMF 2018).

Liquidity Tools

Liquidity tools are the most widely used macroprudential policy instruments in the CAPDR region (Figure 13.5). Liquidity tools aim to ensure the resilience of the financial system against systemic liquidity shocks. Such liquidity risks could originate from banks' reliance on noncore funding (short-term, wholesale or foreign currency), which may impair their ability to obtain funding in stressed times.

Figure 13.5. Central America: Liquidity Instrument Intensity
(Intensity index per country)

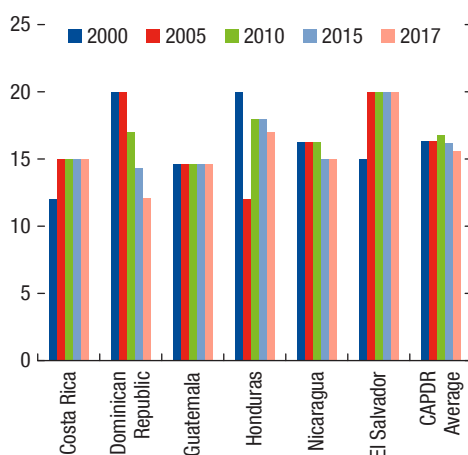


Sources: Country authorities and IMF staff estimate.
Note: Excludes El Salvador and Panama, where liquidity instruments have not been loosened. For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

As in CAPDR, liquidity tools are also the most frequently used macroprudential tools globally. On average, CAPDR countries use 4 liquidity tools compared to 2.8 in the broader Latin American and Caribbean region and 3.4 for emerging market and developing economies (IMF 2018).¹⁶ Liquidity tools are also the only tools that the CAPDR region, except for El Salvador and Panama, has to date loosened, as evidenced by the intensity-based liquidity indexes.

Reserve requirements on deposits out of the liquidity tools are the most actively used macroprudential policy instrument in the region (Figure 13.6), although it is difficult to evaluate the extent to which these requirements have been used for monetary policy versus macroprudential objectives. All countries, except Panama, which does not have a central bank, have reserve requirements on deposits, applicable to both domestic and foreign currency deposits.¹⁷ Some countries have differentiated requirements on domestic and foreign currency deposits, with the Dominican Republic and Honduras maintaining higher requirements on foreign currency deposits. In general, the region's reserve requirements have remained relatively stable over time, although some countries have used reserve requirements to either directly influence the credit cycle or, more specifically,

**Figure 13.6. Macroprudential Policy Tools:
Reserve Requirements on Domestic
Currency Deposits**
(In percent of deposits)



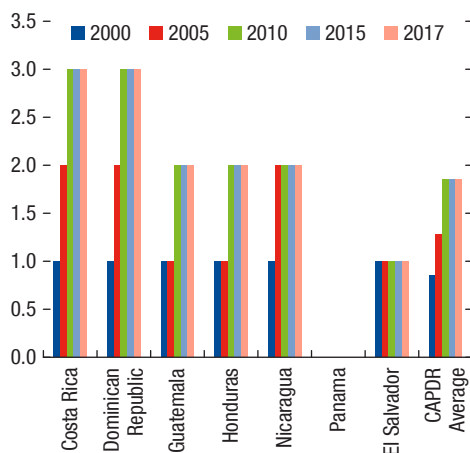
Sources: Country authorities and author calculations.

Note: CAPDR = Central America, Panama, and the Dominican Republic.

¹⁶Based on results from IMF (2018), which has a less detailed decomposition of liquidity measures than the CAPDR survey.

¹⁷El Salvador also maintains reserve requirements on external credit lines to banks.

**Figure 13.7. Macprudential Policy Tools:
Liquidity Tools Targeted to Contain
Currency Mismatches**
(Number of active measures)



Sources: Country authorities and author calculations.

Note: Panama is dollarized. Tools include constraints on and specific capital requirements on net open foreign currency positions, reserve requirements on foreign currency deposits, and constraints on funding in foreign currency. CAPDR = Central America, Panama, and the Dominican Republic.

foreign currency lending, or as an instrument of monetary policy. The loosening of liquidity-based macroprudential policies in the region has been almost exclusively associated with reductions in reserve requirements, but it is difficult to assess whether this reflects a loosening of macroprudential versus monetary policy or a longer-term reduction in reserve requirement ratios to bring the region's relatively high requirements in line with international practice. Nevertheless, some countries in the region increased reserve requirements after the global financial crisis as an instrument to avoid excessive credit growth.

The region is also containing currency mismatches with constraints on open foreign currency positions present in all countries with the obvious exception of those that are formally dollarized (Figure 13.7). The reliance on this type of instrument is consistent with global trends, where 75 countries have in place limits on net foreign exchange positions (IMF 2018). In CAPDR, these requirements have also been complemented with specific capital requirements on net open foreign-exchange positions in Costa Rica, the Dominican Republic, and Nicaragua.

With respect to formal liquidity coverage requirements, the region is at the early stages of transitioning toward the minimum liquidity coverage ratio under Basel III, which aims to strengthen the short-term resilience of the liquidity risk

profile of banks. Only Costa Rica, Nicaragua, and Panama have formal liquidity coverage ratio requirements.¹⁸ This compares to 74 countries globally that have adopted the liquidity coverage ratio, eight of which are in Latin America and the Caribbean, including those in CAPDR, and 44 in emerging market and developing economies (IMF 2018). The region has yet to adopt Basel III's Net Stable Funding Ratio, which aims to act on bank funding structure by requiring the amount of stable funding to match banks' holding of long-term assets.¹⁹ Limits on net noncore funding, minimum core funding ratios, and taxes on capital inflows have yet to be implemented in the region and remain among the least used liquidity tools internationally (IMF 2018).

Structural Tools

The region is beginning to consider using structural macroprudential policy tools designed to increase the loss absorbency of financial institutions, particularly those of systemic importance. Structural macroprudential policy tools are designed to mitigate systemic risks by increasing the resilience of systemically important financial institutions and reducing interconnections within the financial system. Assessing the systemic importance of financial institutions is a prerequisite for CAPDR to move ahead with structural macroprudential tools. A first step is assessment of the potential impact of risks associated with individual financial institutions on stability in the broader financial system. Costa Rica and Panama are at the forefront, having recently developed a methodology to designate systemically important banks, which is based on indicators such as size, interconnectedness, cross-jurisdictional activities, complexity, and substitutability consistent with Basel Committee on Banking Supervision (2013a) recommendations.²⁰ The rest of the region will need to formalize this process, adapting to the size of their own financial systems, as a prerequisite to intensifying supervision of systemically important banks and developing macroprudential policies to address risks from these institutions. It will then be able to consider joining 61 other countries globally, including five in Latin America, that have introduced capital surcharges for systemically important institutions (IMF 2018).²¹

¹⁸Liquidity coverage ratio implementation at its 100 percent minimum under Basel III is being phased in, with only Panama having completed the full transition in early 2018. In Costa Rica, the liquidity buffer was set at 80 percent in 2017, while in Nicaragua it was 70 percent at the time of the survey and had increased to 80 percent as of July 1, 2018. Panama also has a regulatory requirement for liquidity called the legal liquidity index, defined as the ratio of liquid assets as a share of qualifying deposits, set at a minimum of 30 percent.

¹⁹The liquidity coverage ratio is defined as the ratio of high-quality liquid assets over assumed cash outflow in 30 days of severe liquidity stress (see BCBS 2013a).

²⁰Cross-jurisdictional activities are also considered as a country-specific factor in Panama's methodology, which is appropriate considering the importance of regionally active financial conglomerates. This is consistent with the BCBS (2012) methodology for global systemically important banks, not included in the BCBS (2013b) methodology for domestic systemically important banks.

²¹The five Latin American countries that have capital surcharges for systemically important financial institutions are Argentina, Brazil, Mexico, Paraguay, and Uruguay.

Some progress has been made to address risks posed by interconnectedness of financial institutions through concentration limits. To limit the concentration risk that could arise from the failure of a single counterparty, all countries in the region maintain limits on exposures to single counterparties (or individual financial institutions), ranging between 20 percent (Costa Rica, Dominican Republic) to 30 percent (Honduras, Nicaragua) of their capital, among 40 countries in the world to do so (IMF 2018). These concentration limits have been in place throughout the duration of the survey period, with no changes to their calibration in any of the CAPDR countries. While these concentration limits are broadly consistent with the BCBS standard (BCBS 2014), the region should also strive to assess the adequacy of the limits based on a detailed analysis of interconnections within the region's financial system.

THE EFFECTIVENESS OF MACROPRUDENTIAL POLICY IN CAPDR

How effective have the macroprudential policies implemented by CAPDR countries been in reducing systemic risk in CAPDR? This section assesses how the macroprudential policies used by the region have affected growth in real credit to the private sector, as a proxy for systemic risk, using panel regressions for the CAPDR countries. The overall MPI and the various subindexes for each of the broad categories of macroprudential policies are considered separately. The benchmark regression model is:

$$Y_{it} = \beta_1 MPI_{it-1} + \beta_2 X_{it-1} + \alpha_t + \gamma_i + \varepsilon_{it} \quad (1)$$

where Y_{it} is a measure of systemic risk, typically real growth in credit to the private sector in country i at time t .²² MPI_{it-1} is the aggregate MPI, or its various subindexes for each of the broad categories of macroprudential policies. The regressions include a set of control variables, X_{it-1} , all lagged one time period. The control variables include real GDP growth, a dummy variable capturing the presence of a banking crisis as defined by Laeven and Valencia (2013), the real monetary policy interest rate, and appreciation/depreciation in the real effective exchange rate. α_t is a time-specific fixed effect, and γ_i are country-specific fixed effects.²³

Macroprudential policies have been effective in reducing systemic risk in the region. The results of the benchmark specification (Table 13.5, column 1) suggest that a tightening of policies has a negative and statistically significant impact on

²²See Beaton and others (forthcoming) for more details on the regressions, their estimation, and the results. Real growth in credit to the private sector is an imperfect proxy for systemic risk as it may also reflect financial deepening, but is used here as a proxy given its wide availability over a long time period for the region. The credit gap, which is a better measure of systemic risk, is considered in Beaton and others (forthcoming) as an alternative dependent variable, but is not available for a long time period for all countries in the region.

²³For El Salvador, Nicaragua, and Panama, where there is no policy interest rate; the real lending rate is included instead.

TABLE 13.5.

The Effectiveness of Macroprudential Policy in Central America				
	(1)	(2)	(3)	(4)
	Real credit growth	Real credit growth	FX credit as share of total credit	FX credit as share of total credit
Macroprudential policy index _{t-1}	-0.849* (0.394)			
Liquidity macroprudential policy index _{t-1}		-1.636** (0.553)	-1.161** (0.390)	
FX-oriented macroprudential policy index _{t-1}				-0.928* (0.424)
Real GDP growth _{t-1}	0.780 (0.525)	0.761 (0.468)	0.00687 (0.356)	0.0418 (0.379)
Real effective exchange rate (+ appreciation) _{t-1}	0.240*** (0.0367)	0.276*** (0.0309)	-0.111 (0.105)	-0.146 (0.106)
Real monetary policy interest rate _{t-1}	0.00349 (0.651)	0.0259 (0.633)	-0.0355 (0.230)	-0.0800 (0.231)
Banking crisis dummy (1 = banking crisis, 0 = none) _{t-1}	-19.68 (18.52)	-19.24 (17.94)	-3.716 (4.721)	-4.793 (5.120)
Observations	111	111	82	82
R-squared	0.494	0.502	0.309	0.280
Number of countries	7	7	5	5
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

credit growth. This result is broadly comparable to that in the literature based on broader panels of countries with more limited categories of macroprudential policies included in the MPI indexes (for example, Cerutti and others 2015, Akinci and Olmstead-Rumsey 2015).

The results of the regressions including the MPI subindexes for each of the broad categories of macroprudential policies suggest that liquidity macroprudential policy tools have been the most effective at mitigating credit growth in the region. The liquidity sub-index is the only sub-index where the index has a statistically significant negative effect on real credit growth.²⁴ This result is consistent with the more intense use of this category of macroprudential policies in the region relative to the other categories. As many of the liquidity tools have been targeted toward addressing the buildup of foreign-exchange-related risks to financial stability, as an alternative, the impact of liquidity tools on the share of foreign exchange credit in total credit was also assessed, and indeed these tools were found

²⁴Results for the sub-indexes for the other categories of macroprudential policy tools are available from the authors and in Beaton and others (forthcoming).

to have been effective at reducing the share of foreign exchange credit in CAPDR countries. Consistent results are found when the set of macroprudential instruments is limited to those explicitly addressing foreign-exchange-related risks. While some specific categories of macroprudential tools have yet to play an important role in mitigating systemic risk in CAPDR, they remain important in the toolkit for tackling systemic risk. The finding that these tools have yet to have had a significant effect on credit growth in the region reflects the limited use of these tools in the region.

CONCLUSIONS

With some variations, the macroprudential institutional setting in the region is consistent with risks stemming from the bank-dominated financial system structure and the institutional supervisory framework. In all countries except Panama, the central bank plays a prominent role in macroprudential oversight, policy formulation, and dissemination. In most cases, this function is executed in consultation with an interagency MPC. Operational control of macroprudential policy instruments, however, usually lies with multiple agencies. This institutional framework parallels the one developed in the largest Latin American countries over the past decades.

The range and number of instruments accelerated after the global financial crisis, when the first broad-based measures were introduced in the region. However, the number of macroprudential policy tools remains below the average for Latin American countries and for emerging market and developing economies, except for liquidity tools. Reserve requirements are the most actively used macroprudential policy tool in the region, although it is difficult to evaluate the extent to which these requirements have been used for monetary policy versus macroprudential objectives.

Based on data from the dedicated survey of macroprudential policy instruments covering 2000–17, the chapter analyzed how macroprudential policies have affected growth in real credit to the private sector, as a proxy for systemic risk, using panel regressions for the CAPDR countries. While very few cases were observed of instruments being used within a macroprudential policy function, they have been effective in reducing systemic risk. In particular, liquidity macroprudential tools have been most effective at mitigating the effect of credit growth and the buildup of foreign-exchange-related risks on financial stability in the region.

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The Credit Cycle

**VALENTINA FLAMINI, PIERLUIGI BOLOGNA, FABIO DI VITTORIO AND
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INTRODUCTION

Credit is key to healthy and sustainable economic growth. However, high aggregate credit growth can make highly leveraged banks and financial firms more vulnerable to shocks and lead to systemic financial crises. Monitoring the course of credit and financial cycles plays a vital role in identifying aggregate credit risk buildup through the economic cycle, and—as was seen in the previous chapter—policymakers must calibrate macroprudential policies accordingly. With financial markets in Central America, Panama, and the Dominican Republic still relatively shallow and dominated by banks, attention to the credit cycle and its effect on economic growth is also an important task.

The countercyclical capital buffer proposed by the Basel Committee on Banking Supervision (BCBS) in 2010 is designed to protect the banking sector from risks associated with excessive aggregate credit growth. The buffer may also help counterweigh the procyclicality of the financial system by leaning against the buildup phase of the credit cycle. In downturns, the release of the buffer should help reduce the risk of regulatory capital requirements squeezing the supply of credit to the real economy. The buffer ensures that capital requirements are adjusted according to the macro-financial environment in which banks operate.

Studies have shown that the credit-to-GDP gap (the gap between the private sector credit-to-GDP ratio and its estimated trend) can be a powerful predictor of banking crises.¹ Given that the credit gap has early warning power, the BCBS recommends its use as a reference indicator to set the countercyclical capital buffer, and has identified thresholds that prompt extra vigilance. However, reliably estimating the credit-to-GDP gap is not a trivial task, particularly in developing economies where financial deepening is typically underway and available credit time series tend to be short and/or subject to important structural breaks.

This chapter, in reviewing financial and credit developments in CAPDR countries, estimates the credit-to-GDP gap for each country. Regional credit cycles are compared, and the benefits of the countercyclical capital buffer as a tool to increase banks' risk resilience is also discussed.

¹See, for example, Lund-Jensen (2012) and Drehmann and Juselius (2014).

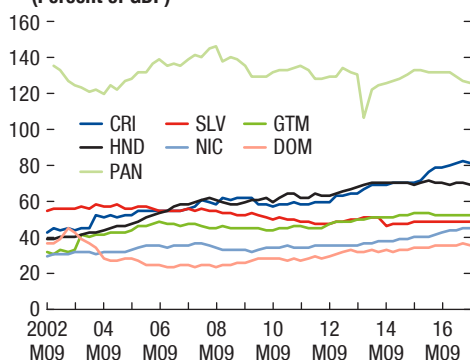
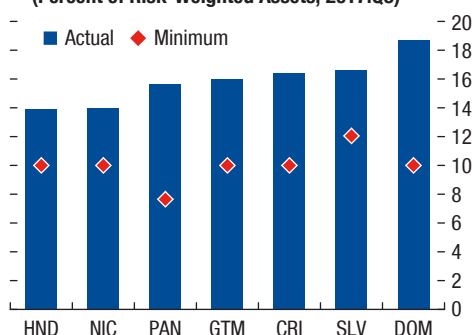
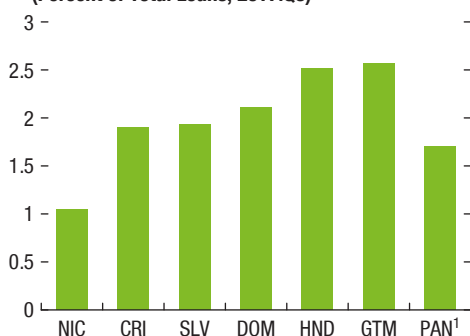
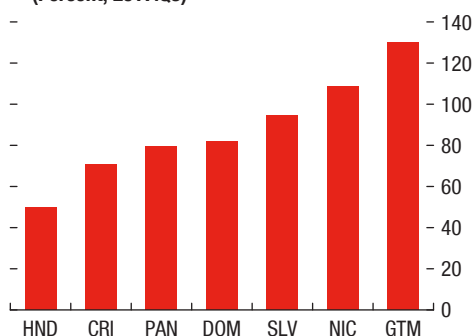
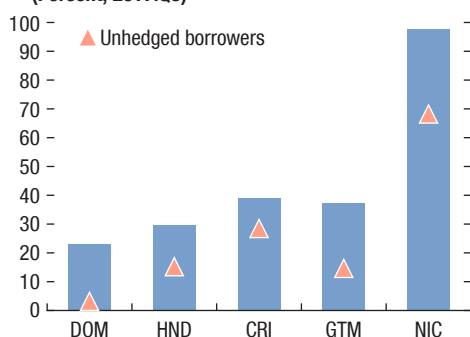
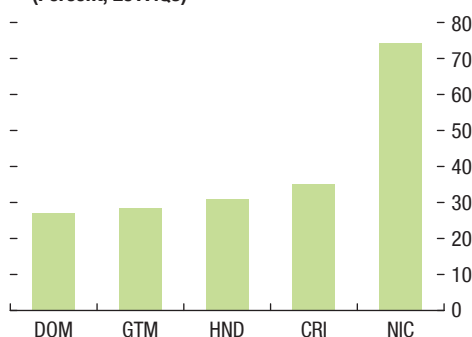
FINANCIAL MARKETS AND CREDIT IN CAPDR

Credit-to-GDP ratios are low in most countries in the region, and banks continue to dominate the financial landscape, providing more than 90 percent of credit to the private sector with wide intermediation spreads. Bank credit-to-GDP ratios range from about 40 percent in the Dominican Republic to about 80 percent in Costa Rica, with Nicaragua, El Salvador, Guatemala, and Honduras in the middle range (Figure 14.1). Panama is an outlier, with a larger and deeper financial system and lower bank concentration.

Most CAPDR countries have experienced a prolonged increase in their credit-to-GDP ratios in recent years, suggesting that financial deepening is ongoing. Over the past decade, the bank credit-to-GDP ratio has increased by about 50 percent in Costa Rica and the Dominican Republic (although in the latter it remains below the peak it reached just before the 2003 financial crisis) followed by 30 percent in Nicaragua, 20 percent in Honduras, and 10 percent in Guatemala, while remaining broadly constant in Panama and El Salvador. However, financial deepening has not always implied financial inclusion, especially for households, and the financial development does not always appear fully aligned with macroeconomic fundamentals. In particular, *lower* financial development than implied by fundamentals reflects a contraction of credit supply following the 2003 crisis in the Dominican Republic (Ramírez de León 2012), and high bank concentration and weak collateral frameworks in Costa Rica and Nicaragua. On the other hand, *positive* gaps in Panama, Honduras, Guatemala, and El Salvador capture scant investment opportunities and underdeveloped stock markets that lack adequate legal and contractual infrastructure (IMF 2016b).

Banks are well capitalized, with good credit quality and a solid deposit base, but the high dollarization of both assets and liabilities creates vulnerabilities. Banking systems have capital ratios comfortably above minimum requirements, and nonperforming loans (NPLs) are low—ranging from about 1 percent of loans in Nicaragua to about 2.5 percent in Honduras and Guatemala—and typically overprovisioned. Credit is mostly financed by customer deposits, which on average account for 80 percent of total (non-interbank) loans. Panama and El Salvador are officially dollarized, with dollarization particularly high in Nicaragua (97 percent of bank assets and 74 percent of liabilities). Dollarization in the rest of the region averages about 30 percent of assets and liabilities, and is high in Costa Rica and Guatemala, exposing them to exchange rate and rollover risks. The high share of credit in foreign currency granted to borrowers without natural hedges (as high as 70 percent in Costa Rica and Nicaragua) compounds these exposures with credit risk in case of sustained exchange rate depreciations.

Financial links in the region have increased considerably since the early 2000s, driven by strengthened economic ties. The past decade has seen a rapid expansion of financial conglomerates with cross-border operations in the region, as domestic financial institutions became regional financial conglomerates with complex structures, although their presence varies significantly (from over 90 percent of total banking assets in El Salvador to negligible presence in the Dominican

Figure 14.1. Selected Banking Sector Indicators**1. Total Bank Credit
(Percent of GDP)****2. Regulatory Capital
(Percent of Risk-Weighted Assets, 2017:Q3)****3. Nonperforming Loans
(Percent of Total Loans, 2017:Q3)****4. Consumer Deposits to Total (Non-Interbank) Loans
(Percent, 2017:Q3)****5. Foreign Currency Loans to Total Loans
(Percent, 2017:Q3)****6. Foreign Currency Liabilities to Total Liabilities
(Percent, 2017:Q3)**

Sources: Secretaría Ejecutiva del Consejo Monetario Centroamericano; Haver Analytics; and IMF, *International Financial Statistics*.
 Note: CRI = Costa Rica; DOM = Dominican Republic; GTM = Guatemala; HND = Honduras; PAN = Panama;
 NIC = Nicaragua; SLV = El Salvador.

¹Data provided by the country desk.

Republic). While regional financial integration could foster diversification of domestic financial systems, it also increases the risk of potential cross-border spillovers. Policy coordination and consolidated supervision of cross-border operations are critical for maintaining regional financial stability (See IMF 2016a for a detailed overview of financial integration in Latin America).

ESTIMATING THE CREDIT CYCLE

The credit cycle is estimated as the deviation of the credit-to-GDP ratio from its long-term trend. The methodology used in this chapter is based on the one-sided backward-looking HP filter, in accordance with BCBS's guidance (see Annex 14.1 for more details on the HP filter methodology).

Credit in this context is defined as aggregate credit extended to households and nonfinancial private businesses from banks and nonbanks. This measure includes all credit extended to the private nonfinancial sector through nonbanks, corporate bond markets, and foreign intermediaries or investors. This indicator has proven better than narrower definitions of credit in signaling future banking crises. However, since there is a clear trade-off between length and coverage of the alternative credit series, aggregate quarterly data on credit extended by banks (including offshore banks and adding cooperatives and other financial institutions) is considered. Corporate bonds are not included due to inadequate data availability.

Possible drawbacks related to this methodology apply to CAPDR, as to other emerging economies. The main ones are issues regarding the length of the available data (as noted above) and the presence of structural breaks in the time series. Besides ongoing financial deepening in CAPDR, shifts in exchange rate policies have introduced structural breaks into the credit series, given the region's strong credit dollarization. Using such credit gap measures may hinder the beneficial financial deepening undergone by many emerging market economies (Reserve Bank of India 2013), because it essentially penalizes fast growth rates of credit-to-GDP, which could be a structurally desirable and positive outcome. This also induces a reverse problem: a sustained period of high growth, in credit-to-GDP ratio translates to a faster trend growth estimate, which would bias downward the estimates of the credit-to-GDP gap and hence make the countercyclical capital buffer never binding. BCBS (2010) and BCBS (2011) recognize these issues and the limited information in the one-sided HP filtered credit gap and recommend using additional variables to guide the decision regarding countercyclical capital buffer rates.

Other signals of financial risk buildup recommended by the BCBS include measures of excessive credit growth, lenient credit risk pricing, and measures of high leverage. In contrast to the credit gap, however, there are no specific definitional or numerical recommendations for these measures by the BCBS:

- *Excessive credit growth*: credit growth rates at sectoral level, such as household and construction, and persistently large current account deficits.
- *Credit mispricing*: low risk premiums for risky assets (low credit spreads), high equity valuations, high housing price growth rates, or price-to-rent ratios.

- *High leverage/risk buildup*: high leverage ratios in the banking sector, high leverage ratios in the corporate sector, high loan-to-value ratios or debt-service-to-income ratios in the household sector.

Since the usual credit gap measure is inconsistent with sustained fast credit growth, a normalized indicator is considered in this chapter to reflect ongoing financial deepening in the region. The standard credit-to-GDP gap proposed by the BCBS is based on studies of countries with large financial deepening, mostly with credit-to-GDP ratios above 100 percent. For countries with less financial deepening such as in CAPDR, which has credit-to-GDP ratios averaging 65 percent, the standard credit gap might not be the best measure to capture the evolution of the credit cycle. As an alternative, a percentage deviation of the credit gap relative to the trend of the credit-to-GDP ratio is proposed.² Hence the normalized credit gap is defined as:

$$\widehat{(\text{CreditGap})}_t = \frac{CTG_t - \text{Trend}_t}{\text{Trend}_t}$$

Where Do CAPDR Countries Stand in the Credit Cycle?

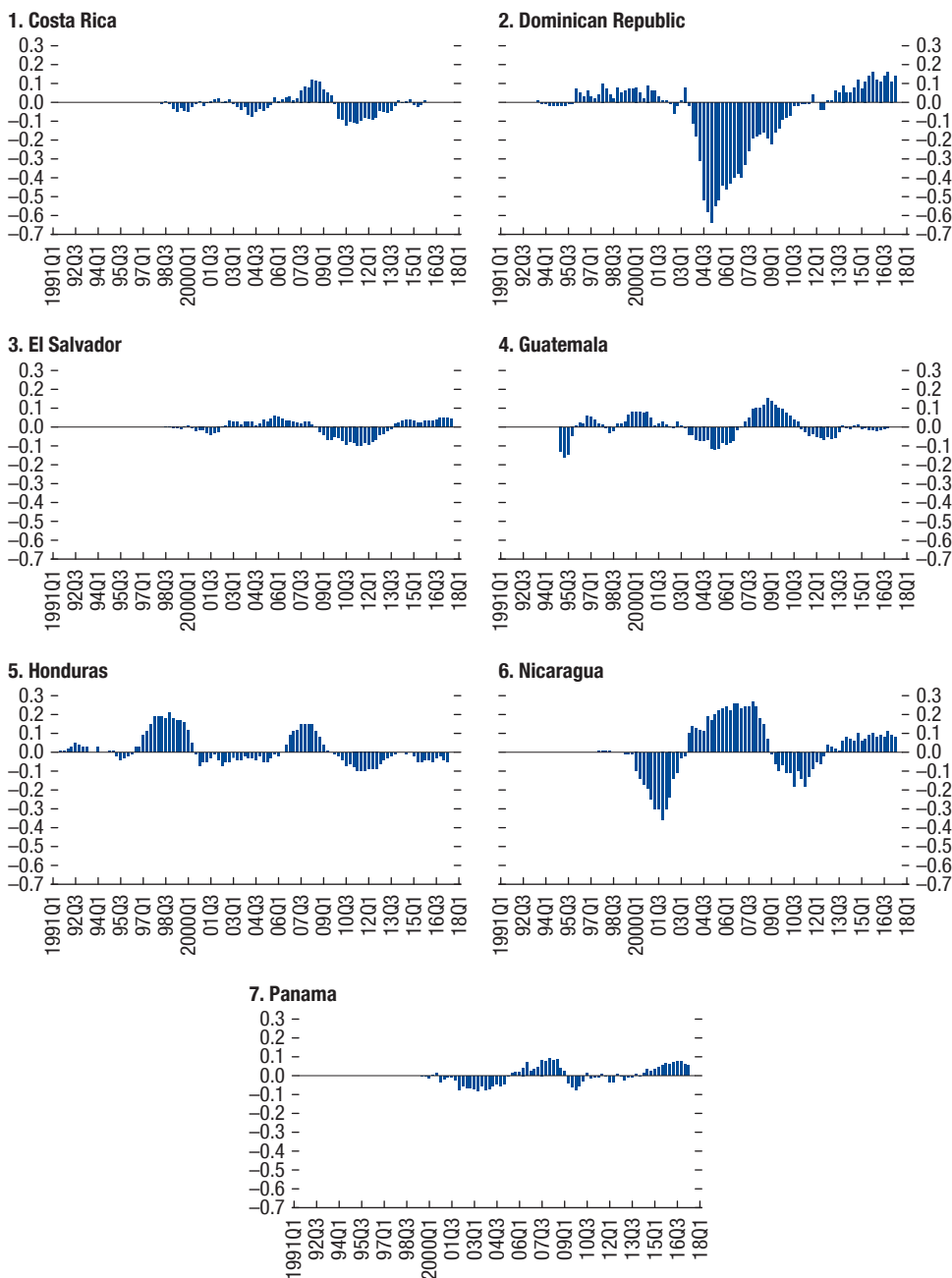
Credit in CAPDR countries is recovering after the large contraction during the global financial crisis. Figure 14.2 shows credit cycles for CAPDR countries since the early 1990s. Several experienced credit booms between 2003 and 2007, followed by a severe credit crunch during the global financial crisis.

CAPDR credit cycles are compared by constructing measures based on business cycles literature. Following Mink and others (2012) and Samarina and others (2017) the focus is on two dimensions of credit cycles: (1) correlation (synchronicity) to compare the direction of credit gaps in the countries' credit cycles, and (2) dispersion (similarity) to compare the magnitude of the credit gaps of the countries' credit cycles.

The *country synchronicity index* assumes value 1 if the credit cycle moves in the same direction as the CAPDR credit cycle, defined as the median credit gap for all CAPDR countries, and –1 otherwise (see Annex 14.2 for the formulas of the indexes presented in this section).

The *CAPDR synchronicity index* is defined on the interval [0,1]. It assumes value 1 when all countries' credit cycles move in the same direction as the

²The motivation for the alternative measure can be better understood by going through an example. Consider two countries with different financial deepening: country A with a credit-to-GDP ratio of 30 percent and a trend value of 20 percent, and country B with a credit-to-GDP ratio of 110 percent and a trend value of 100 percent. Following the BCBS standard approach, both countries have a credit gap of 10 percentage points. However, for country A to reach a credit-to-GDP ratio of 30 percent, credit must grow about 50 percent faster than GDP, while in country B credit has to grow only about 10 percent faster than GDP. If one thinks that a constant fraction of the new credit extended above the trend value (10 percentage points in the case of country B) is excessive and increases systemic vulnerability, the increase in capital and loss-absorbing capacity in country A should be about five times larger than that of country B. Using the percentage deviation of credit gap from the trend avoids this issue.

Figure 14.2. Central America: Credit Cycle by Country

Sources: IMF, *International Financial Statistics*, and country authorities.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

CAPDR credit cycle (perfect synchronization) and 0 when only half of the countries' credit cycles move in the same direction.

The *country similarity index* is defined as the difference in credit cycle amplitude between country i and the CAPDR credit gap. The index is defined on the interval $[-1, 1]$, with 1 corresponding to the case of identical amplitude and synchronization of each country credit cycle.

The CAPDR regionwide *similarity index* is defined on the interval $[0, 1]$. Higher values indicate that the amplitudes of the countries' credit cycles nearly match the CAPDR cycle (see Annex 14.2 for index formulas).

The credit cycles of CAPDR countries are somewhat heterogeneous. The analysis focuses on synchronicity and similarity of national credit cycles with respect to the CAPDR regional cycle. Table 14.1 shows averages of the synchronicity and similarity indexes over 1998–2017. Most of the countries' credit cycles move in the same direction as the CAPDR reference cycle most of the time, since the average synchronicity index is above 0.5 for most of the countries. However, notable exceptions are observed. The credit cycle of the Dominican Republic is out of step with the regional cycle since recovery from crisis in 2003 prevented credit accumulation in the run-up to the global financial crisis, and monetary policy measures aimed at influencing credit dynamics in response to idiosyncratic shocks. Moreover, the credit cycles of Guatemala and, to a lesser extent, Costa Rica are less synchronized with the CAPDR region. In contrast, El Salvador's credit cycle is the most synchronized with the regional credit cycle, followed by Honduras, Nicaragua, and Panama (which have synchronicity indexes slightly above 0.5). The credit cycles of CAPDR countries could also be compared with regard to the amplitude of the credit gaps (similarity). According to this index, Panama's credit cycle is the most "similar" to the region reference cycle, while the Dominican Republic's is the most dissimilar. Moreover, notwithstanding the high synchronization of Nicaragua's credit cycle with reference to the CAPDR credit cycle, the amplitude of its credit gaps is significantly larger than the regional average (Table 14.1).

The synchronicity and similarity indexes of the CAPDR credit cycle are countercyclical. Synchronicity has increased during contractionary phases and declined during booms over the past 20 years (Figure 14.3). The regionwide credit cycle was more synchronized in 1998, in 2007/08, and again in 2011 and 2012. After a significant drop in 1999, synchronicity slowly increased in the early 2000s, reaching a maximum of 0.94 during the global financial crisis. Similarly, the amplitude of the countries' credit gaps, measured by the similarity index, increased from the late 1990s and reached its peak during the years of the global financial crisis. Exposure of CAPDR countries to a common external shock, such as the global financial crisis, drives this result.

Early Warning Power of the Credit-to-GDP Gap

Assessing the early warning properties of the credit-to-GDP gap is necessary to evaluate the potential usefulness of this indicator to inform macroprudential policy decisions on the countercyclical capital buffer. As CAPDR countries other

TABLE 14.1.

Central America: Synchronicity and Similarity of Credit Cycles

Country	Synchronicity	Similarity
Costa Rica	0.46	0.53
Dom. Republic	0.22	−0.64
El Salvador	0.76	0.60
Guatemala	0.39	0.46
Honduras	0.53	0.13
Nicaragua	0.53	−0.37
Panama	0.53	0.71
CAPDR average	0.50	0.20

Source: Authors' estimates.

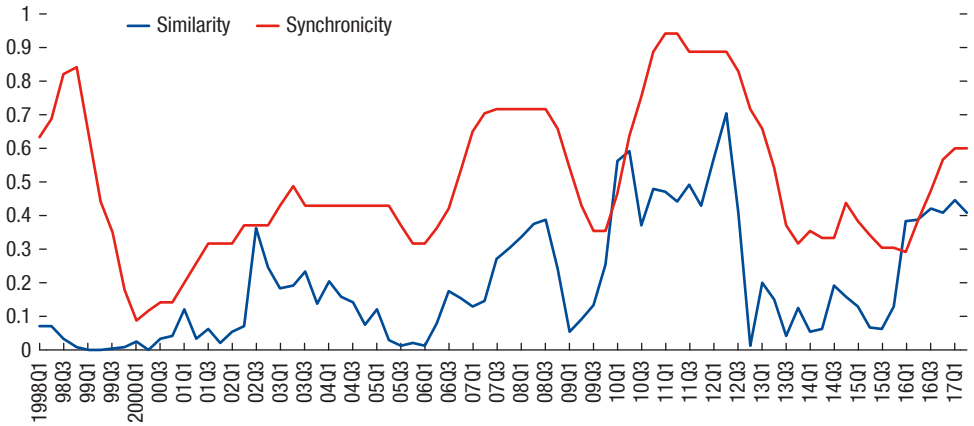
Note: The table reports averages of individual country and CAPDR-wide synchronicity and similarity indexes over the period 1998–2017. The country synchronicity index lies between a maximum of 1, when the country's credit cycle has always moved in the same direction as the CAPDR credit cycle over the reference period, and a minimum of −1 when the country's credit cycle has always moved in the opposite direction. Positive (negative) values of the index indicate that the country's credit cycles have moved more often in the same (opposite) direction as the regional credit cycle over the reference period. The similarity index is defined over the interval $[1-n, 1]$, where n is the number of countries in the CAPDR region. It is 1 in case of identical amplitude of the country's credit cycle with respect to the CAPDR credit cycle. Negative values indicate larger differences in the amplitude of the country's credit cycle with respect to that of its region over the reference period (the deviation of the country's credit gap from the region's credit gap exceeds the average credit gap of all countries). For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

than the Dominican Republic have not experienced a banking crisis in recent decades, the annual change in the NPL ratio is used as a measure of financial distress against which to assess the early warning properties of the credit gap. This is not a limitation. Countercyclical capital buffers should be large whenever systemic risk is high, irrespective of whether a crisis materializes. This makes it even more appropriate to use a continuous risk measure such as the change in NPL, instead of a binary crisis variable, to assess the properties of the credit gap.

The power of the indicator is evaluated at 1- and 2-year horizons through a simple regression on quarterly data, first using the credit gap as the only regressor and then augmenting the model with additional macro variables: yearly GDP growth rate, consumer price inflation, and annual change in the current account balance-to-GDP ratio.³ The time sample varies by country depending on data availability.

The results using a simple univariate model indicate that the credit-to-GDP gap is a powerful predictor of financial distress in CAPDR countries. This result, consistent with empirical evidence from countries outside the region, is confirmed for Costa Rica, the Dominican Republic, Guatemala, and Honduras at both 1- and 2-year horizons, and for El Salvador and Nicaragua at the 2-year horizon, and for Panama at the 1-year horizon (Table 14.2). The results show that the credit-to-GDP gap has its maximum predictive power for the 2-year horizon for all countries

³The regressions here aim at exploring the early warning power of the credit-to-GDP gap and are not meant to provide a full assessment of the determinants of NPL growth. For this reason, they do not include some regressors included in the literature on the determinants of NPL (see, among others, Ghosh (2015) for a study of NPL determinants).

Figure 14.3. Central America: Credit Cycle, Synchronicity and Similarity

Source: Authors' estimates.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. The chart reports averages of individual country and CAPDR-wide synchronicity and similarity indexes over the period 1998–2017. The country synchronicity index lies between a maximum of 1, when the country's credit cycle has always moved in the same direction as the CAPDR credit cycle over the reference period, and a minimum of -1 when the country's credit cycle has always moved in the opposite direction. Positive (negative) values of the index indicate that the country's credit cycles have moved more often in the same (opposite) direction as the regional credit cycle over the reference period. The similarity index is defined over the interval $[1-n, 1]$, where n is the number of countries in the CAPDR region. It is 1 in case of identical amplitude of the country's credit cycle with respect to the CAPDR credit cycle. Negative values indicate larger differences in the amplitude of the country's credit cycle with respect to that of its region over the reference period (the deviation of the country's credit gap from the region's credit gap exceeds the average credit gap of all countries).

except Panama, even though for Honduras only in economic terms (as the 2-year prediction is slightly less significant than the 1-year prediction). The augmented model broadly confirms the role of the credit-to-GDP gap. The gap retains its significance for most countries in the sample—and still with a higher significance for the 2-year prediction horizon. Two exceptions are Guatemala and Honduras, where the credit gap loses its significance when macroeconomic variables are added.

The augmented model confirms the significance of the credit gap (with the noted exceptions of Guatemala and Honduras) and indicates that GDP growth and inflation could also contribute to an explanation of NPL changes for most of the countries (Annex 14.3). In particular, GDP growth is significant for the 2-year horizon for Costa Rica, the Dominican Republic, Honduras, El Salvador, and marginally for Nicaragua. For El Salvador significance is observed also for the 1-year horizon. Inflation is significant for Costa Rica (in the 2-year horizon estimation), El Salvador (in the 1- and 2-year horizon estimations) and Honduras (in the 1-year horizon estimation). In the case of Costa Rica also the change in the current-account-to-GDP ratio is significant in the 8-quarter-ahead estimation. In the case of Guatemala alone none of the variables is significant.

TABLE 14.2.

Central America: Early Warning Properties of the Credit Gap (Summary of Results)

Variables	Costa Rica		Dominican Republic		Guatemala		El Salvador		Honduras		Nicaragua		Panama	
	(1) Δ4 NPL	(2) Δ8 NPL	(1) Δ4 NPL	(2) Δ8 NPL	(1) Δ4 NPL	(2) Δ8 NPL	(1) Δ4 NPL	(2) Δ8 NPL	(1) Δ4 NPL	(2) Δ8 NPL	(1) Δ4 NPL	(2) Δ8 NPL	(1) Δ4 NPL	(2) Δ8 NPL
Credit gap	0.0265*** (0.00761)	0.0380*** (0.00895)	2.294* (1.203)	5.350*** (1.664)	0.0208** (0.0102)	0.0360** (0.0137)	3.993 (4.619)	9.685** (4.842)	4.912*** (1.766)	5.898** (2.490)	0.00564 (0.00544)	0.0217*** (0.00759)	0.0140* (0.00810)	−0.00458 (0.0126)
Constant	−8.87e−05 (0.000444)	−0.000169 (0.000541)	0.189 (0.278)	0.467 (0.393)	−0.00463*** (0.000688)	−0.00886*** (0.000956)	0.128 (0.196)	−0.0658 (0.208)	−0.0929 (0.137)	−0.139 (0.200)	−0.000337 (0.000819)	−0.000764 (0.00116)	0.00108 (0.000797)	−0.00123 (0.00131)
Observations	60	56	64	60	56	52	75	71	39	35	78	74	53	51
R-squared	0.173	0.250	0.055	0.151	0.071	0.122	0.010	0.055	0.173	0.145	0.014	0.102	0.056	0.003

Source: Authors' estimates.

Note: NPLs = non-performing loans; the credit gap is the difference between the credit-to-GDP ratio and its estimated long-run trend.

For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

The results are however not fully consistent across countries, which makes their economic interpretation complicated and suggests the need for further analysis. GDP growth has a positive sign for the 2-year forecast horizon for Costa Rica, the Dominican Republic, and Honduras, but it has a negative sign for both the 1- and the 2-year horizons for El Salvador and for the 2-year horizon for Nicaragua (although only marginally). Inflation is positive for El Salvador (for both the 1- and 2-year estimation horizons) and for Honduras (for the 1-year horizon) but it is negative for Costa Rica (for the 2-year horizon). The positive sign of GDP growth over the 2-year horizon (the most robust result across CAPDR) could be interpreted as an indication that higher economic activity could be symptomatic of a slowdown 2 years ahead, which could in turn imply a deterioration in the creditworthiness of economic agents. The positive sign of inflation rate offers the same interpretation: overheating economic activity signaling a forthcoming slowdown and hence an increase in NPLs. Under this reasoning, the interpretation of the negative sign of inflation for Costa Rica and of GDP for El Salvador becomes problematic. However, it is also worth noting that, if taken in isolation, a negative sign of GDP growth would seem the most intuitive result; an economic slowdown leading to higher NPL 1 and 2 years into the future.

As an additional exercise, the credit gap is replaced with 2-year credit growth, and its role is tested as a predictor of the change in NPL (Annex 14.3). Computing 2-year growth amounts to smoothing the credit dynamics series in a way that is not conceptually different from using the HP filter with a high value of the lambda parameter (as the one used in this chapter). In the univariate specification the results are very robust across the CAPDR and for the two estimation windows, as are those of the credit-to-GDP gap. This confirms the important role of credit variables in the financial cycle. As for the credit gap, credit growth retains its significance in the multivariate augmented specification for most cases. The results for the other variables broadly follow those obtained using the credit gap.

Panel estimates confirm that the credit gap is a powerful predictor of systemic vulnerabilities in the region. Consistent with the country-specific evidence, panel regression results show the credit-to-GDP gap is highly significant both at the 1- and 2-year horizons and retains its significance in the augmented model. Inflation is also a significant predictor of the change in NPL 1 year ahead with positive sign, while it loses significance 2 years ahead—as does GDP growth in both horizons. In contrast to country-specific regressions, credit growth is not a significant predictor of changes in NPLs, either alone or in the augmented model. These results hold when running the model with either fixed or random effects (see Annex 14.3 for random effects estimates).

ACTIVATION OF THE COUNTERCYCLICAL CAPITAL BUFFER

The countercyclical capital buffers is calibrated based on the estimated credit cycle, following the Basel III framework. The Basel Committee (BCBS 2010, 2011) selected the credit gap as the main indicator for setting the buffer, mainly

TABLE 14.3.

Central America: Early Warning Properties of the Credit Gap (Panel Estimates—Fixed Effects)								
Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		0.0105 (0.0281)		0.0217 (0.0394)	0.000634 (0.0116)	0.00233 (0.0179)		
GDP growth					−0.359 (0.577)	0.907 (0.916)	−0.477 (0.574)	0.658 (0.910)
CPI inflation					3.210*** (0.990)	2.532 (1.608)	2.707*** (1.005)	1.445 (1.649)
CA/GDP					−5.34e−05 (0.000184)	−0.000187 (0.000290)	−4.74e−05 (0.000183)	−0.000178 (0.000287)
Credit gap	1.471*** (0.466)		3.109*** (0.588)				0.775** (0.354)	1.383** (0.570)
Constant	0.0245 (0.0531)	−0.00185 (0.0523)	−0.00131 (0.0676)	−0.00240 (0.0754)	−0.214*** (0.0643)	−0.415*** (0.106)	−0.180*** (0.0657)	−0.331*** (0.110)
Observations	425	436	399	410	329	302	330	303
R-squared	0.023	0.000	0.067	0.001	0.037	0.026	0.052	0.045
Number of country_code	7	7	7	7	7	7	7	7

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

because of its out-of-sample forecasting power in predicting banking crises across a large sample of countries. Subsequent researchers have largely confirmed its properties for advanced economies, while some have questioned its performance for developing economies. According to the Basel III guidelines, the buffer varies between zero and 2.5 percent of risk-weighted assets: authorities should increase the rate when risks associated with excessive credit growth build-up, and lower it when risks materialize, sustaining the flow of credit to households and corporations and containing the risk of systemic deleverage. Authorities are expected to apply judgment in the setting of the buffer in their jurisdiction by using the best information available to gauge the buildup of system-wide risk.

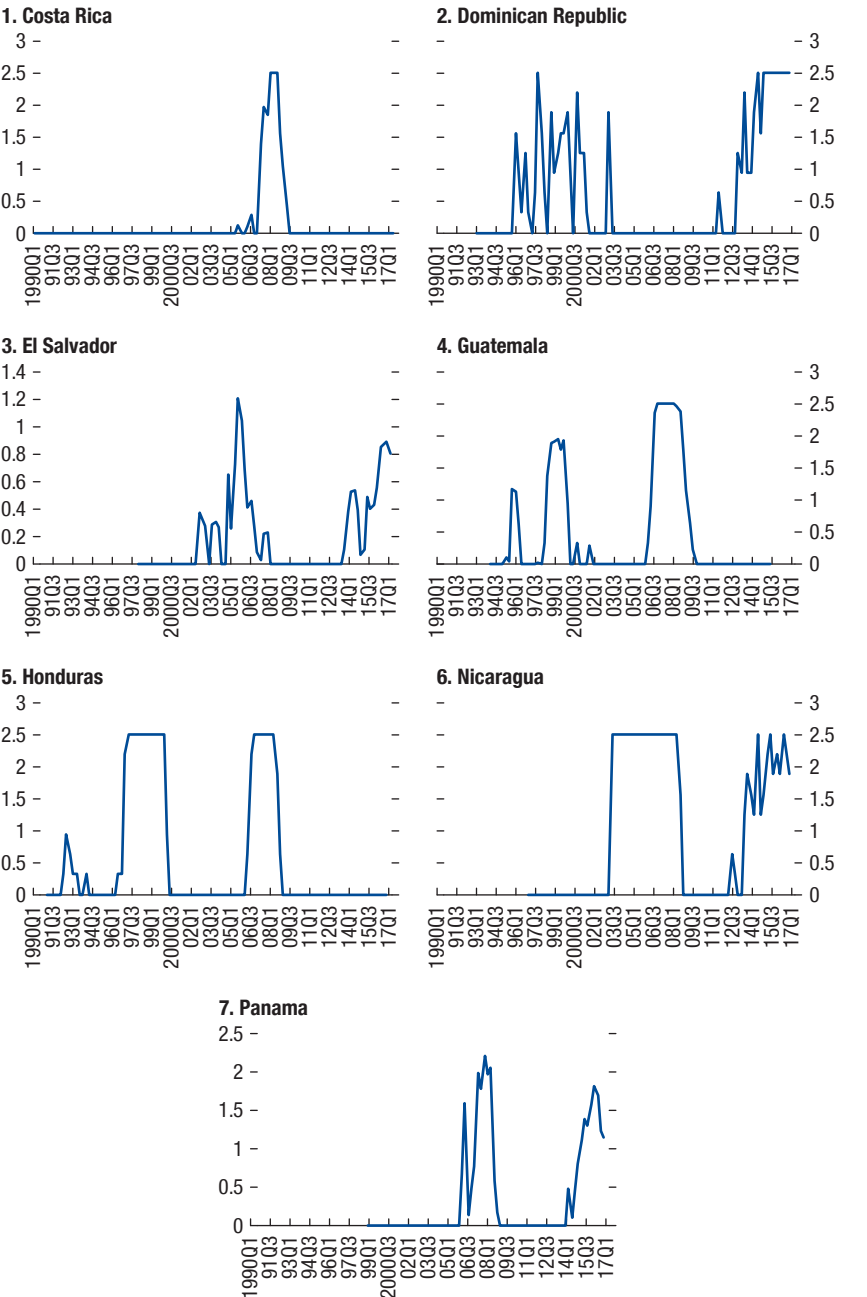
Countercyclical capital buffers based on the estimated credit-to-GDP gap would have been activated during the run-up to the global financial crisis and released during the crisis in most countries. Signs of financial distress were clear around the time of the crisis. Setting buffer rates according to BCBS thresholds that are based on the estimated credit-to-GDP gap would have activated the buffer in a timely manner for all countries in the years before it happened (Figure 14.3). In Costa Rica, Guatemala, Honduras, and Nicaragua the buffer would have reached its 2.5 percent peak at different stages of the global financial crisis and would have been released thereafter, although the accumulation phase started as early as 2003 in Nicaragua. In Panama and El Salvador, the buffer would have also steadily increased and peaked during the crisis but it would not have reached its maximum and would have been released almost immediately, suggesting a less steep and protracted credit accumulation. The Dominican Republic would have seen no activation ahead of the crisis as the system was still recovering from the 2003 banking crisis. The buffers, however, would have built up during the run-up to the 2003 crisis and peaked in 1997, although the suggested pattern is somehow less stable than in other countries. The countercyclical capital buffer would have also been activated during the expansive credit cycles of the late 1990s in Guatemala and Honduras.

Some countries are now undergoing an expansionary credit cycle. The Dominican Republic, El Salvador, Nicaragua, and Panama have experienced this since 2013–14, as bestowed by the continued accumulation of the simulated buffer in Figure 14.4. The countercyclical capital buffer would have already reached its 2.5 percent maximum in the Dominican Republic and Nicaragua, while El Salvador and Panama continued having some slack. However, in Nicaragua the simulated countercyclical capital buffer accumulation is not as smooth as during the global financial crisis.

The credit gap is a powerful predictor of financial distress and should be the lead indicator in policy decisions. However, instability in some instances of countercyclical capital buffer accumulation based on the credit gap, as well as the Basel proposed calibration, suggests that decisions about the optimal calibration and timing of capital-based macroprudential instruments should be complemented by policymakers' judgment also based on other macroeconomic variables to avoid creating excessive volatility in bank capitalization and lending.

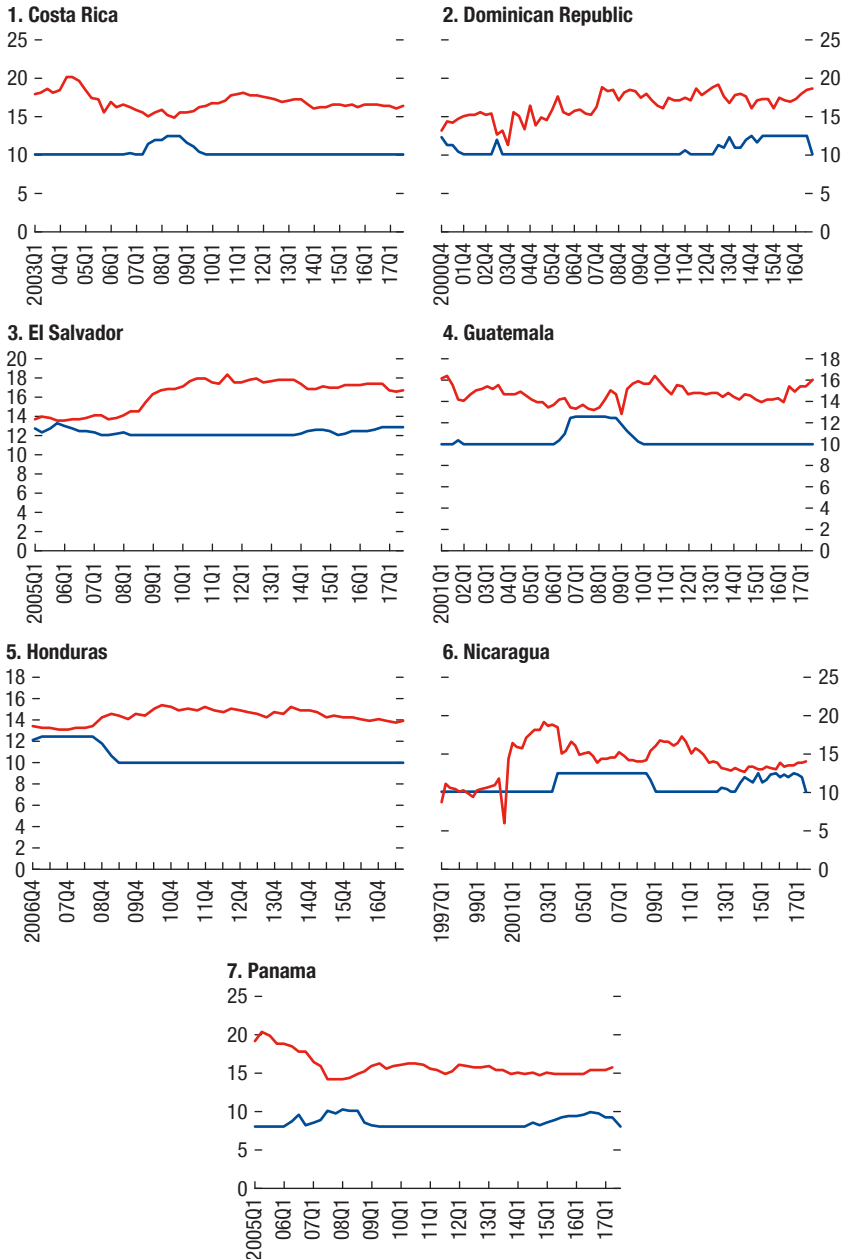
In general, banks in the region are well capitalized and the countercyclical capital buffer requirement would have been non-binding in most cases (Figure 14.5). Based

Figure 14.4. Central America: Activation of the Countercyclical Capital Buffer
(Percent of risk-weighted assets)



Source: IMF staff calculations.
Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Figure 14.5. Central America: System-wide CAR and Simulated Minimum Requirement
(Percent of risk-weighted assets)



Source: IMF staff calculations.

Note: For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR). The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. CAR = capital adequacy ratio.

on the simulated countercyclical capital buffer, a theoretical capital requirement can be established in each country as the minimum capital adequacy ratio (CAR) plus the countercyclical capital buffer. Results show that over the years for which cross-country comparable aggregate CAR data series are available, the countercyclical capital buffer would not have been binding for the system as whole in most cases. The main exception is Nicaragua, for which the aggregate CAR would have fallen below the minimum requirement plus the countercyclical capital buffer during the late 1990s. It is worth noting that countercyclical capital buffer policies are not ineffective when they are not binding for the whole banking system. There are two explanations. First, higher regulatory minimum requirements restrict the amount of capital subject to banks' voluntary decisions. Second, even when the system-wide CAR does not breach the aggregate capital requirement some banks might fail to meet the requirement, and therefore would need to increase their capital.

It should be noted that the countercyclical capital buffer is complementary to dynamic provisioning (covered in the previous chapter), which requires loan-loss provisioning to cover expected losses over an average economic cycle, whereas the countercyclical capital buffer covers unexpected losses. Banks are required to maintain funds for dynamic provisioning in addition to the minimum regulatory capital requirement. The additional provisions accumulated in the expansionary phase of the cycle can then be drawn down in the contractionary phase. Panama introduced dynamic provisioning in 2013 (with application starting in 2014). Costa Rica followed in 2016 and Nicaragua in 2017 (with a 3-year phased implementation).

CONCLUSIONS AND POLICY RECOMMENDATIONS

The credit cycle in CAPDR has been studied in this chapter using the credit-to-GDP gap. The analysis shows that since the 1990s, despite being free of significant systemic banking crises, most of the countries have experienced at least one credit cycle. The significant synchronicity of the credit cycles confirms the growth of financial links within the region.

The credit-to-GDP gap is a powerful early warning predictor of financial stress in CAPDR countries. Despite some notable data limitations, the analysis confirms the early warning power of the credit gap in CAPDR countries, in line with the evidence available in the literature for many economies.

A formal analytical framework to assess the applicability of the countercyclical capital buffer in CAPDR should be considered to improve banking system stability. The signaling power of the credit gap suggests that authorities could consider introducing the countercyclical capital buffer in their policy toolkit. It would be a useful policy instrument to strengthen the resilience of the banking system through the financial cycle and limit the procyclicality of lending.

Decisions on the countercyclical capital buffer should be based on a deep assessment of the credit developments. Although ideally the buffer should mainly be anchored to the credit-to-GDP gap, a word of caution is warranted. The performance of the credit-to-GDP gap for CAPDR is subject to caveats, mostly

related to existing data limitations. Authorities would need to complement the credit gap with additional analysis. An example would be the use of granular information on credit developments. Micro data can provide important insights into the outlook for financial stability. Whenever credit growth is strong, authorities can forensically analyze disaggregated loan data to identify which sectors and industries are borrowing: how much, why, and at what price.

Qualitative information and judgment should also be used to analyze changes in lending standards and credit conditions. Regular meetings between central banks and financial institutions to discuss different views on credit conditions are also helpful. Ultimately, policymakers need to make sure that any credit expansion is healthy, and understand the reasons behind any contraction in lending. Credit deepening must go hand in hand with measures that encourage healthy credit expansion, such as legal frameworks that help create, mobilize, and realize collateral, as well as effective insolvency proceedings.

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ANNEX 14.1: HP FILTER METHODOLOGY

The one-sided HP filter used to estimate the long-run trend in the credit-to-GDP ratio solves the following minimization problem:

$$\min_{Trend_t} \sum_{t=1}^T (CTG_t - Trend_t)^2 + \lambda \sum_{t=3}^T (Trend_t - 2Trend_{t-1} + Trend_{t-2})^2$$

which balances the trade-off between the size of the estimated cycles and the variation in trend growth rate, with the smoothing parameter λ establishing the relative weight of each of the two terms: the larger the smoothing parameter, the more importance is assigned to the second term, and therefore the “smoother” the trend series would be. This is consistent with the Basel Committee on Banking Supervision’s guidelines (BCBS 2010 and 2011), although some studies have suggested that a two-sided filter might perform better. Since financial cycles are thought to operate at very low frequencies, the smoothing parameter is usually set at large values. BCBS (2010), based on Borio and Lowe (2002), suggests a smoothing parameter of 400,000.¹

¹This value should be compared to 1,600—the value of the smoothing parameter used for estimating business cycles. The difference between the two reflects the idea that financial cycles are thought to be four to five times longer than business cycles.

ANNEX 14.2: MEASURES OF THE CAPDR CREDIT CYCLE

Following Mink and others (2012) and Samarina and others (2015), let $c_i(t)$ be the credit gap of country i in period t , where the credit gap is the cyclical component measured by the deviation of the logarithm of credit from its trend, and let $c_r(t)$ be the credit gap of the CAPDR region at time t , calculated as the median credit gap for all CAPDR countries. *Synchronicity* between country i and the CAPDR credit cycle at time t is defined as:

$$\rho_i(t) = \frac{c_i(t) c_r(t)}{|c_i(t) c_r(t)|}$$

The *country synchronicity index* assumes value 1 if the credit cycle moves in the same direction as the CAPDR credit cycle (the two credit gaps have the same sign) and -1 otherwise. The CAPDR synchronicity cycle for the seven CAPDR countries can be defined as the average of the synchronicity indexes for each country i at each time t :

$$\rho_i(t) = \frac{1}{n} \sum_{i=1}^n \frac{c_i(t) c_r(t)}{|c_i(t) c_r(t)|}$$

The *CAPDR synchronicity index* is defined on the interval $[0,1]$. It assumes value 1 when all countries' credit cycles move in the same direction as the CAPDR credit cycle (perfect synchronization) and 0 when only half of the countries' credit cycles move in the same direction.

Credit cycle *similarity* is defined as the difference in credit cycle amplitude between country i and the CAPDR credit gap:

$$\pi_i(t) = 1 - \frac{|c_i(t) - c_r(t)|}{\frac{1}{n} \sum_{i=1}^n |c_i(t)|}$$

The index is defined on the interval $[1-n, 1]$, with 1 corresponding to the case of identical amplitude and synchronization of each country credit cycle. The CAPDR region-wide similarity index can be defined as:

$$\pi(t) = 1 - \frac{\sum_{i=1}^n |c_i(t) - c_r(t)|}{\sum_{i=1}^n |c_i(t)|}$$

The index is defined on the interval $[0,1]$. Higher values indicate that the amplitudes of the countries' credit cycles are very similar to those of the CAPDR cycle.

ANNEX 14.3. EARLY WARNING PROPERTIES OF THE CREDIT GAP: RESULTS OF REGRESSION ANALYSIS

Costa Rica

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		0.000159* (9.32e-05)		0.000167 (0.000117)	0.000100 (9.46e-05)	9.10e-05 (0.000110)		
GDP growth					-0.000747 (0.0127)	0.0316** (0.0148)	0.000733 (0.0123)	0.0327** (0.0128)
CPI inflation					0.0276 (0.0179)	-0.00300 (0.0214)	0.0108 (0.0191)	-0.0465** (0.0217)
CA/GDP					-0.0446 (0.0281)	-0.0850** (0.0333)	-0.0357 (0.0271)	-0.0673** (0.0288)
Credit gap	0.0265*** (0.00761)		0.0380*** (0.00895)				0.0214** (0.00923)	0.0412*** (0.0103)
Constant	-8.87e-05 (0.000444)	-0.000558 (0.000464)	-0.000169 (0.000541)	-0.000770 (0.000603)	-0.00488** (0.00193)	-0.00859*** (0.00231)	-0.00280 (0.00213)	-0.00332 (0.00242)
Observations	60	59	56	55	59	55	60	56
R-squared	0.173	0.049	0.250	0.037	0.142	0.260	0.203	0.429

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Dominican Republic

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		3.197* (1.671)		8.704*** (2.110)	7.570*** (0.689)	7.327*** (1.766)		
GDP growth					2.136 (2.470)	14.69** (5.703)	8.548 (6.052)	18.78** (6.885)
CPI inflation					-2.052 (1.792)	-15.40*** (4.348)	4.427 (5.974)	-3.349 (6.711)
CA/GDP					0.0115 (0.0156)	0.0292 (0.0365)	0.0427 (0.0394)	0.0704 (0.0444)
Credit gap	2.294* (1.203)		5.350*** (1.664)				4.381* (2.237)	7.210** (2.939)
Constant	0.189 (0.278)	-1.069* (0.588)	0.467 (0.393)	-2.938*** (0.744)	-2.552*** (0.223)	-3.326*** (0.503)	-1.376*** (0.474)	-2.423*** (0.534)
Observations	64	64	60	60	23	19	23	19
R-squared	0.055	0.056	0.151	0.227	0.894	0.764	0.325	0.632

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

El Salvador

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		1.419** (0.695)		3.020*** (0.950)	1.929** (0.784)	4.636*** (1.308)		
GDP growth					-7.226** (3.013)	-8.252 (5.049)	-8.038** (3.091)	-9.848* (5.299)
CPI inflation					11.97*** (3.617)	19.55*** (6.113)	13.65*** (3.673)	22.50*** (6.269)
CA/GDP					-0.000151 (0.000238)	-0.000294 (0.000405)	-0.000114 (0.000237)	-0.000212 (0.000408)
Credit gap	3.993 (4.619)		9.685** (4.842)				4.246** (1.640)	9.536*** (2.883)
Constant	0.128 (0.196)	-0.221 (0.218)	-0.0658 (0.208)	-0.481 (0.305)	-0.499*** (0.138)	-1.227*** (0.236)	-0.252* (0.132)	-0.598** (0.235)
Observations	75	91	71	87	71	67	71	67
R-squared	0.010	0.045	0.055	0.106	0.202	0.284	0.209	0.268

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Guatemala

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		0.0138 (0.0109)		0.0377** (0.0144)	0.00586 (0.0120)	0.0134 (0.0171)		
GDP growth					0.0125 (0.0322)	0.0421 (0.0457)	0.0105 (0.0271)	0.0470 (0.0380)
CPI inflation					0.0180 (0.0447)	-0.000391 (0.0660)	0.0107 (0.0408)	-0.0200 (0.0596)
CA/GDP					0.0357 (0.0295)	0.0138 (0.0413)	0.0249 (0.0250)	-0.00800 (0.0349)
Credit gap	0.0208** (0.0102)		0.0360** (0.0137)				0.0115 (0.00876)	0.0170 (0.0122)
Constant	-0.00463*** (0.000688)	-0.00648*** (0.00154)	-0.00886*** (0.000956)	-0.0139*** (0.00209)	-0.00493*** (0.00179)	-0.0115*** (0.00270)	-0.00393*** (0.00185)	-0.00977*** (0.00275)
Observations	56	56	52	52	44	40	44	40
R-squared	0.071	0.029	0.122	0.120	0.069	0.136	0.103	0.167

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Honduras

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		2.824*** (0.610)		3.703*** (0.837)	1.925** (0.715)	3.464*** (0.968)		
GDP growth					2.715 (3.479)	13.49*** (4.826)	3.526 (3.781)	14.94** (5.624)
CPI inflation					8.491 (5.896)	-9.529 (8.750)	13.52** (6.323)	0.478 (9.931)
CA/GDP					-50.93* (29.59)	-34.70 (40.86)	-53.92 (32.18)	-40.68 (47.61)
Credit gap	4.912*** (1.766)		5.898** (2.490)				1.829 (1.929)	3.454 (2.777)
Constant	-0.0929 (0.137)	-0.957*** (0.219)	-0.139 (0.200)	-1.278*** (0.312)	-1.588*** (0.351)	-1.934*** (0.527)	-1.381*** (0.443)	-1.642** (0.704)
Observations	39	39	35	35	39	35	39	35
R-squared	0.173	0.367	0.145	0.372	0.478	0.503	0.383	0.325

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Nicaragua

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		0.00114 (0.00253)		0.0107*** (0.00350)	0.00282 (0.00502)	0.0139** (0.00545)		
GDP growth					0.00341 (0.0247)	-0.0485* (0.0266)	0.00268 (0.0207)	-0.0345* (0.0172)
CPI inflation					0.0286 (0.0293)	0.0712** (0.0331)	-0.00475 (0.0271)	0.00339 (0.0243)
CA/GDP					0.548 (2.317)	5.271** (2.508)	-2.312 (2.127)	0.899 (1.800)
Credit gap	0.00564 (0.00544)		0.0217*** (0.00759)				0.0309*** (0.00868)	0.0562*** (0.00752)
Constant	-0.000337 (0.000819)	-0.000740 (0.00135)	-0.000764 (0.00116)	-0.00527*** (0.00187)	-0.00470 (0.00299)	-0.00822** (0.00325)	-0.00212 (0.00254)	-0.00106 (0.00220)
Observations	78	74	74	70	42	38	42	38
R-squared	0.014	0.003	0.102	0.122	0.065	0.396	0.297	0.732

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panama

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		−0.00294 (0.00309)		−0.00246 (0.00448)	0.00326 (0.00463)	0.00631 (0.00723)		
GDP growth					−0.0171** (0.00808)	−0.0107 (0.0130)	−0.0149*** (0.00549)	−0.00905 (0.00827)
CPI inflation					0.00171 (0.0216)	−0.0366 (0.0311)	−0.000125 (0.0204)	−0.0454 (0.0291)
CA/GDP					0.000472 (0.00361)	0.00420 (0.00526)	0.000542 (0.00334)	0.00366 (0.00474)
Credit gap	0.0140* (0.00810)		−0.00458 (0.0126)				0.0172** (0.00751)	0.0345** (0.0131)
Constant	0.00108 (0.000797)	0.000578 (0.000825)	−0.00123 (0.00131)	−0.000264 (0.00121)	0.00330** (0.00124)	0.00178 (0.00202)	0.00506*** (0.00143)	0.00641** (0.00267)
Observations	53	53	51	51	51	48	51	48
R-squared	0.056	0.017	0.003	0.006	0.161	0.091	0.239	0.203

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel Estimates (Random Effects)

Variables	(1) Δ4 NPL	(2) Δ4 NPL	(3) Δ8 NPL	(4) Δ8 NPL	(5) Δ4 NPL	(6) Δ8 NPL	(7) Δ4 NPL	(8) Δ8 NPL
Credit growth_2y		0.0101 (0.0279)		0.0207 (0.0392)	0.000471 (0.0115)	0.00191 (0.0178)		
GDP growth					0.469 (0.368)	1.165 (0.768)	0.380 (0.372)	0.977 (0.768)
CPI inflation					2.589*** (0.764)	2.691* (1.449)	2.276*** (0.779)	1.773 (1.494)
CA/GDP					5.07e−05 (0.000171)	−0.000132 (0.000283)	5.61e−05 (0.000171)	−0.000121 (0.000280)
Credit gap	1.372*** (0.439)		2.860*** (0.548)				0.653* (0.336)	1.231** (0.560)
Constant	0.0229 (0.0527)	−0.00173 (0.0520)	−0.00628 (0.0671)	−0.00214 (0.0750)	−0.272*** (0.0571)	−0.457*** (0.128)	−0.251*** (0.0582)	−0.393*** (0.131)
Observations	425	436	399	410	329	302	330	303
Number of country_code	7	7	7	7	7	7	7	7

Source: Authors' estimates.

Note: CA = current account; CPI = consumer price index; GDP = gross domestic product; NPLs = non-performing loans.

For convenience, references to Central America refer to the IMF subregion Central America, Panama, and the Dominican Republic (CAPDR).

The Central American countries in this group are: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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Index

A

Accountability, 165
 in fiscal responsibility laws, 170
Adequacy rates
 calculation of, 151*n*16
 capital, 271*f*
 of contribution systems, 139–40
 of pensions, 140*f*, 144*f*
Africa, technology in, 49–50
Age groups
 female labor force participation by, 33*f*
 retirement and, 143
Aging, fiscal costs of, 150–52
Akinci, Ogze, 242
American Community Survey, 45
Anti-Drug Abuse Act, 90
Apparel sector, market share in, 68*f*
Arcia, Gustavo, 120
Arnone, Marco, 202
Asociación de Supervisores Bancarios de las Américas, 50
Asset market bubbles, 233
Asset values, 197
ATMs, 221
Autonomy, of central banks, 191

B

Bank concentration, 209*t*, 211*t*
Banking and Insurance Commission, 236
Banking correspondents, 224
Banking relationships, remittances and, 49–50
Banking sectors
 competition, 203
 indicators, 259*f*
Bank lending channel, 196*n*4
 in CAPDR, 204–10
Bank lending rates, 195
Bargaining power, 100
Barrio 18 gang, 104
Basel Committee on Banking Supervision (BCBS), 251, 257, 274
 on buffers, 267–69
Basel III, 245, 251, 267–68

BCBS. *See* Basel Committee on Banking Supervision
Beaton, Kimberly, 54
Bilateral arrangements, 49
Blake, G. O., 90
Blinder, Alan S., 210
Bootstrapping, 126
Borio, C., 274
Borrowing constraints, 225
 combined effects of, 228–29
 GDP and, 227*f*
 Gini coefficient and, 227*f*
 relaxing, 226–27
Brainard, William, 210
Brain drain, innovation and, 51
Budget caps, 145
Budget controls, health care and, 145
Budget deficits
 in CAPDR, 174–75
 targets, 173–74
Buffers
 BCBS on, 267–69
 countercyclical capital, 267–72, 270*f*
 rebuilding, 111
 to shocks, 111

C

CAFTA-DR. *See* Dominican Republic–Central America Free Trade Agreement
CAPDR. *See* Central America, Panama, and Dominican Republic
Capital adequacy ratio (CAR), 271*f*
Capital growth
 in CAPDR, 17–18, 20–21
 decline in, 18–19
 medium term trends in, 20–21
Capital requirements, sectoral, 247–48
CAR. *See* Capital adequacy ratio
Cellphones, female labor force participation and, 37
Central America, Panama, and Dominican Republic (CAPDR), 69*f*
 bank lending channel in, 204–10

- breakdown, 67*f*
 - budget deficits in, 174–75
 - capital growth in, 17–18, 20–21
 - central banks in, 191
 - comparative advantage in, 74*f*
 - credit cycle and, 261–63, 275
 - credit in, 258–72
 - crime in, 87–90
 - dummy, 208
 - economic size, 235*t*
 - emigration, 43
 - exchange rates in, 194*f*
 - exports of, 61, 64, 70
 - financial markets in, 258–72
 - financial sector, 200*t*, 201*t*
 - fiscal gaps in, 142
 - fiscal responsibility laws in, 170–80
 - gender gap in, 29
 - GFC and, 13
 - growth in, 1
 - GVCs and, 65–66
 - health care in, 136–38, 141
 - homicides in, 88
 - inflation in, 194*f*
 - infrastructure in, 34–35
 - interest rates in, 194*f*
 - international reserves in, 194*f*
 - labor force participation, 30*f*
 - macroprudential policy in, 240–54
 - market access of, 72
 - monetary policy in, 190–95, 197–204
 - operations frameworks, 191–92
 - PAYG in, 135
 - pensions in, 135–36
 - potential output of, 13
 - product complexity in, 71*f*
 - remittances in, 44*f*, 46–50
 - remittances to, 48*f*
 - synchronicity index, 261–62, 275
 - trade agreements, 63*f*
 - trade barriers in, 64*f*
 - trade composition in, 68–71
 - trade integration of, 62–68
 - trade openness of, 62*f*, 235*t*
 - transparency in, 193
 - weighted average tariffs in, 63*f*
 - working age population in, 20
- Central banks
- autonomy of, 191
 - in CAPDR, 191
 - of Guatemala, 239–40
 - independence of, 196*n*5, 202
 - intervention of, 195
 - loss function, 212
- Cerutti, Eugenio, 241, 242
- China, 64–65
- Cobb-Douglas production function, 27
- Cocaine, 88
- Colombia, 230
- Colon Free Zone, Panama, 67
- Comparative advantage, in CAPDR, 74*f*
- Compensation fragmentation, 120
- Competition Authority (El Salvador), 21
- Competition Commission (Costa Rica), 21
- Competitiveness, remittances and, 55
- Computers, female labor force participation and, 37
- Consumer deposits, 259*f*
- Consumption, remittances and, 52
- Contribution rates
- pensions, 137*f*, 143–44
 - raising, 142
- Contribution systems
- adequacy of, 139–40
 - in Dominican Republic, 139
 - in El Salvador, 139
 - in Panama, 139
- Contributory benefits, in LAC, 137*f*
- Coordination Committee, 235–36
- Corruption Perception Index, 216
- Costa Rica
- CAR in, 271*f*
 - credit in, 276
 - exports, 15–16
 - growth in, 1–2
 - health care in, 145
 - household surveys, 36–37
 - inflation in, 265
 - microdata on, 38*t*
 - pensions in, 138, 143*t*
 - regression analysis, 38*t*
 - social spending in, 112, 117, 121–22
 - working age population in, 20
- Countercyclical capital buffer, 267–72
- activation of, 270*f*
 - in Dominican Republic, 270*f*
 - in El Salvador, 270*f*

- in Guatemala, 270*f*
- in Honduras, 270*f*
- in Nicaragua, 270*f*
- in Panama, 270*f*
- Country similarity index, 263
- Country synchronicity index, 261, 275
- Credit
 - in CAPDR, 258–72
 - in Costa Rica, 276
 - in Dominican Republic, 276
 - in El Salvador, 277
 - excessive growth, 261
 - gap, 265, 266*f*, 268*f*, 276–79
 - GDP and, 260–61, 263–67
 - growth, 54, 257
 - in Guatemala, 277
 - in Honduras, 278
 - mispricing, 261
 - in Nicaragua, 278
 - quality, 54
 - regression analysis and, 276–79
 - remittances and, 54–55
 - risk, 261
- Credit channel, 195
- Credit cycle
 - CAPDR and, 261–63, 275
 - by country, 262*f*
 - estimating, 260–61
 - expansionary, 269
 - measures of, 275
 - policy recommendations, 272–73
 - similarity, 275
 - synchronicity, 264
- Crime
 - calibration summary, 109*t*
 - in CAPDR, 87–90
 - derivation of equations in model of, 109
 - direct costs of, 85–86
 - drug trafficking and, 88
 - economics and, 85
 - effect of, 92
 - in El Salvador, 91, 103–6
 - firms and, 94–96
 - GDP and, 93
 - growth and, 90–94
 - in Honduras, 91, 101–3
 - indirect costs of, 85–86
 - instrumental variables, 92–93
 - labor productivity and, 99*f*
 - in LAC, 87, 88*f*
 - macroeconomic models and, 86–87
 - measurement of, 85–86
 - modeling, 98*f*
 - occupational choices and, 97
 - organized, 96–97
 - output and, 99*f*
 - policy experiments, 97–98, 100*t*
 - policy recommendations, 106–7
 - as priority problem, 86*f*, 90*f*
 - trends in, 89*f*
 - unemployment and, 99
 - unionization and, 100
 - vacancy-posting costs and, 100
 - workers and, 94–96
- Cross-country transmission, 208–10
- D**
 - Dabla-Norris, M. E., 219, 222
 - DACA. See Deferred Action for Childhood Arrivals
 - Data envelopment analysis (DEA), 114, 125
 - Decision-making, macroprudential, 237*t*, 238*t*
 - Deferred Action for Childhood Arrivals (DACA), 57
 - Deficit bias, 181
 - Delgado, Fernando, 240
 - Demand curves, 163
 - Demand drag, 160
 - Demographics, 6–7
 - dividend delays, 134–35
 - in LAC, 134*f*
 - policies affecting, 145–46
 - Dependency ratios, 16, 17*f*
 - Deportations, 58
 - criminal, 92*f*
 - from United States, 91–94
 - Diamond-Mortensen-Pissarides (DMP), 94
 - Ding, X., 75
 - Direct costs, of crime, 85–86
 - Discount rate, money market rate and, 205*t*
 - Disinflation, 191
 - DMP. See Diamond-Mortensen-Pissarides

- Dollarization, 10–11, 234
 - financial, 199
 - ratio, 199*f*
- Domestic savings, 22–23
- Domestic value, growth and, 77*t*
- Dominican Republic
 - CAR in, 271*f*
 - contribution systems in, 139
 - countercyclical capital buffer in, 270*f*
 - credit in, 276
 - economic complexity of, 15–16
 - exports, 15–16
 - fiscal policy in, 153–54, 159–62
 - fiscal reform in, 160*f*
 - growth in, 159–60
 - pensions in, 143*t*
 - poverty in, 3
- Dominican Republic-Central America
 - Free Trade Agreement (CAFTA-DR), 63
- DPR. *See* Dynamic loan-loss provisioning requirements
- Drug trafficking
 - crime and, 88
 - declines in, 101
- Dynamic loan-loss provisioning
 - requirements (DPR), 245–46
- E**
- Economic activity, VAT and, 157*f*
- Economic complexity
 - of Dominican Republic, 15–16
 - index, 71*f*
 - of Panama, 15–16
- Economic development, female labor
 - force participation and, 31–32, 34
- Economic impact, of trade integration, 76–78
- Economics, crime and, 85
- Education, 4*f*
 - female labor force participation and, 32, 34–35
 - gender gap in, 29
 - in Guatemala, 113
 - input-output combinations, 113*f*
 - life expectancy and, 113*f*
 - microdata on, 37
 - net enrollment rates, 113*f*
 - primary, 116*f*, 127*t*, 128*t*
 - pupil-teacher ratios, 113*f*
 - school enrollment, 33*f*
 - secondary, 116*f*, 129*t*, 130*t*
 - social spending on, 116*f*
 - trade composition and, 75*f*
 - years of schooling, 113*f*
- Educational attainment, emigration and, 47*f*
- Efficiency gains, 117
- El Salvador
 - CAR in, 271*f*
 - contribution systems in, 139
 - countercyclical capital buffer in, 270*f*
 - credit in, 277
 - crime in, 91, 103–6
 - fiscal responsibility laws in, 175–76, 181–83
 - Gini index in, 230
 - homicides in, 101*f*, 104*f*
 - inequality in, 230–31
 - pensions in, 139, 143*t*
 - potential employment growth in, 16–17
 - poverty in, 3
 - pupil-teacher ratios in, 119
 - reforms in, 136
 - social spending in, 117–19
 - TFP in, 16
 - violence in, 105
- El Salvador Seguro, 105–6
- Emerging markets, 189
- Emigration, 7
 - CAPDR, 43
 - educational attainment and, 47*f*
 - employment and, 46
 - experience of, 44–46
 - from LAC, 45
 - Latin America and, 46*f*
 - natural disasters and, 44–45
 - negative effects of, 43
 - from Northern Triangle, 44
 - occupations and, 47*f*
 - percent of population, 45*f*
 - in 2015, 45*f*
 - to United States, 45–46
 - wages and, 47*f*
- Employment
 - emigration and, 46
 - informality of, 134
 - See also* Unemployment

- Enabling trade index, 73*f*
- ENCOVI, 159
- Entrepreneurship, 21
- Escalafones, 118
- Escape clauses
 - fiscal responsibility laws, 169, 177*f*, 179
 - in Honduras, 179
 - in Panama, 179
- Exchange rates
 - in CAPDR, 194*f*
 - inflation and, 213–14
 - monetary policy and, 198–204
 - short-term government securities, 196
- Expansionary credit cycle, 269
- Expenditure identities, 150
- Exports
 - baskets, 61, 70
 - of CAPDR, 61, 64, 70
 - complexity of, 70
 - concentration, 69
 - constraints on, 79*f*
 - Costa Rica, 15–16
 - diversification of, 73–74, 82
 - Dominican Republic, 15–16
 - interregional, 66*f*
 - intraregional, 66*f*
 - maquilas, 78
 - portfolios, 70
 - quality of, 77*t*
 - regional, 66*f*
 - to United States, 62
- External finance premiums, asset values and, 197
- F**
- Farrell, M. J., 124
- FDI. See Foreign direct investment
- Female labor force participation, 22, 29–30
 - by age groups, 33*f*
 - cellphones and, 37
 - computers and, 37
 - contributions to, 36*f*
 - drivers of, 31–33
 - economic development and, 31–32, 34
 - education and, 32, 34–35
 - evidence on, from regression analysis, 32–36
 - fertility and, 32, 34
 - income and, 31–32
 - infrastructure, 34–35
 - LA5, 36*f*
 - microdata on, 36–37
 - policies affecting, 145
 - policy recommendations, 37–40
 - by school enrollment, 33*f*
 - technology and, 37
 - total investment and, 33*f*
 - underlying factors, 33*f*
- Fertility
 - female labor force participation and, 32, 34
 - microdata on, 37
- Financial constraints
 - country-specific, 226*f*
 - easing, 231–32
- Financial development, 217
 - GDP and, 218*f*
 - improvement of, 231
 - index, 219*f*
 - in LAC, 220*f*
 - in 1995, 220*f*
 - policy implications, 231–32
 - ranking across components, 221*f*
 - stylized facts on, 219–22
 - in 2013, 220*f*
- Financial dollarization, 199
- Financial markets, in CAPDR, 258–72
- Financial sector, CAPDR, 200*t*, 201*t*
- Financial sector policy, 10–12
- Financial Stability Reports (FSR), 240
- Firms, crime and, 94–96
- Fiscal anchors, 178
- Fiscal balance
 - minus targeted balance, 173*f*
 - outburn, 173*f*
- Fiscal costs
 - aging and, 150–52
 - of health care, 140–41
- Fiscal gaps, in CAPDR, 142–43
- Fiscal policy
 - in Dominican Republic, 153–54, 159–62
 - growth and, 8–10
 - in Guatemala, 155–59

- in Honduras, 153–55
- inequality and, 153–54
- paper, 170
- stances, 182*f*
- toolkit model, 163–64
- Fiscal reform
 - in Dominican Republic, 160*f*
 - in Honduras, 156*f*
- Fiscal responsibility laws
 - accountability in, 170
 - assessment of, 169
 - in CAPDR, 170–80
 - characteristics, 166–67
 - coverage of, 177*f*
 - defining, 166–67
 - in developing countries, 170
 - in El Salvador, 175–76, 181–83
 - escape clauses, 169, 177*f*, 179
 - fiscal anchors in, 178
 - global, 186*t*, 187*t*
 - guiding principles of, 165
 - in Honduras, 178, 183
 - implementation of, 169, 172
 - key features, 175–80
 - medium-term orientation, 180
 - non-compliance, 176*f*
 - numerical rules, 176*f*
 - objectives of, 171
 - operational targets in, 176*f*, 178
 - in Panama, 178, 180–81
 - policy recommendations, 183–84
 - popularity of, 166
 - preconditions for, 167–68
 - rules in, 170
 - sanctions and, 179
 - scope of, 170
 - stabilization mechanisms, 177*f*
 - structural components of, 169
 - Supreme Court and, 183
 - sustainability and, 171
 - time of adoption, 176*f*
 - transitional provisions, 177*f*
 - transparency in, 170, 176*f*, 180
 - types of, 166
- Foreign currency
 - in balance sheets, 235*f*
 - liabilities, 259*f*
 - loans, 259*f*
- Foreign direct investment (FDI), 80
- Foreign exchange markets, 192
- Formal financial sector, 199–202
- FSR. *See* Financial Stability Reports
- G**
 - Gangs, 90*f*
 - Gargiulo, C., 120
 - GDP. *See* Gross domestic product
 - Gender gap, 22
 - in CAPDR, 19
 - in education, 29
 - global, 29
 - informal employment and, 30*f*
 - unemployment, 30*f*
 - See also* Women
 - Germany, 64–65
 - GFC. *See* Global financial crisis
 - Gini index, 159
 - borrowing constraints and, 227*f*
 - in El Salvador, 230
 - trade composition and, 75*f*
 - Global competitiveness index, 75*f*
 - Global Competitiveness Report, 32
 - Global financial crisis (GFC)
 - CAPDR and, 13
 - remittance and, 56
 - Global Financial Development Indicators, 216
 - Global value chains (GVCs)
 - in CAPDR, 65–66
 - global view of, 67*f*
 - growth and, 77*t*
 - participation in, 65–66, 67–68
 - Government securities
 - long-term, 196
 - secondary market for, 202–3
 - short-term, 196
 - Grigoli, Francesco, 114
 - Gross domestic product (GDP)
 - borrowing constraints and, 227*f*
 - convergence of, 14*f*
 - credit and, 260–61, 263–67
 - crime and, 93
 - early warning power and, 263–67
 - evolution of, 14*f*
 - financial development and, 218*f*
 - growth and, 77*t*
 - health care and, 151–52
 - homicides and, 94*f*

- inequality and, 225–26
- migration and, 51*f*
- per capita real growth equation
 - estimates, 77*f*
 - remittances and, 51*f*
- Gross national savings, 23*f*
- Guatemala
 - CAR in, 271*f*
 - central bank of, 239–40
 - countercyclical capital buffer in, 270*f*
 - credit in, 277
 - education in, 113
 - fiscal policy in, 155–59
 - health care in, 145
 - household surveys, 36–37
 - inequality in, 229–30
 - microdata on, 39*f*
 - pensions in, 139, 143*t*
 - potential employment growth in, 16–17
 - poverty in, 3
 - regression analysis, 39*f*
 - social spending in, 117, 119–20
 - taxation in, 156–57
 - TFP in, 16
- GVCs. *See* Global value chains
- H**
- Hadzi-Vaskov, M., 75
- HALE. *See* Health-adjusted life expectancy
- Health-adjusted life expectancy (HALE), 114
- Health care, 131*t*, 132*t*
 - budget controls and, 145
 - in CAPDR, 136–38, 141
 - in Costa Rica, 145
 - expenditure calculations, 151–52
 - fiscal costs, 140–41
 - in Guatemala, 145
 - in Honduras, 145
 - international comparison of, 141*t*
 - in LAC, 137*f*
 - in Panama, 145
 - policy options, 142–46
 - public expenditure on, 136, 137*f*, 141
 - reforms, 145
 - as share of GDP, 151–52
 - social spending, 115*f*, 116*f*
- Heng, Dyna, 218, 219
- Herrera, S., 114
- Hispanics
 - remittances and, 57*f*
 - unemployment of, 56
 - in United States, 56
- Homicides, 4*f*
 - in CAPDR, 88
 - in El Salvador, 101*f*, 104*f*
 - GDP and, 94*f*
 - in Honduras, 101*f*
 - in Northern Triangle, 85
 - reduction of, 101–2
 - robberies and, 92
 - trends in, 89*f*
- Honduran Social Security Institute (IHSS), 103
- Honduras
 - CAR in, 271*f*
 - countercyclical capital buffer in, 270*f*
 - credit in, 278
 - crime in, 91, 101–3
 - escape clauses in, 179
 - fiscal policy in, 153–55
 - fiscal reform scenarios, 156*f*
 - fiscal responsibility laws in, 178, 183
 - health care in, 145
 - homicides in, 101*f*
 - household surveys, 36–37
 - inequality in, 155, 156*f*
 - microdata on, 40*t*
 - pensions in, 139
 - police force in, 102
 - poverty in, 3, 156*f*
 - regression analysis, 40*t*
 - social spending in, 112, 115–16, 120–21
- Households, 222–24
 - inclusion of, 223*f*
 - in LAC, 223*f*
- HP filter methodology, 274
- Human capital, 6, 22*f*
 - accumulation of, 51
 - quality of, 21–22
- I**
- IFS. *See* International Financial Statistics
- IHSS. *See* Honduran Social Security Institute

- Immigration
 - Latin America and, 46*f*
 - laws, 90
 - shifts in, 56–57
 - United States and, 90
 - Immigration Reform and Control Act, 91
 - Implementation capacity, 172
 - Inclusion, 218–19
 - of households, 223*f*
 - indices, 222*f*
 - of SMEs, 222–24
 - Income
 - female labor force participation and, 31–32
 - remittances and, 49*f*
 - Income per capita, trade composition and, 75*f*
 - Indirect costs, of crime, 85–86
 - Indirect value added, growth and, 77*t*
 - Inequality, 3*f*; 9–10
 - in El Salvador, 230–31
 - fiscal policy and, 153–54
 - GDP and, 225–26
 - growth and, 224–26
 - in Guatemala, 229–30
 - in Honduras, 155, 156*f*
 - measures of, 155
 - VAT and, 157*f*
 - Inflation, 10–11
 - in CAPDR, 194*f*
 - in Costa Rica, 265
 - exchange rate regimes and, 213–14
 - remittances and, 55
 - targeting, 213–14
 - unemployment and, 26–27
 - Informal employment, gender gap and, 30*f*
 - Informality, 217
 - Infrastructure
 - in CAPDR, 34–35
 - female labor force participation, 34–35
 - growth and, 77*t*
 - in LAC, 223*f*
 - quality index, 4*f*
 - in rural areas, 38
 - trade composition and, 75*f*
 - transportation, 80
 - Innovation
 - brain drain and, 51
 - supporting, 21
 - Input-output combinations
 - education, 113*f*
 - social spending, 115*f*
 - Institutional framework, for
 - macroprudential policy, 236–40
 - Institutional frameworks, 197
 - Integrated Trade Intelligence Portal (I-TIP), 64
 - Intensity-based indexes, 242
 - liquidity and, 248*f*
 - Interbank market
 - development of, 202
 - interest rates, 195
 - Interest rates
 - in CAPDR, 194*f*
 - interbank market, 195
 - long-term, 197
 - long-term government securities and, 196
 - pass-through, 207*f*
 - short-term government securities and, 196
 - Intermediation costs, 225
 - combined effects of, 228–29
 - lowering, 228
 - International Financial Statistics (IFS), 216
 - International reserves, in CAPDR, 194*f*
 - Interregional exports, 66*f*
 - Interregional trade, 64
 - Intraregional exports, 66*f*
 - Intraregional trade, 64
 - Investment, supporting, 22–23
 - I-TIP. *See* Integrated Trade Intelligence Portal
- K**
- Kapsoli, Javier, 114
- L**
- LA6, 70
 - product complexity in, 71*f*
 - Labor force participation
 - CAPDR, 30*f*
 - global, 30*f*
 - in LAC, 134*f*
 - See also* Female labor force participation
 - Labor markets
 - efficiency, 34
 - formalization in, 145

- microdata on, 37
- policies affecting, 145–46
- in rural areas, 163
- transformation, 21–22
- in urban areas, 163
- Labor productivity, crime and, 99*f*
- LAC. *See* Latin America and the Caribbean
- Laeven, Luc, 252
- Latin America and the Caribbean (LAC), 218
 - contributory benefits in, 137*f*
 - crime in, 87, 88*f*
 - demographics in, 134*f*
 - emigration from, 45, 46*f*
 - financial development in, 220*f*
 - health care in, 137*f*
 - households in, 223*f*
 - immigration and, 46*f*
 - infrastructure in, 223*f*
 - labor in, 134*f*
 - market access of, 72
 - maternal mortality in, 3
 - pensions in, 137*f*, 138*f*
 - regional trade clusters in, 65*f*
 - remittances to, 46
 - trade integration in, 62–63
 - United States and, 64–65
- Laurens, Bernard, 202
- Legal reforms, 192
- Lending rates, 207*f*
- Leverage ratio, 245
- Life expectancy, 3
 - education and, 113*f*
 - health-adjusted, 114
- Lim, Cheng Hoon, 240
- Liquidity
 - coverage ratio, 251*n*18
 - instrument intensity, 248*f*
 - macroprudential policy and, 241*t*, 250*f*
 - tools, 248–51
- Loan-deposit spreads, 230
- Loan-to-value ratio, 247–48
- Logistics performance, 73*f*
- Long-term government securities, interest rates and, 196
- Long-term interest rates, 197
- Loss function, central banks, 212
- Lowe, Phillip, 274
- M**
- MACCIH. *See* Mission against corruption and impunity
- Macroeconomic models
 - crime and, 86–87
 - stability of, 167
 - VAT and, 155
- Macroprudential authority, 239*t*
- Macroprudential committee (MPC), 236
- Macroprudential decision-making, 237*t*, 238*t*
- Macroprudential policy, 11, 193, 233
 - broad-based, 241*t*, 244–46, 244*f*
 - in CAPDR, 240–54
 - effectiveness of, 252–54
 - indices, 240–41, 244*f*
 - institutional framework for, 236–40
 - instruments, 240–52
 - liquidity and, 241*t*, 250*f*
 - reserve requirements and, 249*f*
 - results, 243–44
 - sector-specific, 241*t*
 - structural tools and, 251–52
 - systemic risks and, 234–36
- Malnutrition, 3
- Mano Dura, 103–4, 105
- Maquilas, 67, 68
 - exports, 78
 - production activity in, 69
- Marital status, microdata on, 37
- Market access
 - of CAPDR, 72
 - of LAC, 72
- Market diversification, 82
- Market shares, in apparel sector, 68*f*
- Maternal mortality, in Latin America, 3
- Medium-Term Fiscal Framework (MTFF), 167
- Mercosur, 81
- Meza, Mynar, 240
- Mi Bono Seguro, 159
- Microdata
 - on Costa Rica, 38*t*
 - on education, 37
 - on female labor force participation, 36–37
 - on fertility, 37
 - on Guatemala, 39*f*
 - on Honduras, 40*t*

- on labor markets, 37
- on marital status, 37
- Migration
 - GDP and, 51*f*
 - growth and, 50–52
 - importance of, 43
 - returning, 58
 - See also Emigration; Immigration
- Mink, M., 261
- Mission against corruption and impunity (MACCIH), 103
- Monetary policy, 10–12
 - CAPDR, 190–95, 197–204
 - data, 216
 - exchange rate regimes and, 198–204
 - frameworks, 189, 198–204
 - moderning, 190–95
 - rates, 204–5
 - sources, 216
 - stabilization policy and, 210–13
- Monetary transmission, mechanism, 195–97
- Money markets, 192
 - bank lending rates and, 205–6
 - development of, 202
 - discount rate and, 205*t*
 - rates, 204–6, 205*t*
- MPC. See Macprudential committee
- MRIO. See Multi-region input-output table
- MS-13 gang, 104
- MTFF. See Medium-Term Fiscal Framework
- Multi-region input-output table (MRIO), 67
- Multivariate Kalman filter, 27
- N**
- NAIRU, 27
- Natural disasters
 - emigration and, 44–45
 - remittances and, 53*f*
- Net enrollment rates, 113*f*
- Net Stable Funding Ratio, 251
- New Keynesianism, 25
- Nicaragua, 1
 - CAR in, 271*f*
 - countercyclical capital buffer in, 270*f*
 - credit in, 278
 - pensions in, 138, 143*t*
 - social spending in, 117, 121
- Non-compliance, fiscal responsibility laws, 176*f*
- Noneconomic shocks, 56–57
- Non-financial public sector debt, 181*f*
- Non-parametric methods, 125
- Nonperforming loans (NPLs), 54–55, 258, 259*f*
- Nontariff barriers, 80–81
- Northern Triangle, 1, 3, 5, 58
 - emigration from, 44
 - homicides in, 85
 - robberies in, 87
- NPLs. See Nonperforming loans
- O**
- Occupations, emigration and, 47*f*
- Okun's law, 25
- Old-age dependency ratio, 9
 - increasing, 133
- Olmstead-Rumsey, Jane, 242
- Operational targets, in fiscal responsibility laws, 178
- Organization of American States, 103
- Organized crime, 96–97
- Output shock terms, 26
- P**
- Panama, 1, 243
 - CAR in, 271*f*
 - Colon Free Zone, 67
 - contribution systems in, 139
 - countercyclical capital buffer in, 270*f*
 - debt objectives in, 178*n*16
 - DPR and, 246*n*10
 - economic complexity of, 15–16
 - escape clauses in, 179
 - fiscal responsibility laws in, 178, 180–81
 - growth in, 1–2
 - health care in, 145
 - PAYG in, 139
 - pensions in, 143*t*
 - public sector debt in, 181*f*
 - transportation infrastructure in, 80
- Pang, G., 114
- Parametric methods, 124–25
- Parametric reforms, for pension systems, 143*t*
- Participation costs, 224, 225
 - combined effects of, 228–29
 - lowering, 227–28

- Pass-throughs, 206
- Pay-as-you-go (PAYG), 133
 - in CAPDR, 135
 - in Panama, 139
 - public spending on, 138
 - reform of, 142
- PDV. *See* Present discounted value
- Pensions, 9
 - adequacy ratios, 140*f*, 144*f*
 - in CAPDR, 135–36
 - characteristics, 137*f*
 - contribution rates, 137*f*, 143–44
 - in Costa Rica, 138, 143*t*
 - without defined benefits, 151
 - in Dominican Republic, 143*t*
 - in El Salvador, 139, 143*t*
 - fiscal costs, 138–40
 - in Guatemala, 139, 143*t*
 - in Honduras, 139
 - in LAC, 137*f*, 138*f*
 - main drivers, 140*f*
 - in Nicaragua, 138, 143*t*
 - in Panama, 143*t*
 - parameters, 135–36, 136*t*
 - parametric reforms of, 143*t*
 - policy options, 142–46
 - reforms, 142–44
 - sustainability of, 139
- Personal income tax, VAT and, 157
- Philips curve, 25
 - equations, 26
- Plotnikov, Dmitry, 94
- Police force, in Honduras, 102
- Political procyclicality, 171–72
- Potential employment growth
 - in El Salvador, 16–17
 - in Guatemala, 16–17
 - medium term trends in, 20
- Potential output growth, 14*f*
 - of CAPDR, 13
 - decline in, 18–20
 - defining, 25
 - determinants of, 19*f*
 - evolution of, 14–18
 - medium term trajectory of, 19–21
 - shocks and, 26
 - stochastic process for, 25
 - theoretical primer on, 25–27
 - trend output and, 25
- Poverty, 3*f*
 - in Dominican Republic, 3
 - in El Salvador, 3
 - in Guatemala, 3
 - in Honduras, 3, 156*f*
 - VAT and, 157*f*
- Present discounted value (PDV), 151
- Private investment, 23*f*
- Product complexity
 - in CAPDR, 71*f*
 - in LA6, 71*f*
- Product proximity, 72–73
 - in CAPDR, 74*f*
- Progressivity, 9–10
- Prosecution, 96
- Public expenditure, 8–9
 - on health care, 136, 137*f*, 141
 - on PAYG, 138
 - on pensions, 139
 - See also* Social spending
- Public sector debt
 - non-financial, 181*f*
 - in Panama, 181*f*
- Pupil-teacher ratios, 113*f*
 - in El Salvador, 119
 - social spending and, 115*f*
- R**
- RCA. *See* Revealed comparative advantage
- R&D, 21
- Real effective exchange rate (REER),
 - remittances and, 55
- Regional cooperation, 82
- Regional Council of Financial
 - Superintendent, 235–36
- Regional exports, 66*f*
- Regional trade clusters, in LAC, 65*f*
- Regional value chains, 64
- Regression analysis
 - Costa Rica, 38*t*
 - country-by-country, 53
 - credit gap and, 276–79
 - cross-country, 35*t*
 - of female labor force participation,
 - 32–36
 - Guatemala, 39*f*
 - Honduras, 40*t*
- Regulatory capital, 259*f*
- Regulatory environment, 202

- Remittances, 43
 - banking relationships and, 49–50
 - to CAPDR, 44*f*, 46–50, 48*f*
 - competitiveness and, 55
 - consumption and, 52
 - costs of, 48–49, 50*f*
 - credit and, 54–55
 - dependence on, 56–58
 - GDP and, 51*f*
 - GFC and, 56
 - growth and, 50–52
 - Hispanics and, 57*f*
 - by income, 49*f*
 - inflation and, 55
 - to LAC, 46
 - long-term effects of, 54
 - natural disasters and, 53*f*
 - REER and, 55
 - revenue raised by, 52–53
 - securitization of, 54
 - sending, 48–49
 - shocks and, 52
 - short-term effects of, 54
 - sizable, 46–50
 - stabilizing role of, 52–56
 - in sub-Saharan Africa, 49
 - unemployment and, 57*f*
 - United States and, 48
- Replacement rates, 139
 - calculation of, 151*n*16
- Reporting systems, transparency of, 168
- Reserve requirements, macroprudential
 - policy and, 249*f*
- Retirement, 139
 - age of, 143
- Revealed comparative advantage (RCA), 68–69
 - CAPDR, 69*f*
 - increasing, 73–74
 - in new product groups, 69–70
- Revenue
 - collection of, 163
 - mobilization, 153
 - remittances raising, 52–53
- Robberies
 - homicides and, 92
 - in Northern Triangle, 87
 - trends in, 89*f*
- Rule of law index, 4*f*
- Rural areas
 - infrastructure in, 38
 - labor markets in, 163
- S**
- Samarina, A., 261
- Sanctions, fiscal responsibility laws and, 179
- San Pedro Sula, 103
- School enrollment, female labor force
 - participation by, 33*f*
- Sectoral capital requirements, 247–48
- Sector-specific tools, 246–48
- Segalotto, Jean-Francois, 202
- SFA. See Stochastic frontier model
- Shocks
 - buffers to, 111
 - noneconomic, 56–57
 - output shock terms, 26
 - potential output growth and, 26
 - remittances and, 52
- Short-term government securities, interest
 - rates and, 196
- Simar, L., 126
- Simulated minimum requirement, 271*f*
- Small and medium enterprises (SMEs), 218–19, 223*f*
 - inclusion of, 222–24
- Social development, growth and, 3
- Social Fiscal Responsibility Law, 181
- Social programs, 9–10
- Social spending, 229–30
 - allocative efficiency, 125*f*
 - benchmarking methodology, 124–32
 - in Costa Rica, 112, 117, 121–22
 - on education, 116*f*
 - in El Salvador, 117–19
 - empirical results, 114–18
 - in Guatemala, 117, 119–20
 - health care, 115*f*, 116*f*
 - in Honduras, 112, 115–16, 120–21
 - in Nicaragua, 117, 121
 - policy recommendations, 118–23
 - pupil-teacher ratios and, 115*f*
 - trends in, 112–14
- Stability, 165
 - of macroeconomic models, 167
 - remittances and, 52–56
- Stabilization policy, monetary policy and, 210–13

- Steady-states, 226
- Stochastic frontier model (SFA), 125
- Structural factors, 6
 - growth and, 4*f*
- Structural tools, macroprudential policy and, 251–52
- Sub-Saharan Africa, remittances in, 49
- Supply curves, 163
- Supreme Court, fiscal responsibility laws and, 183
- Sustainability
 - fiscal responsibility laws and, 171
 - of pensions, 139
- Systemic risks
 - defining, 234*n*1
 - macroprudential policy and, 234–36
 - measurement of, 252
 - sources of, 234
- T**
- Tariffs, trade composition and, 75*f*
- Taxation
 - in Guatemala, 156–57
 - increases, 161*f*
 - mobilization, 154
 - personal income, 157
 - progressive, 153–54
 - remittances and, 52–53
 - See also Value added tax
- Tax credits, 39–40
- Tax net, 154
- Technology
 - in Africa, 49–50
 - female labor force participation and, 37
- Telecoms, 34
- Temporary protected status (TPS), 56–57
- Terms of trade, growth and, 77*t*
- TFP. See Total factor productivity
- Toolkit model, 163–64
 - summary, 164*f*
- Total bank credit, 259*f*
- Total factor productivity (TFP), 13
 - decline in, 18–19
 - in El Salvador, 16
 - growth, 14–15
 - in Guatemala, 16
 - medium term trends in, 20
 - rebound in, 15
- TPS. See Temporary protected status
- Trade agreements
 - CAPDR, 63*f*
 - preferential, 80
- Trade barriers, in CAPDR, 64*f*
- Trade composition
 - CAPDR, 68–71
 - determinants of, 75*f*
 - education and, 75*f*
 - Gini index and, 75*f*
 - income per capita and, 75*f*
 - infrastructure and, 75*f*
 - tariffs and, 75*f*
- Trade determinants, 72–76
- Trade expansion, structural factors, 72
- Trade flows, 61
- Trade initiatives, important, 79*f*
- Trade integration
 - of CAPDR, 62–68
 - global context of, 62–68
 - growth and, 77*n*15
 - in LAC, 62–63
 - as pillar of growth strategy, 61
 - policy implications, 81–82
 - spurring, 78
 - supporting, 81–82
- Trade liberalization, 7
- Trade openness
 - CAPDR, 62*f*, 235*t*
 - growth and, 77*t*
- Trade policy
 - authorities', 79*f*
 - objectives, 79*f*
 - regional view of, 78–81
 - strategies, 79*f*
 - survey results on, 79*f*
- Transparency, 165
 - in CAPDR, 193
 - in fiscal responsibility laws, 170, 176*f*, 180
 - improvements in, 180
 - of reporting systems, 168
- Transparency International, 216
- Transportation infrastructure, in Panama, 80
- Trend output
 - defining, 25
 - potential output growth and, 25
- Trump, Donald, 57

U

Uncertainty penalty, 212

Unemployment

crime and, 99

evolution of, 26–27

gender gap, 30*f*

of Hispanics, 56

inflation and, 26–27

remittances and, 57*f*

Unionization, crime and, 100

United States

deportations from, 91–94

emigration to, 45–46

exports to, 62–63

Hispanics in, 56

immigration and, 90

LAC and, 64–65

remittances and, 48

Univariate models, 264

V

Vacancy-posting costs, crime and, 100

Value added tax (VAT), 154

economic activity and, 157*f*

impact of, 157*f*

increases in, 155

indirect, 160

inequality and, 157*f*

macroeconomic models and, 155

personal income tax and, 157

poverty and, 157*f*

Van Eden, H., 166

VAR. See vector autoregression

VAT. See Value added tax

Vector autoregression (VAR), analysis,
206–7

Victimization surveys, 88–89

evidence from, 90*f*

Violence, in El Salvador, 105

W

Wages, emigration and, 47*f*

War tax, 95

Weighted average tariffs, in CAPDR, 63*f*

Wilson, P. W., 126

Women

labor force participation of, 22, 29–30

unequal status of, 29

Workers, crime and, 94–96

Working age population, 17*f*

CAPDA in, 20

World Bank, 50

Global Financial Development

Indicators, 216

World Development Indicators, 32

World Population Prospects report, 133,
150

World Prison Brief, 102

World Trade Organization, 62–63, 80

Y

Yo Cambio, 105

Over the past three decades, countries in Central America, Panama, and the Dominican Republic have experienced a sustained economic transformation. The region has moved away from its rural and agricultural past to a modern and urban present and has significantly integrated its economies regionally and globally. Many factors have shaped the region's economic performance and are expected to contribute to its future development.

This book aims to foster policy dialogue and contribute to the efforts to address the region's unique challenges. First, this volume looks at the region's growth with a view to understanding how structural determinants have contributed to the region's uneven gains and shaped priorities to strengthen the foundations of growth. Next, the book highlights the importance of addressing the region's fiscal challenges and how it can support growth and improve social outcomes. Finally, the book emphasizes the importance of a supportive financial sector for growth, including through financial inclusion and development.

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