5. Advancing Financial Development in Latin America and the Caribbean

In recent years, many Latin American and Caribbean (LAC) countries have made significant efforts to develop their financial systems. This chapter examines the current state of financial development in the region, as well as implications for potential growth and stability from further development. The analysis suggests that access to financial institutions has expanded notably in the past decade, and LAC compares favorably with other emerging market regions on this dimension. Nonetheless, the region continues to lag behind peers on broader financial development, especially with respect to markets, though there is substantial heterogeneity across countries. Moreover, financial systems in many LAC countries appear underdeveloped relative to their macroeconomic fundamentals. From today's vantage point, therefore, further financial development would likely convey net benefits to the region, provided there is adequate regulatory oversight to prevent excesses.

Measuring Financial Development

Financial development has proven difficult to measure in a comprehensive way. Typical proxies in the literature have included the ratio of private credit to GDP and, to a lesser extent, stock market capitalization. These traditional indicators, however, are too narrow to capture the broad spectrum of financial sector activities. Indeed, nonbank financial institutions (pension funds, insurance companies, mutual funds, etc.) have grown significantly over the past decade, providing opportunities for greater consumption smoothing, investment funding, and risk diversification across households and firms (Figure 5.1). Similarly, financial markets have grown and become more diversified, with access to market finance available to a wider set of economic agents.

Note: Prepared by Dyna Heng, Anna Ivanova, Rodrigo Mariscal, Uma Ramakrishnan, Joyce Cheng Wong, with contributions from Steve Brito.

Figure 5.1

Nonbank Assets
(Regional averages in percent of GDP)
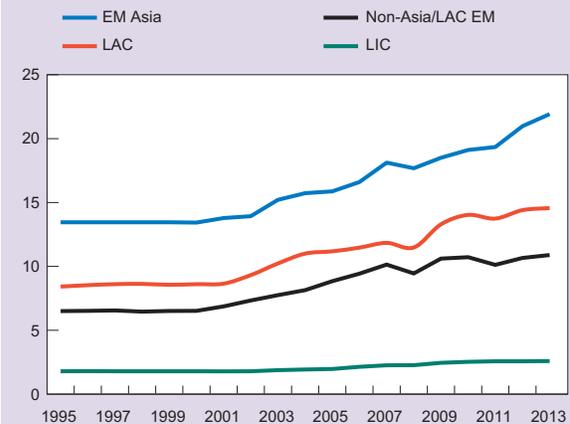
Sources: World Bank, FinStats and World Development Indicators; and IMF staff calculations.
Note: Nonbank assets are defined as the sum of insurance company assets and mutual fund assets as a percent of GDP. Simple average across countries. EM Asia = emerging Asia; LAC = Latin America and the Caribbean; Non-Asia/LAC EM = emerging market economies excluding Asia and LAC; LIC = low-income countries.

To better capture different facets of these trends, a new comprehensive and broad-based index of financial development was developed by the IMF (Sahay and others 2015a). The index contains two major components: financial institutions and financial markets. Each component is broken down into access, depth, and efficiency subcomponents. These subcomponents, in turn, are constructed based on a number of underlying variables that track development in each area. We employ the same framework to capture financial sector development in LAC, with a few modifications (Figure 5.2 and Annex 5.1). Even though data availability limits the choice of countries and variables for index construction, the database includes 123 countries for 1995–2013.

There are some striking differences between our financial development index and more
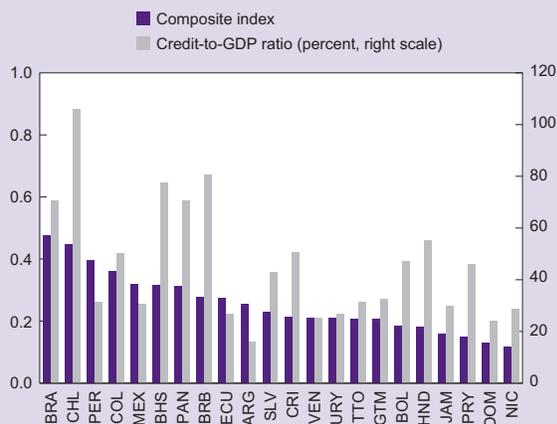
Figure 5.2

How to Measure Financial Development
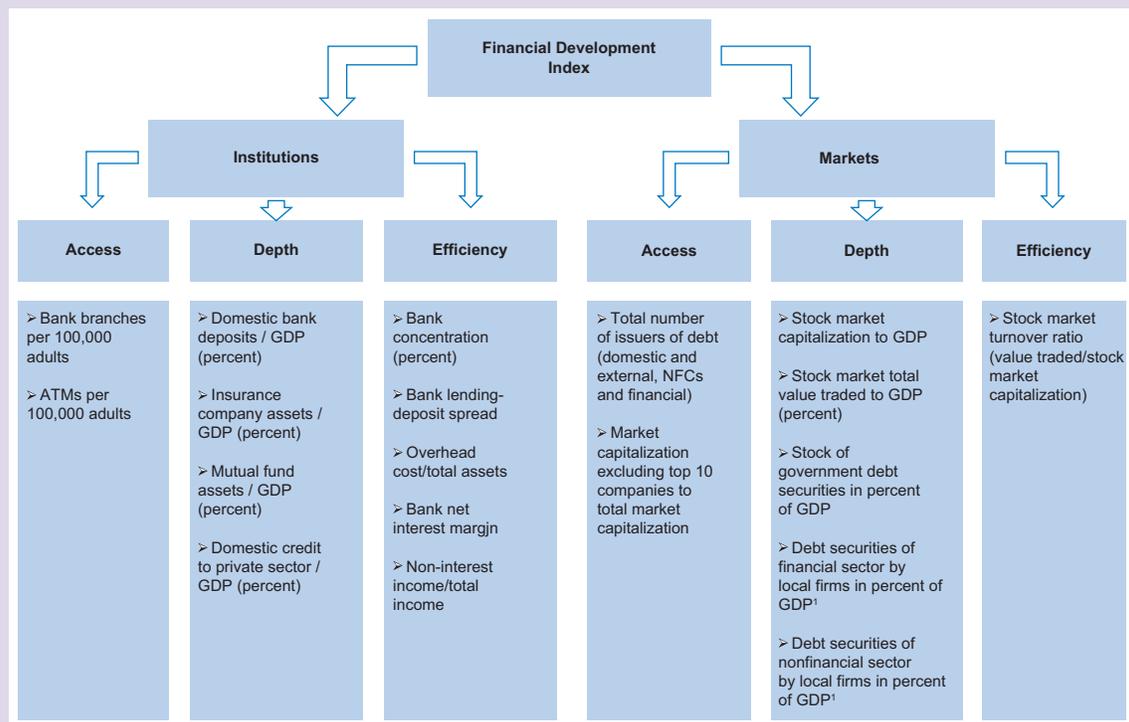
Source: IMF staff calculations.
Note: NFCs = nonfinancial corporations.
[1]Stock of debt by local firms is based on residency concept.

Figure 5.3

Composite Financial Development Index vs. Credit-to-GDP Ratio, 2013

Sources: World Bank, FinStats and World Development Indicators; and IMF staff calculations.
Note: The composite index takes values from zero to one, with one indicating the highest level of financial development based on the performance of 123 countries from 1995–2013. For country name abbreviations, see page 89.

traditional measures (Figure 5.3). For example, driven by large domestic banks, Honduras's credit ratio—the most common measure of financial deepening—is high, suggesting strong financial development. Honduras, however, does not fare well on nonbank institutional depth, efficiency of financial institutions, or on all aspects of financial market development, resulting in a weaker composite index. In a similar vein, Trinidad and Tobago's stock market capitalization is currently the third highest in the region but this ranking reflects to a large extent cross-listing of regional companies, while market access by domestic companies and market efficiency measured by the turnover ratio have remained low. That points to the limitations of market cap measures to signal "financial development." Trinidad and Tobago also does not score well on access to financial institutions.

Financial Development: Where Does LAC Stand?

Overall, countries in LAC compare unfavorably with other emerging markets with respect to financial development. In fact, only low-income countries (LICs) lag behind LAC (Figure 5.4). However, results vary by component:

- LAC scores higher on financial institutions than on financial markets, a feature shared with LICs. Even so, the LAC region's scores on depth and efficiency of financial institutions lag other emerging market regions, as do its metrics for all the subcomponents of financial market development.

- The category in which LAC excels relative to other emerging markets is access to financial institutions, reflecting the emphasis that countries have placed on improving financial inclusion through improved bank and ATM networks. However, LAC still lags other emerging market regions on the level of usage of financial services by households (Box 5.1).

Moreover, there is substantial variation in financial development across LAC (Figure 5.5). Chile and Brazil rank the highest in the development of financial markets and financial institutions, respectively. Peru, Colombia, and Mexico are next on the list; the latter has made major strides recovering from its 1994 crisis.

- Chile's financial reforms began in the mid-1970s, with measures to facilitate bond and equity market development. The creation of a fully funded pension system generated a large domestic institutional investor base, which provided stable demand for private bonds of increasingly longer maturities. Reforms in the 2000s gave institutional investors further flexibility to increase the portion of their portfolios invested in domestic equities. Currently, the domestic bond market represents almost 40 percent of GDP, while the market

Figure 5.4

Interregional Variation in Financial Development

1. Financial Development by Region, 2004 and 2013
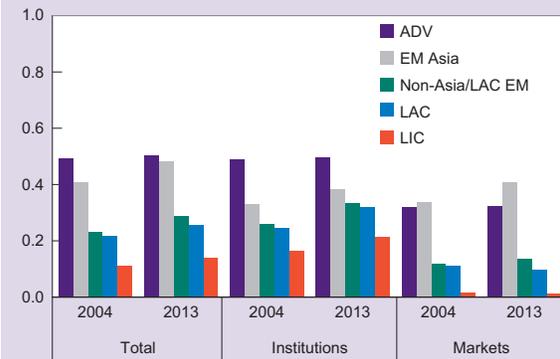
2. Components of the Financial Development Index by Region, 2013
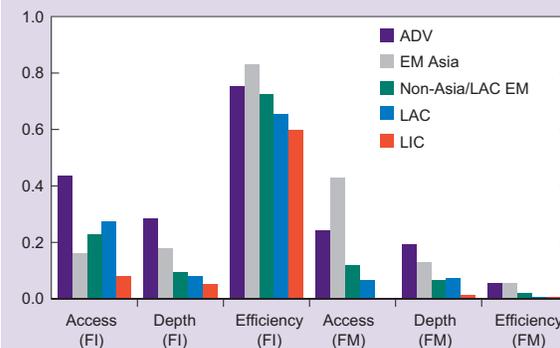
3. Distribution across Institutions and Markets, 2013[1]
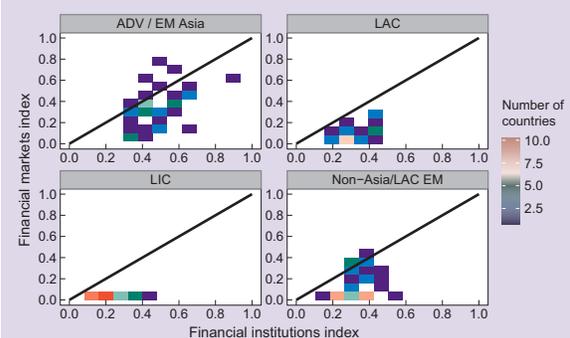
Source: IMF staff calculations.
Note: ADV = advanced economies; EM Asia = emerging Asia; FI = financial institutions; FM = financial markets, LAC = Latin America and the Caribbean; LIC = low-income countries. Non-Asia/LAC EM = emerging market economies excluding Asia and LAC.
[1]Two-dimensional histogram based on countries' frequency. The rectangular bins show the number of countries for each combination of FI and FM.

value of listed companies in the equity market (about 90 percent of GDP) far exceeds that of its neighbors.

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Figure 5.5

Latin America and the Caribbean: Financial Development Progress and Remaining Gaps
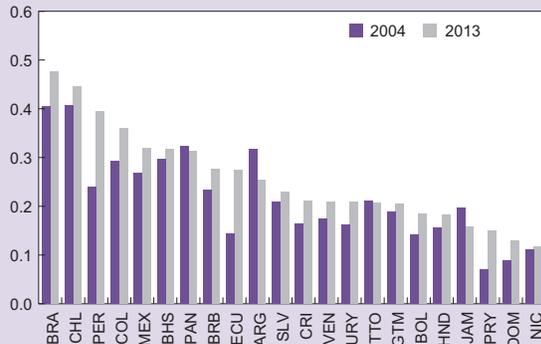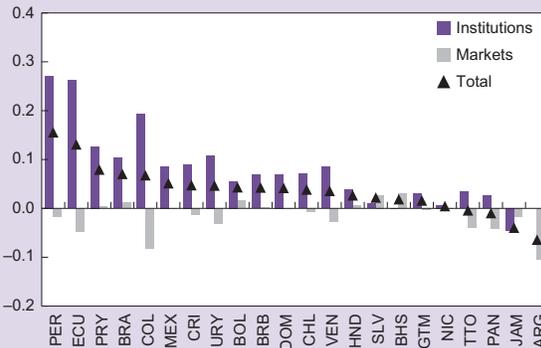
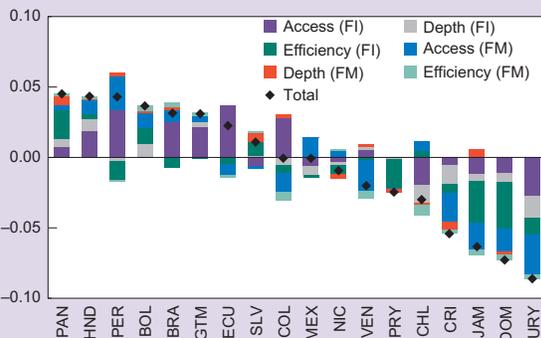**1. Financial Development Index**
(Composite index)

2. Changes in Financial Development Index, 2004–13
(Change of composite index between dates)

3. Financial Development Gaps with Respect to Country's Own Fundamentals, 2013¹

Source: IMF staff calculations.
Note: FI = financial institutions; FM = financial markets. For country name abbreviations, see page 89.
¹Gap decomposition is calculated using the aggregated reggression specification on the individual components.

- Brazil, in contrast, saw rapid development in both financial institutions and markets over the past decade. The government implemented a market-friendly debt management strategy, which helped develop the domestic capital market, including lengthening maturities of government bonds, building benchmarks at different points along the yield curve, and reviving the market for covered bonds. These reforms also contributed to the development of Brazil's financial institutions—the ratio of insurance company assets to GDP more than doubled in the past decade, while mutual fund assets grew from 30 percent of GDP to 50 percent of GDP, making Brazil sixth in the world, excluding financial centers. The markets for private bonds, equities, and derivatives also grew remarkably.

- After its 1994 crisis, Mexico focused on increasing trust in the banking system by strengthening regulations, reforming deposit insurance, and improving collateral execution and information sharing among credit bureaus.[1] At the same time, there were also reforms to promote financial education and competition in the banking sector. All these reforms contributed to an acceleration in credit growth, which is a welcome development given the still low credit to GDP ratio.

Other LAC countries (such as Colombia, Ecuador, and Peru) also experienced notable progress in financial development over the past decade. In particular, Colombia and Peru took large steps in developing financial institutions as the number of commercial bank branches more than quadrupled. In Ecuador the number of bank branches also grew dramatically, driven by the expansion of two large banks and the conversion of several cooperatives into commercial banks. On the market side, The Bahamas and El Salvador have seen notable development, with the former rooted in the growth of the financial sector.

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[1] See Klemm and Herman (forthcoming) for a discussion of financial intermediation in Mexico.

Financial Development and Macroeconomic Fundamentals

For many LAC countries, the current stage of financial development does not appear to be fully aligned with their respective macroeconomic fundamentals. Financial development gaps—computed as the deviation of the IMF's index from a prediction based on economic fundamentals, such as income per capita, government size, macroeconomic stability, and others (see Annex 5.1)—can help identify potential distortions or other sources of financial under- or overdevelopment for individual countries (see Figure 5.5).[2]

Consistent with previous studies (De La Torre, Ize, and Schmukler 2012; De La Torre, Feyen, and Ize 2014) we find that shortfalls on institutional efficiency and depth as well as market access and efficiency are common in LAC. The gaps can reflect a variety of factors. For instance, financial systems that experienced crises in the more recent past may still be in recovery mode. In the case of the Dominican Republic, which experienced a financial crisis in 2003, for example, the *lower* levels of development than those implied by fundamentals partly reflect the erosion of trust in financial institutions and depressed demand for credit as a consequence of the crisis. In Uruguay (which had a banking crisis in 2002), on the other hand, the negative gap mostly reflects low access to financial institutions and markets. Negative gaps can also result from weak frameworks for obtaining or seizing collateral (for instance, Peru's negative efficiency gap). In other cases (e.g., Jamaica's negative efficiency gap), the lack of efficiency reflects both high levels of bank concentration and a historical investment dependence on low-risk government debt, which has hindered banks'

capacity for risk assessments when lending to the private sector, thus driving up spreads. Negative market efficiency gaps in LAC are linked to offshoring by larger companies, according to De La Torre, Ize, and Schmukler (2012), though the underlying drivers still need to be identified.

Positive gaps in financial development should also be examined for indications of potential excess or inefficiency. For example, Bolivia's use of regulated interest rates and credit quotas for certain sectors can pose risks to banks' profitability and generate inefficient allocation of credit. Similarly, rapid credit growth in Honduras beyond what can be justified by macroeconomic fundamentals has largely fueled consumption due to scant investment opportunities. In yet other countries, notably in Central America, positive gaps in the development of financial markets capture the fact that stock markets feature a small number of listed firms but hardly see any trading activity, lack adequate legal and contractual infrastructure, and are not viewed as an affordable financing source by the majority of domestic companies.

Countries in LAC should strive to alleviate gaps in financial development. Given that macroeconomic fundamentals are often difficult to change in the short term, policies to alleviate gaps in financial development should be tailored to address country-specific distortions (see Conclusions).

The Nexus between Finance, Stability, and Growth: What Is in Store for LAC?

Financial development has been shown to be positively related to economic growth (Goldsmith 1969; McKinnon 1973; Shaw 1973; Beck, Demirgüç-Kunt, and Levine 2004; Levine 2005). Efficient financial systems help channel capital to productive uses, provide insurance against shocks, reduce information asymmetries, and can potentially alleviate poverty and inequality (Beck, Demirgüç-Kunt, and Levine 2004). Sound financial systems can also foster innovation and entrepreneurship through risk diversification (King and Levine 1993).

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[2] The regressions explain a large portion of the variation in financial development, with *R*-squares of 0.74 and 0.61 for institutions and market regressions, respectively. Nonetheless, the lack of a solid theory on the factors driving financial development implies that the correct model specification is subject to uncertainty. Hence, the gaps should be interpreted with due caution.

However, recent studies document the existence of a certain threshold of financial development beyond which additional deepening generates decreasing returns to growth and stability (Arcand, Berkes, and Panizza 2012; Sahay and others 2015a). One possible explanation is that large financial systems divert resources from productive activities to speculative and risky financial investments (Minsky 1975).[3] Also, excessive leverage and risk taking can lead to increased economic and financial volatility, with potentially negative consequences for long-term growth, especially if regulation and supervision are inadequate (IMF 2003; Reinhart and Rogoff 2011; Sahay and others 2015a; and Sahay and others 2015b).

Following previous work on this broad topic, we also find nonlinear relationships between financial development and growth (Figure 5.6), and between financial development and instability in LAC.[4] Financial development initially lowers the risk of macroeconomic instability, perhaps by creating greater opportunities for risk management, insurance, and diversification. However, there appears to be a turning point after which the marginal contribution to greater stability turns negative (Annex 5.1).[5] Similar nonlinearity also

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[3] Diminishing returns to growth from financial development were also documented in Cecchetti and Kharroubi (2012, 2015), Philippon and Reshef (2013), Aizenman, Jinjarak, and Park (2015), Cournède, Denk, and Hoeller (2015), and Sahay and others (2015a).

[4] We use a measure of financial instability calculated as the first principal component of the inverse of the z-score (the distance to distress), real credit growth volatility, and real and nominal interest rate volatility. For growth volatility the standard deviation of GDP growth is used.

[5] We tried testing the relevance of regulatory quality, as proxied by a dummy variable based on a z-score (see Annex 5.1), as a conditioning variable for the link between financial development and growth. However, adequately measuring regulatory quality presents a serious challenge due to (1) the lack of an appropriate measure across countries and over time, and, more important, (2) because most regulatory changes occur in response to financial crises which also affect growth, causing endogeneity problems for the regression.

Figure 5.6

Financial Institutions and Markets Development, and Economic Growth

1. Contribution to Growth by Institutions and Markets[1]
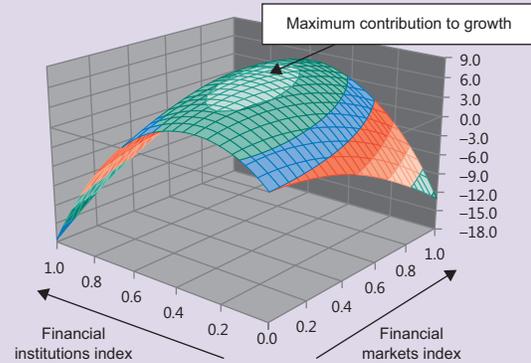
2. LAC: Composite Indices and Growth Contribution, 2013[2]
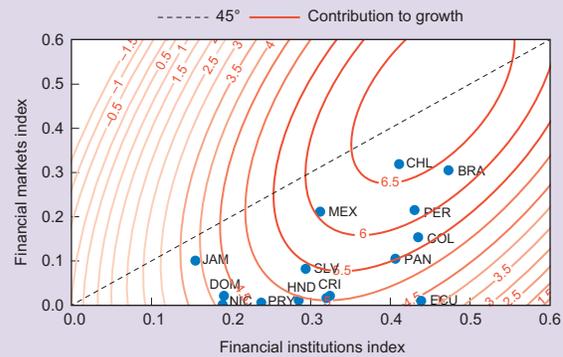
Source: IMF staff calculations.
Note: For country name abbreviations, see page 89.
[1] Surface shows the predicted effect on growth for each level of the indices, holding fixed other sets of controls.
[2] The lines show the levels of contribution to growth projected from a three-dimensional surface to a two-dimensional plane; circles show the financial institutions and markets combination for selected LAC countries.

holds for financial development and growth. This nonlinearity is particularly pronounced in the relationship between institutional depth and growth, maybe because a large financial system is more likely to give room for excessively risky behavior (Bruno and Song 2014; Rajan 2005), which, for instance, could generate excessive credit creation, and, in turn, portend large credit losses and macroeconomic instability, thus hindering strong and durable growth (Cecchetti and Kharroubi 2015). However, the linear relationship between growth and financial services efficiency suggests continued welfare gains from a more

efficient financial sector, though there could be stability costs because reduced bank profitability could provide incentives to diversify into riskier business areas.

Regression evidence also suggests that too much market development at the early stages of institutional development may have negative effects on stability. This is likely because the increased volatility from market development dominates when financial institutions are not strong enough to help insure against shocks. In particular, rapid market development driven by liberalization and deregulation without sound institutional and legal settings can make a country more vulnerable to market manipulation, volatile capital flows, and financial crises (Laeven 2014; De La Torre and Schmukler 2007). For similar levels of development, however, institutions and markets complement each other positively for both growth and stability. Hence, a gradual approach, aimed at first securing gains in institutional development before taking steps toward market development, may be warranted.

In summary, there is scope for further financial development in LAC over the longer horizon. Most of the countries in the region have not yet reached the turning point where marginal growth dividends from additional financial development become negative. Brazil and Chile are nearest to this "optimum" level of financial development, whereas the Dominican Republic, Paraguay, and Honduras are on the opposite side of the spectrum (Figure 5.7). Note that these relationships stem from a partial analysis that assumes that all other growth determinants (such as income level, inflation, government size, etc.) are held constant and financial development is consistent with the level of macroeconomic fundamentals.

Thus, in the longer term, reaping maximum benefits from financial development for growth and stability would also require improving a country's macroeconomic fundamentals, which in turn would support the further development of financial systems. This is an interactive process whereby financial systems are shaped by fundamentals, and fundamentals evolve partly as a function of more

Figure 5.7

Financial Development, Growth, and Stability

1. Predicted Contribution to Growth[1]
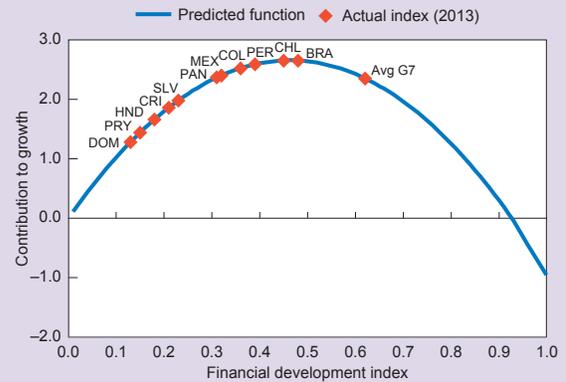
2. Predicted Contribution to Growth Volatility[2]
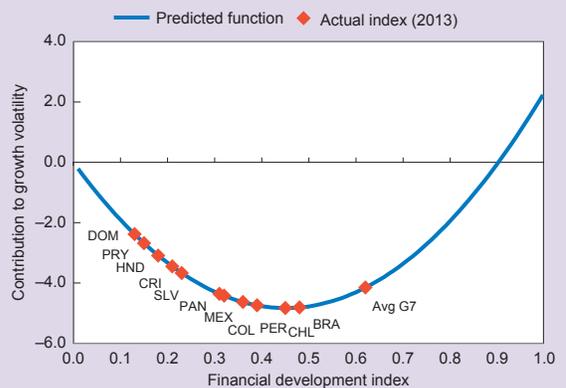
Source: IMF staff calculations.
Note: For country name abbreviations, see page 89.
[1]Curve shows the predicted effect on growth for each level of the index, holding fixed other sets of controls.
[2]Curve shows the predicted effect on growth volatility for each level of the index, holding fixed other sets of controls. Growth volatility refers to the standard deviation of GDP growth rate over five-year samples.

developed financial systems. Estimates should, however, be interpreted with caution since it is difficult to disentangle causality in econometric terms, even though instrumental variables were used to address potential endogeneity issues.[6]

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[6] We use the system generalized method of moments estimation (Arellano and Bover 1995; Blundell and Bond 1998) to address the dynamic dependence of our variables of interest and potential endogeneity of control variables. We also employ additional instrumental variables used in the literature, namely, rule of law (Kaufmann, Kraay, and Mastruzzi 2010) and a set of dummies for the country's legal origin (La Porta, Lopez-de-Silanes, and Shleifer 2008).

Conclusions and Policy Implications

Financial systems in LAC have developed and deepened in recent years but continue to lag other emerging market groupings, especially with respect to financial market development. More importantly, some countries have financial development gaps compared with the levels implied by their macroeconomic fundamentals. In particular, gaps on institutional efficiency and depth as well as market access and efficiency are common.

Given that the fundamentals are sticky in the short term, countries should explore policies tailored to their own circumstances and that aim to remove the distortions and, in turn, help close the financial development gaps.

While there is no one-size-fits-all solution, the literature points to several important building blocks for a well-functioning financial system, such as (1) strong property rights; (2) an efficient legal system; (3) low incidence of corruption; (4) sufficient financial information; (5) good corporate governance; and (6) sound prudential regulation and supervision of the banking system (Mishkin 2007; Laeven 2014). These building blocks could be useful in designing policies geared toward closing financial development gaps in LAC.

For example, LAC countries that are recovering from financial crises could benefit from improving the credibility of financial systems, strengthening capital and liquidity buffers, ensuring credible deposit insurance, and addressing balance-sheet mismatches. Many of these reforms were undertaken in Mexico after the 1994 crisis and have proven invaluable—although a negative financial development gap still remains in Mexico.

Countries that have negative gaps in the depth and efficiency of financial institutions (such as the Dominican Republic, Jamaica, and Peru) could explore strengthening institutional and legal

frameworks related to property rights and collateral, as well as improving the efficiency of courts and credit reporting systems (Emerging Market Committee 2012).

Similarly, LAC countries that have underdeveloped bond markets (such as Costa Rica and Uruguay) could benefit from following market-friendly debt management and issuance strategies, such as the use of standardized simple instruments with conventional maturities, to help foster secondary markets for government securities. These countries could also benefit from strengthening legal and regulatory frameworks.

Finally, countries where stock markets are underdeveloped or inefficient, which is the case for the majority of LAC countries, could benefit from a strong macroeconomic environment, institutional and legal frameworks that promote investor rights and information disclosure, as well as policies that increase market size (for example, pension reforms, carefully sequenced financial liberalization, corporate governance, and tax reforms; see Laeven 2014). However, in smaller LAC economies developing domestic equity markets may not be justified owing to the small market size.

In countries where financial development levels are *higher* than those implied by macroeconomic fundamentals (that is, positive development gaps), efforts could be reinforced to enhance supervisory vigilance aimed at improving credit quality and avoiding problems of poor underwriting quality, as well as strengthening macroprudential policy frameworks.

In the longer term, as fundamentals continue to evolve, LAC countries could benefit from further financial development by stimulating economic growth without jeopardizing macroeconomic and financial stability. The process, however, is likely to be gradual and iterative, with income growth supporting financial development and vice versa.

When financial development proceeds too fast, it can lead to economic and financial instability, especially where regulation and

supervision do not keep pace. Hence, developing regulation and supervision that are consistent with the existing level of financial development and embed enough flexibility to address future challenges in financial deepening is an important safeguard.

The sequencing of reforms could also be important. Indeed, care should be taken to avoid promoting excessive market development when financial institutions are underdeveloped, since this could jeopardize macroeconomic and financial stability.

Box 5.1

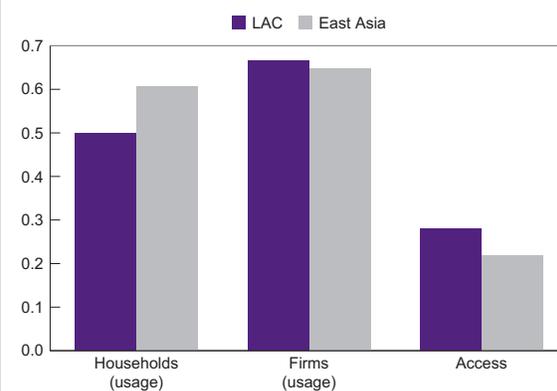## Financial Inclusion: Latin America and the Caribbean

Latin America and the Caribbean (LAC) has recently made strides in improving the financial inclusion of households, strengthening many dimensions, including the proportion of people having an account, saving and borrowing in a financial institution, and using ATMs and debit cards.[1] Despite this progress, the region continues to lag behind other emerging markets (particularly emerging Asia).[2] In 2014, only 47 percent of households in LAC had an account at a formal financial institution versus 60 percent of those in emerging Asia. Only 17 percent of adults in LAC save formally—about half the share of savers in emerging Asia (31 percent). Progress in the region has also been uneven: while Brazil, Chile, Mexico, and Uruguay took big steps forward between 2011 and 2014, there was much less progress in Haiti and Honduras. In the case of Haiti, household inclusion actually worsened between those years. LAC performs well on the usage of financial services by small

Figure 5.1.1
Financial Inclusion Index
(2011 data, 2014 for households)

and medium-size enterprises, more than 90 percent of which have an account at a financial institution—comparable to such firms in emerging Asia. The share of firms with a loan or line of credit (46 percent) is also comparable to that in emerging Asia (48 percent). In addition, the region is exploring options with nontraditional financing sources such as factoring.[3] Nevertheless, collateral requirements are high and access to, and the cost of, finance is seen as a major constraint by a larger share of firms—the average collateral (considering only collateralized loans) in LAC represents about 200 percent of the loan value, compared with 175 percent in east Asia. In some countries, this reflects cumbersome legal systems and regulations (for example, Peru) in others, information asymmetries and lack of

Note: This box was prepared by Joyce Wong.

[1] Financial inclusion is measured using three indices: (1) usage of financial services by households (FINDEX), (2) usage of financial services by enterprises (enterprise surveys), and (3) access to financial services (FAS). For further details on the indices, see Dabla-Norris and others (2015).

[2] Emerging Asia includes Brunei Darussalam, China, Fiji, Indonesia, Malaysia, the Philippines, and Thailand.

[3] Factoring refers to a financial transaction whereby a business sells its accounts receivable (for example, invoices) to a third party (called a factor) at a discount in exchange for immediate financing. Factoring differs from a bank loan in three ways. First, the emphasis is on the value of the receivables, not the firm's creditworthiness. Second, factoring is not a loan—it is the purchase of a financial asset (for example, the receivable). Finally, a bank loan involves two parties, whereas factoring involves three.

Box 5.1 *(continued)*

reliable credit information (for example, Guatemala). Furthermore, the legal proceedings to collect collateral in cases of nonpayment are cumbersome in many countries (for example, El Salvador).

LAC generally provides good access to financial infrastructure. Specifically, LAC has a higher number of bank branches, both in relation to country area and population, than other emerging markets. However, a severe urban-rural divide persists (for example, Guatemala), largely due to the generally weak infrastructure, and in some Latin American countries (Bolivia, Chile, Venezuela) and the Caribbean, overall access remains poor. With these concerns in mind, several countries in the region are moving ahead with e-money and mobile banking initiatives, taking advantage of the high levels of cell phone penetration in the population (for example, the "Peru Model").

Many LAC countries have created a favorable enabling environment for financial inclusion. According to the Global Microscope, LAC leads on enabling environment for inclusion, compared to other regions. Peru and Colombia top the list. LAC particularly excels in establishing credit bureaus and ensuring client protection but is lagging behind on regulation and supervision of microfinance and formation/operation of regulated microcredit institutions, although formation/operation of nonregulated microcredit institutions is thriving.

Reliance on nontraditional sources of finance, including informal finance, remains high. The correspondent model has helped to bridge the gap between informal and formal finance by allowing accessible retailers (food stores, gas stations, pharmacies) to act as intermediaries for basic financial transactions (deposits, withdrawal, bill payment).[4] LAC as a region has the highest number of banking correspondents per capita in the world. Brazil boasts the oldest (since 1973) and most developed correspondent model in the region but Mexico and Colombia have made significant strides in recent years as well. Nonetheless, informal finance remains important and has been growing in the region. More than one-fifth of households report borrowing from friends and family or an informal lender in 2014, up from 16 percent in 2011.

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[4] Banking 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.

Annex 5.1. Sources and Data Processing[1]

The data generally cover the period 1995 to 2013 with gaps, in particular, for countries in the Middle East, sub-Saharan Africa, and Latin America. For some variables, for example, ATMs per thousand adults, the data were only available starting in 2004. Our data came from numerous sources: the World Bank's World Development Indicators (WDI) database, FinStats, Non-Bank Financial Institutions database (NBFI), Global Financial Development database (GFD); the IMF's International Financial Statistics (IFS) database; Bureau van Dijk, Bankscope; Dealogic's debt capital markets statistics; World Federation of Exchanges (WFE); and the Bank for International Settlements' debt securities statistics.

After a gap-filling process to generate a balanced panel, all variables were normalized using the following formula:

$$I_{x,it} = \frac{x_{it} - \min(x_{it})}{\max(x_{it}) - \min(x_{it})}, \qquad \text{(A5.1.1)}$$

where $I_{x,it}$ is the normalized variable x of country i on year t, $\min(x_{it})$ is the lowest value of variable x_{it} over all i-t; and $\max(x_{it})$ is the highest value of x_{it}. For variables capturing lack of financial development, such as interest rate spread, bank asset concentration, overhead costs, net interest margin, and noninterest income, one minus the formula above was used.

The weights were estimated with principal component analysis in levels and differences, factor analysis in levels and differences, as well as equal weights within a subcomponent of the index. For most of the methods the weights were not very different from equal weights and econometric results were robust to the method of aggregation. For simplicity, we use an index with equal weights.

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[1] The framework for the index largely follows Sahay and others (2015). For further details, see Heng and others (forthcoming).

Regression Frameworks

Regressions were carried out using five-year averages to abstract from cyclical fluctuations, and estimated using dynamic panel techniques common in the growth literature.

Financial Development Gaps

The benchmarking regressions link financial development (FD), institutions (FI), and markets (FM) development indices to fundamentals. Following the literature on benchmarking financial development (Beck and others 2008) fundamentals (X_{it}^{FI}) included initial income per capita, the ratio of government consumption to GDP, inflation, trade openness, educational attainment proxied by the average number of years of secondary schooling for people 25 years and older, population growth, capital account openness, the size of the shadow economy (given its importance for the LAC region) and the rule of law. Instruments (Z_{it}) for financial development, such as the rule of law and legal origin dummies, were also used. Predicted norms were computed using the following equation:

$$FI_{it} = \delta_1' X_{it}^{FI} + \delta_2' Z_{it} + \eta_t^{FI} + \varepsilon_{it}^{FI}, \quad \text{(A5.1.2)}$$

where FI_{it} stands for one of the financial indices (FD, FI, or FM). Gaps shown are the differences between the actual values of the index and the calculated norms.

Financial Development, Growth, and Stability

The link between financial development, growth, and stability was examined using a dynamic panel regression framework. Real GDP growth (ΔY_{it}) is linked to financial development, allowing for a potential nonlinearity by adding a square of financial development while controlling for other factors that are likely to affect growth (below). In the case of individual subcomponents of FI and FM, the interaction term between these two indices is included. The controls for the growth regression (X_{it}^Y) were the same as in the benchmarking regression (X_{it}^{FI}), with two additional variables: the ratio of foreign direct investment to GDP and capital account openness.

The impact of financial development on financial and macroeconomic instability used a similar framework. Financial instability (FS_{it}) is measured by the first principal component of the inverse of the distance to distress (z-score),[2] real credit growth volatility, and real and nominal interest rate volatility. This combined variable allows capturing of different facets of financial instability, thus improving previous research, which typically focused on a single variable. Growth volatility (GV_{it}) is measured by the standard deviation of GDP growth. The controls included initial income per capita, the ratio of government consumption to GDP, trade openness, changes in terms of trade, growth in income per capita, the ratio of capital flows to GDP, exchange rate regime, a measure of political stability, and an indicator for whether a country is an offshore financial center.

The following three equations were estimated using the Arellano-Bond approach:

$$\Delta Y_{it} = (a_0 - 1)\ln(Y_{it-1}) + \beta' f(FinDev_{it}) + \cdots$$
$$\gamma' X_{it}^Y + \eta_t^Y + \nu_i^Y + \varepsilon_{it}^Y \qquad (A5.1.3)$$

$$FS_{it} = a_0 FS_{it-1} + \beta' f(FinDev_{it}) + \gamma' X_{it}^S + \cdots$$
$$\eta_t^S + \nu_i^S + \varepsilon_{it}^S \qquad (A5.1.4)$$

$$GV_{it} = a_0 GV_{it-1} + \beta' f(FinDev_{it}) + \gamma' X_{it}^V + \cdots$$
$$\eta_t^V + \nu_i^V + \varepsilon_{it}^V, \qquad (A5.1.5)$$

where $f(FinDev_{it})$ have two forms, one with the aggregated index: $f(FD_{it}) = \beta_1 FD_{it} + \beta_2 FD_{it}^2$; and one with the subcomponents:

$$f(FI_{it}, FM_{it}) = \beta_1 FI_{it} + \beta_2 FI_{it}^2 + \beta_3 FM_{it} + \cdots$$
$$\beta_4 FM_{it}^2 + \beta_5 FI_{it} \times FM_{it} \qquad (A5.1.6)$$

Annex Table 5.1 shows the results of the estimated equations for growth and instability.

Annex Table 5.1. Estimated Equations

Dependent Variable	Financial Instability		Growth Volatility		Growth	
FD	−6.457*		−21.42***		11.47*	
	(3.814)		(7.270)		(6.279)	
FD²	6.263		23.74**		−12.38*	
	(5.735)		(10.82)		(6.556)	
ΔFD	5.283**		8.423**		5.698*	
	(2.160)		(4.008)		(3.075)	
FI		−13.75**		−27.89***		30.83***
		(5.419)		(9.533)		(8.788)
FI²		18.64**		36.38**		−48.36***
		(8.123)		(14.45)		(11.58)
FM		−0.772		−6.779		−0.586
		(3.119)		(5.345)		(3.987)
FM²		3.360		18.02**		−12.35**
		(4.886)		(8.324)		(5.314)
FM*FI		−5.140		−5.354		27.27**
		(9.730)		(15.81)		(13.16)
ΔFI		4.753**		14.08***		7.088**
		(2.114)		(3.708)		(2.958)
ΔFM		3.190*		−2.335		0.508
		(1.672)		(2.846)		(2.222)
Number of Observations	143	143	158	158	301	301

Source: IMF staff calculations.

Note: FD = financial development; FI = financial institutions; FM = financial markets. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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[2] The z-score is a measure of financial health that compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns.

Annex Table 5.2. Index Components for 2004 and 2013

Variable	ARG	BHS	BOL	BRA	BRB	CHL	COL	CRI	DOM	ECU	GTM	HND	JAM	MEX	NIC	PAN	PER	PRY	SLV	TTO	URY	VEN
2013																						
Automated teller machines (ATMs) (per 100,000 adults)	51.4	74.4	27.9	118.6	36.5	67.3	35.8	54.7	30.7	43.6	28.7	23.6	26.7	47.3	11.9	53.5	35.6	19.8	30.7	35.6	42.7	41.4
Number of branches per 100,000 adults, commercial banks	13.5	34.6	11.7	47.7	19.2	17.2	72.2	22.3	11.7	80.1	38.0	24.0	6.1	15.3	7.6	24.7	88.4	10.3	9.8	12.6	12.7	16.8
Domestic credit to private sector / GDP (percent)	15.8	77.4	47.0	70.7	80.6	105.9	50.2	50.4	24.0	26.7	32.6	55.2	29.6	30.6	28.8	70.7	31.4	45.8	42.7	31.1	26.8	25.3
Mutual fund assets / GDP (percent)	2.3	—	4.5	49.7	22.3	13.8	0.1	3.9	—	0.2	—	—	—	10.1	—	2.9	3.0	—	2.9	27.0	0.0	—
Insurance company assets / GDP (percent)	3.1	17.4	3.1	10.4	26.9	20.2	6.0	6.6	1.5	1.6	1.7	3.1	19.5	5.8	0.6	5.3	5.2	1.7	2.6	26.7	5.5	3.2
Domestic bank deposits / GDP (percent)	23.3	72.1	49.7	57.9	113.8	49.8	24.4	22.5	22.7	30.3	40.4	47.5	41.3	28.4	31.6	78.7	35.4	29.2	41.3	55.0	41.7	41.1
Interest rate spread (lending rate minus deposit rate, percent)	2.3	3.1	9.3	14.1	6.2	4.1	6.8	11.3	7.6	5.6	8.1	8.4	14.1	2.9	14.0	4.5	14.1	14.1	4.6	6.0	7.8	1.4
Bank net interest margin (percent)	50.9	20.7	36.1	27.7	33.0	32.1	31.7	20.7	28.4	30.1	20.7	25.8	27.9	53.2	34.5	22.3	33.9	24.1	20.7	26.2	30.9	25.3
Noninterest income / total income (percent)	36.0	86.0	51.1	54.4	94.6	43.0	52.8	62.0	70.8	55.9	67.0	42.9	89.1	55.2	83.7	60.3	74.2	51.4	56.5	78.7	67.3	45.3
Overhead costs / total assets (percent)	25.0	—	—	141.0	—	36.0	20.0	3.0	2.0	—	3.0	1.0	2.0	65.0	—	2.0	17.0	—	—	—	—	2.0
Three bank asset concentration (percent)	29.9	—	—	46.9	—	55.0	20.9	—	—	—	—	—	—	34.1	—	—	38.4	—	—	—	—	—
Total number of issuers of debt (domestic and external, nonfinancial corporations and financial)	5.7	35.6	16.4	54.7	106.4	117.7	70.8	4.4	0.7	6.7	0.9	8.8	43.2	44.3	—	33.0	50.3	3.9	45.1	64.7	0.4	6.6
Market capitalization excluding top 10 companies to total market capitalization	0.2	0.2	0.1	37.1	0.4	17.6	7.0	0.1	—	0.2	0.1	—	1.4	10.0	—	0.3	2.6	0.2	0.2	0.5	0.0	0.0
Market capitalization of listed companies (percent of GDP)	7.4	10.7	6.5	2.6	12.8	1.6	5.7	5.0	5.9	1.6	3.2	—	20.4	4.3	—	23.1	7.1	—	20.0	3.9	20.7	8.0
Stocks traded, total value (percent of GDP)	0.4	14.8	0.0	5.0	20.7	5.2	4.5	0.4	0.0	0.4	1.5	15.4	—	3.3	—	8.0	6.0	1.4	2.9	0.6	—	4.4
Outstanding international public debt securities / GDP (percent)	3.7	65.2	2.1	13.1	36.2	22.9	9.2	4.7	5.9	1.2	2.5	5.2	31.3	19.8	2.2	30.9	11.0	1.4	3.0	13.2	4.2	15.6
Debt securities of financial sector by local firms in perent of GDP[1]	3.8	—	0.5	67.9	0.4	16.0	11.2	1.9	—	2.3	6.4	—	3.0	25.3	—	1.0	5.7	5.5	0.6	0.8	0.8	0.2
Debt securities of nonfinancial sector by local firms in percent of GDP[1]	7.1	3.5	5.1	5.0	4.6	3.6	6.1	5.7	10.1	6.8	7.6	8.8	10.1	3.0	5.8	3.2	6.2	8.2	5.9	5.1	4.9	7.8
Stock market turnover ratio (value traded/stock market capitalization)	6.5	2.2	5.0	2.8	0.8	2.3	3.9	4.0	6.5	5.2	4.0	6.0	6.5	2.5	4.1	1.6	3.5	4.2	3.6	3.8	4.3	4.4
2004																						
ATMs (per 100,000 adults)	21.8	63.6	13.3	105.2	34.9	33.2	27.0	26.2	18.8	3.1	21.1	4.7	18.3	27.7	3.4	33.7	10.7	12.5	20.7	31.2	27.8	21.9
Number of branches per 100,000 adults, commercial banks	13.4	39.7	4.5	40.9	19.3	12.5	13.4	16.1	9.8	12.8	18.8	16.3	7.3	10.6	5.0	22.6	4.3	4.1	11.7	12.6	12.8	15.4
Domestic credit to private sector / GDP (percent)	8.8	61.2	42.7	29.0	66.0	75.6	27.3	32.0	25.2	19.2	26.2	38.4	20.0	15.0	19.6	85.1	18.2	14.7	41.8	36.0	24.2	11.0
Mutual fund assets / GDP (percent)	1.5	—	2.9	31.6	16.2	11.0	0.2	5.7	—	0.9	—	—	4.5	—	2.9	2.4	—	—	2.9	20.1	0.1	—
Insurance company assets / GDP (percent)	3.0	10.8	4.8	5.7	16.5	20.3	3.5	1.2	1.8	0.5	1.4	2.9	14.7	3.5	0.4	5.4	3.0	1.0	1.9	31.4	3.6	2.1
Domestic bank deposits / GDP (percent)	23.1	57.1	38.0	47.3	96.6	45.8	14.9	21.0	17.7	20.1	35.2	41.3	42.5	21.0	38.3	73.9	20.8	17.2	40.1	33.3	43.2	17.2
Interest rate spread (lending rate minus deposit rate, percent)	4.2	2.2	7.1	19.2	5.8	3.2	7.3	13.9	11.5	5.8	9.6	8.8	10.2	4.7	8.8	6.6	19.2	19.2	4.6	6.5	17.5	5.9
Bank net interest margin (percent)	2.4	1.1	4.4	7.5	4.7	4.4	4.4	7.2	9.8	6.0	6.6	6.6	7.7	7.7	8.1	3.4	6.2	7.7	5.5	4.9	5.6	9.8
Noninterest income / total income (percent)	65.2	49.9	50.6	30.3	46.6	28.9	59.7	30.6	53.1	65.2	19.9	30.4	22.7	32.2	24.3	37.1	33.8	65.2	19.9	41.9	64.8	33.3
Overhead costs / total assets (percent)	3.9	1.0	6.8	6.1	4.3	2.9	7.0	6.0	8.9	7.4	4.6	5.5	5.6	5.2	5.2	2.6	5.5	8.9	2.9	4.6	8.9	7.0
Three bank asset concentration (percent)	45.7	70.2	48.9	47.1	100.0	53.5	34.6	55.2	66.1	48.6	45.4	53.4	79.6	62.3	72.1	37.4	76.7	43.6	68.8	79.8	54.9	39.4
Total number of issuers of debt (domestic and external, nonfinancial and financial)	53.0	—	—	51.0	1.0	26.0	—	1.0	—	—	1.0	1.0	—	45.0	—	—	—	—	—	—	—	2.0
Market capitalization excluding top 10 companies to total market capitalization	20.7	—	—	51.0	—	55.5	45.7	—	—	—	—	—	—	38.0	—	45.4	—	—	—	—	—	—
Market capitalization of listed companies (percent of GDP)	25.3	33.7	22.7	49.8	149.0	116.3	21.5	7.6	0.7	7.1	0.9	8.8	103.9	22.3	—	24.0	30.1	3.1	16.7	132.3	0.6	5.4
Stocks traded, total value (percent of GDP)	4.2	0.5	0.1	14.1	6.6	11.5	1.2	0.2	—	0.3	0.1	—	4.7	5.6	—	0.4	1.7	0.0	0.2	4.1	0.0	0.4
Outstanding international public debt securities / GDP (percent)	47.3	2.8	—	9.1	8.8	3.8	10.8	9.4	6.9	17.1	4.6	—	22.6	5.9	40.5	9.1	—	—	14.7	5.3	31.7	17.0
Debt securities of financial sector by local firms in percent of GDP[1]	2.3	—	—	3.1	5.7	0.4	0.5	0.1	—	0.9	—	5.3	—	1.5	5.1	0.4	—	—	2.8	2.3	14.8	4.2
Debt securities of nonfinancial sector by local firms in percent of GDP[1]	8.4	59.4	3.3	7.1	18.6	35.1	5.9	2.2	3.2	2.9	2.8	1.4	2.0	10.0	0.9	24.1	4.3	0.9	5.3	14.8	2.2	8.2
Stock market turnover ratio (value traded/stock market capitalization)	17.9	—	0.3	33.1	5.3	11.4	7.4	2.3	—	4.2	6.4	—	4.2	29.1	—	1.6	6.2	1.4	1.4	3.8	0.8	9.1

Source: IMF staff calculations.

Note: For country name abbreviations see page 89.

[1] Stock of debt by local firms based on residency concept.