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Advancing Financial Development in Latin America and the Caribbean

By Dyna Heng, Anna Ivanova, Rodrigo Mariscal, Uma Ramakrishnan, Joyce Cheng Wong

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Abstract

This paper examines the state of financial development in the Latin America and Caribbean (LAC) region as well as potential growth and stability implications from further development. The analysis suggests that access to financial institutions has expanded notably in the past decade, and the region compares favorably with other emerging market regions on this dimension. The region, however, continues to lag behind peers on broader financial development, especially with respect to markets, though there is substantial heterogeneity across countries. Financial systems in many LAC countries are also underdeveloped relative to their macroeconomic fundamentals. Further financial development could convey net benefits to the region, provided there is adequate regulatory oversight to prevent excesses.

JEL Classification Numbers: G10, G18, G20, O16, O40

Keywords: Finanical, Deepening, Latin America, Caribbean, Financial Development Index

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TABLE OF CONTENTS

I. INTRODUCTION

Growth has slowed in Latin America and the Caribbean (LAC), and the region's medium-term growth prospects have been marked down. Even during the most recent commodity super-cycle, LAC's growth performance improved significantly relative to the previous decade but still underperformed relative to other emerging market (EM) regions. Going forward, in a less positive external environment with lower commodity prices and lower global growth, LAC countries would need to look for new growth engines. In this context, deepening financial systems through better market access, liquidity, and diversity of instruments can help unleash new growth sources, better reap the benefits from globalization, and transition to higher income levels.

Since early 1990s, many LAC countries have undertaken significant efforts to expand scope and depth of their financial systems to promote diversification and growth, cope with shocks, and enhance macroeconomic stability. This paper examines the current state of financial development in Latin America, as well as implications for potential growth and stability from further development. In particular, we construct a measure of financial development for a large sample of advanced, emerging, and developing countries, estimate financial development gaps in relation to country's current fundamentals, and evaluate the relationship of financial development with growth and stability.

The literature has investigated the link between growth and financial development, usually narrowly defined, using private credit to GDP, liquid liabilities of the financial system to GDP, stock market capitalization to GDP, market turnover ratio (Levine 1997, Levine 2005). Some studies found that there may be too much finance after a certain point (Arcand, Berkes, and Panizza, 2015, Sahay and others, 2015a). A separate line of research explored benchmarking of financial development with respect to country's fundamentals, including income level (Feyen, Kibuuka, and Sourrouille 2014). However, the two strands of research have not been put together in a unified framework. The studies focused on financial development in LAC are relatively scarce (De la Torre, Ize, and Schmukler 2012), and the issue of "too much" finance in LAC has not been systematically examined.

This paper attempts to fill in these gaps. Its contribution, compared to the existing literature, is fivefold: (i) it provides a consistent empirical framework to estimate financial development gaps at the current level of fundamentals as well as long-term relationship between growth and stability on the one hand and financial development on the other, (ii) it refines the index of financial development constructed in IMF (Sahay and others 2015a), (iii) it improves the specification of the growth/stability regressions, (iv) it employs a more comprehensive stability measure than that used in the literature, and (v) explores the state of financial development in LAC.

II. MEASURING FINANCIAL DEVELOPMENT

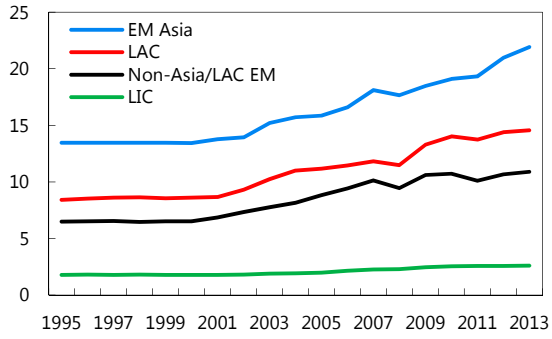
Financial development has proven difficult to measure in a comprehensive way. Typical proxies in the literature have included the ratio of private credit to GDP (Cavallo and

Scartascini, 2012, Hansen and Sulla, 2013, Arcand, Berkes, and Panizza, 2015) and, to a lesser extent, stock market capitalization (e.g. Yartey, 2008). These traditional indicators, however, are too narrow to capture the broad spectrum of financial sector activities. Indeed, non-bank 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 1). Similarly, financial markets have grown and become more diversified, with access to market finance available to a wider set of economic agents.

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 sub-components. These sub-components, 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 2 and Appendix 1). Even though data availability limits the choice of countries and variables for index construction, the database includes 122 countries for 1995–2013. Appendix 1 describes data processing and transformations.

Figure 1: Non Bank Assets

(Regional averages in percent of GDP)



Sources: World Bank, FinStats and World Development Indicators; and IMF staff calculations.
Note: Sum of insurance company assets and mutual fund assets in 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.

All the individual variables listed in Figure 2 were normalized into an index ranging between zero and 1 using the following formula:

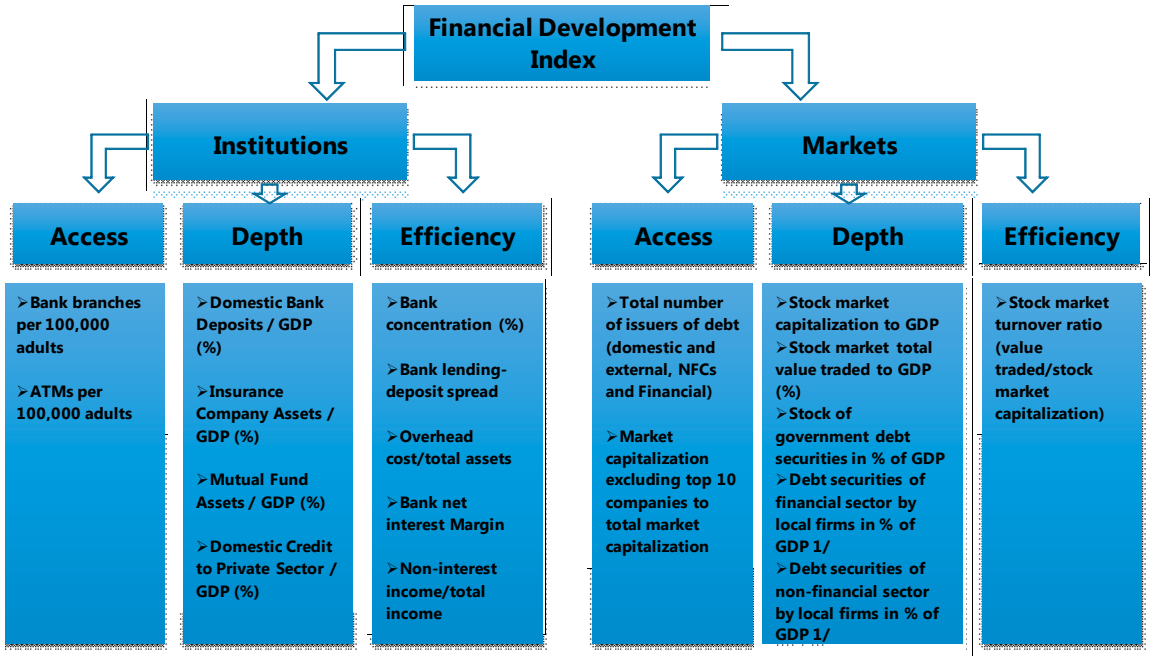
$$I_{x,it} = \frac{x_{it} - \min(x_{it})}{\max(x_{it}) - \min(x_{it})}$$

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 *it*; and $\max(x_{it})$ is the highest value of x_{it}. For those variables for which a decrease over time would reflect financial development, such as Interest Rate Spread, Bank Asset Concentration, Overhead Costs, Net Interest Margin, and Non-Interest Income, we use the reverse formula:

$$I_{x,it} = 1 - \frac{x_{it} - \min(x_{it})}{\max(x_{it}) - \min(x_{it})}$$

The sub-components of the index were then aggregated using different methods. In particular, we estimated the weights using five methods: principal component model in levels and in differences, factor analysis in levels and in differences, as well as equal weights within a subcomponent of the index. The aggregation results were robust to these methods. For simplicity, we use an index with equal weights. Table 1 in Appendix 1 shows the total number of observations per region and per year.

Figure 2: How to Measure Financial Development



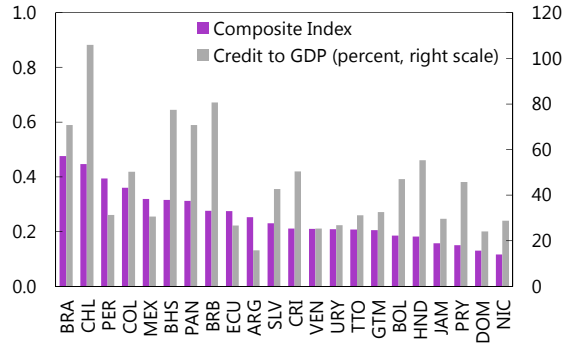
Source: IMF staff calculations.

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

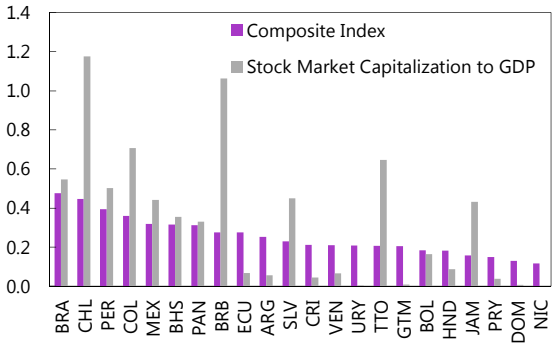
There are some striking differences between our financial development index and more traditional measures (Figure 3). For example, driven by large domestic banks, Honduras' credit ratio—the most common measure of financial deepening—is high, suggesting strong financial development. Honduras, however, neither fares well on non-bank institutional depth, efficiency of financial institutions, nor 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.

Figure 3: Composite Financial Development Index vs. Traditional Measures, 2013

Composite Financial Development Index vs. Credit to GDP



Composite Financial Development Index vs. Stock Market Capitalization to GDP



Source: World Bank, FinStats and World Development Indicators; and IMF staff calculations.

III. Financial Development: Where Does LAC Stand?

Overall, countries in LAC compare unfavorably with other emerging markets (EMs) with respect to financial development. In fact, only low-income countries (LICs) lag behind LAC (Figure 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 EM regions, as do its metrics for all the sub-components of financial market development. This pattern has also broadly held over time.

- LAC excels relative to other EMs is *access* to financial institutions, reflecting the emphasis that countries have placed on improving financial inclusion through improved bank and ATM networks[1]. However, LAC still lags other EM regions on the level of usage of financial services by households (Box 1).

There is substantial variation in financial development across LAC (Figure 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.

[1] For a detailed analysis of financial inclusion in LAC see Dabla-Norris and others 2015. The link between financial inclusion and financial stability and growth is explored in Sahay and others, 2015b.

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

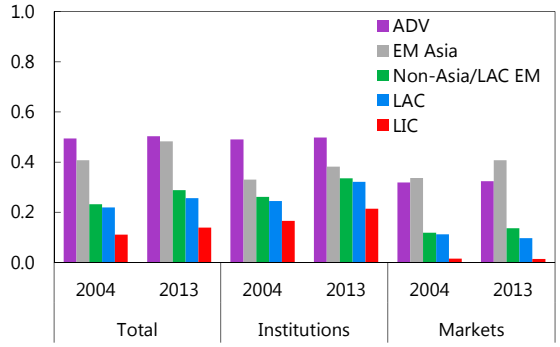
- Brazil, in contrast, saw rapid development in both financial institutions and markets over the past decade. The government implemented a market-friendly debt management strategy, which helped develop the domestic capital market, including lengthening maturities of government bonds, building benchmarks 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—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.[2] 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.

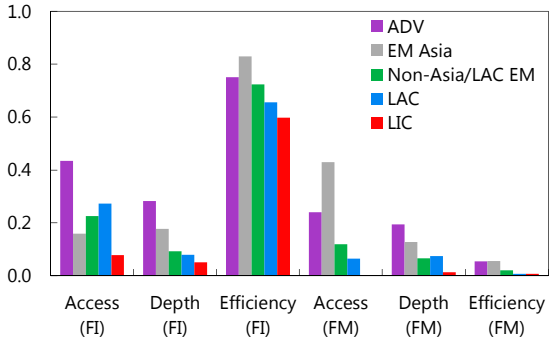
[2]See Selected Issues Paper "Financial Deepening in Mexico," by A. Klemm and A. Herman, IMF Country Report No. 15/314.

Figure 4: Inter-Regional Variation in Financial Development

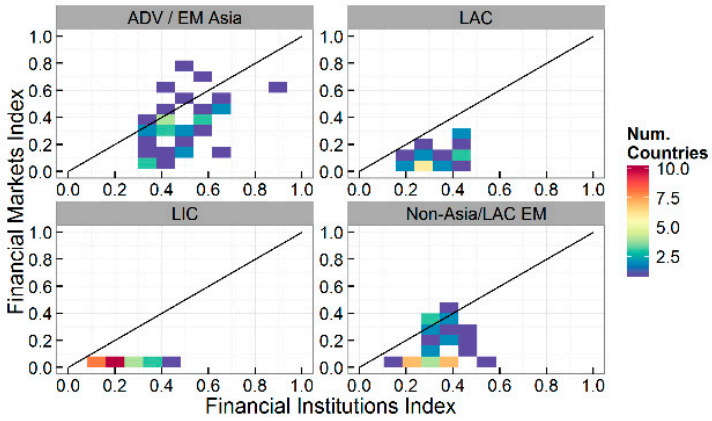
Financial Development by Region, 2004 and 2013



Components of the Financial Development Index by Region, 2013



Distribution Across Institutions and Markets, 2013[1]



Source: IMF staff calculations.

[1] 2D histogram based on countries' frequency. The rectangular bins show the number of countries for each combination of FI and FM.

Note: ADV = advanced economies; EM Asia = emerging Asia; Non-Asia/LAC EM = emerging market economies excluding Asia and LAC; LAC = Latin America and the Caribbean; LIC = low income countries. FI= financial institutions; FM = financial markets.

Other LAC countries (such as Ecuador, Colombia, 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, with the exception of the Bahamas and El Salvador, Lac countries have not made a notable progress.

IV. Financial Development and Macroeconomic Fundamentals

For most 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 our index from a prediction based on economic fundamentals, such as income per capita, government size, macroeconomic stability, and others—can help identify potential distortions or other sources of financial under/over-development for individual countries. This analysis, however, is only suggestive, a normative assessment of the link between financial development and growth and stability is provided in the next section.

The exact specification of regressions linking financial development (FD), institutions (FI) and markets (FM) development indices to fundamentals is below. Following the literature on benchmarking financial development (Beck and others 2008) fundamentals ($\mathbf{X}_{it}^{FI}$) included initial income per capita, government consumption to GDP, inflation, trade openness, educational attainment proxied by the average number of years of secondary schooling for people 25+, population growth, capital account openness, the size of the shadow economy (given its importance for the LAC region) and the rule of law. Instruments ($\mathbf{Z}_{it}$) for financial development such as the rule of law and legal origin dummies were also used. Predicted norms were computed using the following equation:[3]

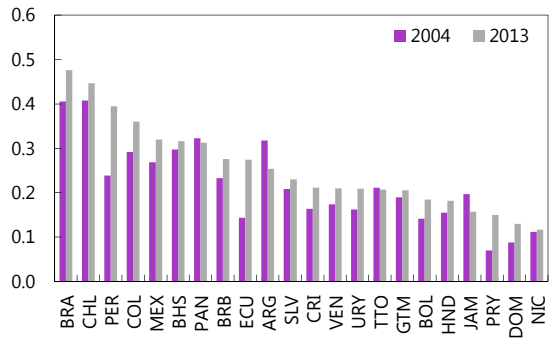
$$FI_{it} = \boldsymbol{\delta}'_1 \mathbf{X}_{it}^{FI} + \boldsymbol{\delta}'_2 \mathbf{Z}_{it} + h_t^{FI} + e_{it}^{FI} ,$$

where FI_{it} stands for one of the financial indices (FD, FI or FM). Gaps shown on Figure 5 are the difference between the actual values of the index and the calculated norms.

[3]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.

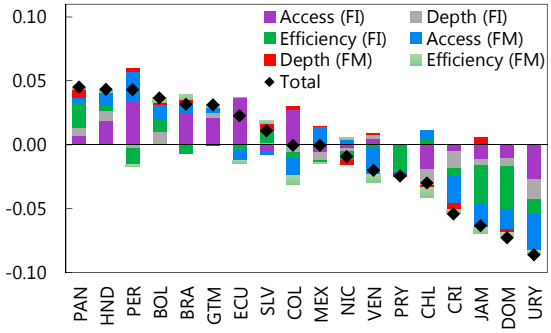
Figure 5: Financial Development Progress and Remaining Gaps

LAC: Financial Development Index
(Composite index)



Latin America and the Caribbean: Changes in Financial Development Index, 2004–13
(Change of composite index between dates)

LAC: Financial Development Gaps w.r.t. Country's Own Fundamentals, 2013[1]



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

Consistent with the previous studies (De La Torre and others 2012, 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 (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, such as 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 (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. However, positive gaps do not necessarily indicate stability problems—they simply position countries with respect to an average of countries with similar fundamentals.

Countries in LAC should explore the causes behind financial development gaps. 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, if identified (see Conclusions and Appendix 2 for an example of application of the framework developed in this paper to the case of Costa Rica).

A. The Nexus Between Finance, Stability, and Growth: What is in Store for LAC?

Financial development has been shown to be positively related to economic growth4. Efficient financial systems help channel capital to productive uses, provide insurance against shocks, reduce information asymmetries, and can potentially alleviate poverty and inequality (Beck, Demirguc-Kunt, and Levine, 2004). Sound financial systems can also foster innovation and entrepreneurship through risk diversification (King and Levine, 1993). 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 and others, 2012; Arcand, Berkes, and Panizza, 2015, 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)[5]. 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).

[4]Goldsmith (1969), McKinnon (1973), Shaw (1973), Beck and Levine (2004) and Levine (2005).
[5]Diminishing returns to growth from financial development were also documented in Cecchetti and Kharroubi (2012, 2015), Reshef (2013), Aizenman and others (2015), Cournède and others, (2015), and IMF (2015).

The link between financial development, growth and stability was examined using a dynamic panel regression framework. Regressions use 5-year averages in order to abstract from cyclical fluctuations, and are estimated using dynamic panel techniques common in the growth literature[6]. Real GDP growth (DY_{it}) is linked to financial development allowing for a potential non-linearity by adding a square of financial development while controlling for other factors that are likely to affect growth (below). In the case of individual sub-components of FI and FM, the interaction term between these two indices is included. The controls for the growth regression $\mathbf{X}_{it}^{Y}$ were the same as in the benchmarking regression ($\mathbf{X}_{it}^{FI}$) with two additional variables: ratio of FDI 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),7 real credit growth volatility, and real and nominal interest rate volatility. This combined variable allows capturing different facets of financial instability, thus improving over 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, government consumption to GDP, trade openness, changes in terms of trade, growth in per capita income, 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:

$$DY_{it} = (a_0 - 1)\ln(Y_{it-1}) + \beta' f(FinDev_{it}) + \gamma' \mathbf{X}_{it}^{Y} + h_t^{Y} + n_i^{Y} + e_{it}^{Y}$$

$$FS_{it} = a_0 FS_{it-1} + \beta' f(FinDev_{it}) + \gamma' \mathbf{X}_{it}^{S} + h_t^{S} + n_i^{S} + e_{it}^{S}$$

$$GV_{it} = a_0 GV_{it-1} + \beta' f(FinDev_{it}) + \gamma' \mathbf{X}_{it}^{V} + h_t^{V} + n_i^{V} + e_{it}^{V}$$

Where $f(FinDev_{it})$ have two forms, one with the aggregated index:

$$f(FD_{it}) = b_1 FD_{it} + b_2 FD_{it}^2$$

and one with the subcomponents:

$$f(FI_{it}, FM_{it}) = b_1 FI_{it} + b_2 FI_{it}^2 + b_3 FM_{it} + b_4 FM_{it}^2 + b_5 FI_{it} \times FM_{it}$$

[6] To check for robustness we also ran the regressions using annual data and the main results held.

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

Table 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)	
Δ FD	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)
Δ FI		4.753**		14.08***		7.088**
		(2.114)		(3.708)		(2.958)
Δ FM		3.190*		-2.335		0.508
		(1.672)		(2.846)		(2.222)
Obs.	143	143	158	158	301	301

Source: IMF staff calculations.
Note: Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Following previous studies on this topic, we also find non-linear relationships between financial development and growth (Table 1 and Figure 6), and between financial development and instability in LAC.[8] 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 (Appendix).[9] Similar non-linearity also holds for financial development and growth, which is particularly pronounced in the

[8]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.

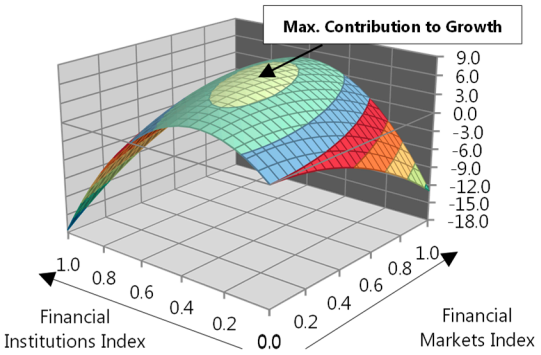
[9]We tried testing the relevance of regulatory quality, as proxied by a dummy variable based on a z score (see Appendix), as a conditioning variable for the link between financial development and growth. However, adequately measuring regulatory quality presents a serious challenge due to (i) the lack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

relationship between institutional depth and growth. This maybe because a large financial system is more likely to give room for excessively risky behavior (Bruno and Shin, H. Song, 2014; Rajan 2005), which could generate excessive credit creation. This may, 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 as reduced bank profitability could provide incentives to diversify into riskier business areas. The latter, however, is not necessarily the case – e.g. efficiency gains in the financial systems dominated by inefficient public banks could be obtained by creating a level playing field for private banks without increase in risk-taking.

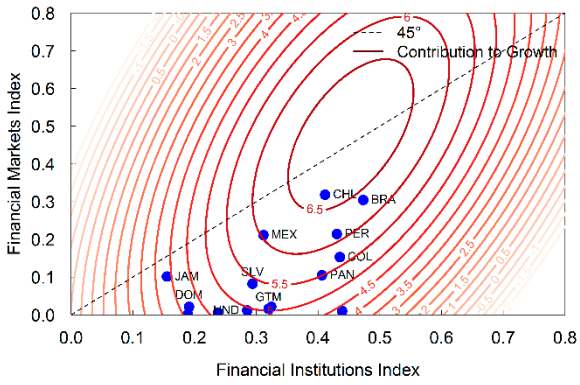
Comparing financial institutions and markets, while the relationship for financial institution development is quite robust across growth and stability regressions, effects from financial market development on any of the endogenous variables are weaker at lower levels of financial market development but become important at the higher development levels for growth and growth volatility. Financial market development is also complementary to institutional development in terms of raising growth.

Figure 6: Financial Institutions and Markets Development, and Economic Growth

Contribution to Growth by Institutions and Markets[1]



LAC: Composite Indices and Growth Contribution, 20132



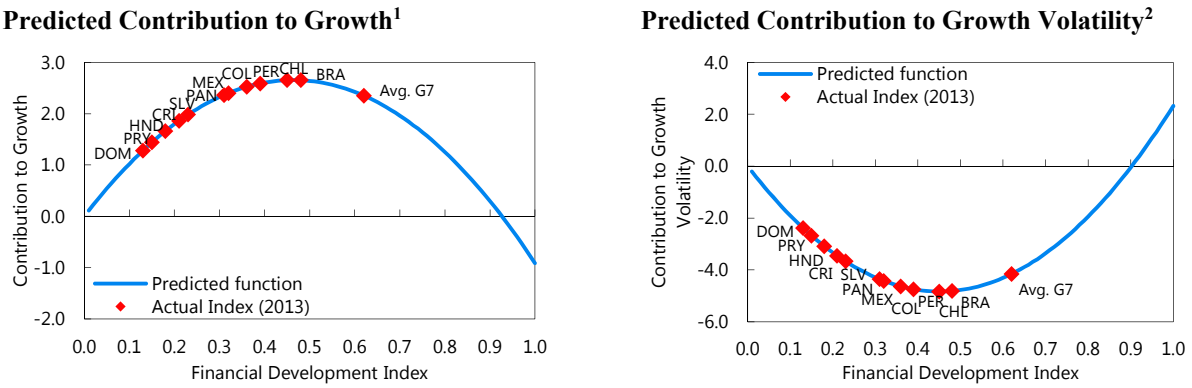
Source: IMF staff calculations.
[1]Surface shows the predicted effect in growth for each level of the indices, holding fixed other sets of controls.
2The lines show the levels of contribution to growth projected from a three-dimensional surface to a two-dimensional plane; the dots show the financial institutions and markets combination for selected LAC countries

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 setting can make a country more vulnerable to market manipulation, volatile capital flows, and financial crises (Laeven 2014, De La Torre and Schmukler 2006). 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 towards market development, may be warranted.

In sum, 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 this "optimum" level of financial development, whereas the Dominican Republic, Paraguay, and Honduras are on the opposite side of the spectrum (Figure 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 while financial development is consistent with the level of macroeconomic fundamentals.

Figure 7: Financial Development, Growth, and Stability



Source: IMF staff calculations.
Note: For country name abbreviations, see page [xx].
[1]Curve shows the predicted effect in growth for each level of the index, holding fixed other sets of controls.
[2]Curve shows the predicted effect in 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 5-year samples.

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 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.[10]

[10]We use *system GMM* 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).

V. 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, if any.

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 (i) strong property rights; (ii) efficient legal system; (iii) low incidence of corruption; (iv) sufficient financial information; (iv) good corporate governance; and (v) 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 to help foster secondary markets for government securities, such as the use of standardized simple instruments with conventional maturities, as well as strengthening legal and regulatory frameworks.

Finally, countries where stock markets are underdeveloped or inefficient, which includes the majority of LAC countries, could benefit from strong macroeconomic environment, institutional and legal frameworks, which promote investor rights, information disclosure, as well as policies that increase market size (e.g., 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 due to the small market size. Hence, a careful investigation of specific country circumstances with the view of identifying constraints, including those outside of the financial sector such as poor corporate governance, as well as tradeoffs is needed.In countries where financial development levels

are higher than those implied by macroeconomic fundamentals (i.e., 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 in not promoting excessive market development when financial institutions are underdeveloped, since this would jeopardize macroeconomic and financial stability.

Lastly, since financial integration will move in tandem as regional financial systems develop, care should be taken to reap the benefits from integration while safeguarding against risks. Furthering financial integration could help generate regional economies of scale (especially for smaller countries) enabling markets to achieve minimum viable sizes and facilitate regional risk diversification. On the other hand, closer interconnections would also require coordination across supervisory and regulatory agents in order to ensure appropriately organized responses (Enoch and others, 2016).

APPENDIX 1: DATA DESCRIPTION AND PROCESSING

In this section we explain how we construct the Index of Financial Development (FD) and its components. Also, we explain where we get the data and how we process the information to produce the final Index. Table 2 shows Index's components and subcomponents.

Sources and data gathering

Our data sources are referred in Table A1. We found annual data starting in the 1960s but for nearly all of the countries the data were only available from mid 1990s. Therefore, we decide to set our period of analysis from 1995 to 2013 (the last date available in most cases). Yet, the database was inadequate for building an index. For example, data gaps and outliers did not reflect accurately the general trends in the data. Most countries in Middle East, Sub-Sahara Africa and Latin America had large data gaps. As for some variables, like ATMs per thousands of adults, we could only find data available from 2004.

Table A1: Variables and Sources

Indices	Subcomponents	Variables	Sources
Financial Institutions	Access	*Automated teller machines (ATMs) (per 100,000 adults)*	*World Bank, WDI*
		Number of Branches Per 100,000 Adults, Commercial Banks	*World Bank, FinStats; IMF, Financial Access Survey*
	Depth	*Domestic credit to private sector / GDP (%)*	*World Bank, WDI*
		Mutual Fund Assets / GDP (%)	*World Bank, FinStats and NBFI database*
		Insurance Company Assets / GDP (%)	*World Bank, FinStats and NBFI database*
		Domestic Bank Deposits / GDP (%)	*World Bank, FinStats and WDI; IMF, IFS*
	Efficiency	*Interest rate spread (lending rate minus deposit rate, %)*	*World Bank, WDI*
		Bank net interest margin (%)	*World Bank, Global Financial Development (GFD)*
		Non-Interest Income / Total income (%)	*World Bank, FinStats; Bankscope*
		Overhead Costs / Total Assets (%)	*World Bank, FinStats; Bankscope*
		3 Bank Asset Concentration (%)	*World Bank, FinStats; Bankscope*
Financial Markets	Access	*Total number of issuers of debt (domestic and external, NFCs and Financial)*	*Dealogic, supplement from SPR*
		Market capitalization excluding top 10 companies to total market capitalization (%)	*World Bank, GFD; World Federation of Exchanges*
	Depth	*Market capitalization of listed companies (% of GDP)*	*World Bank, WDI*
		Stocks traded, total value (% of GDP)	*World Bank, WDI*
		Outstanding International Public Debt Securities / GDP (%)	*BIS, Debt securities statistics*
		Debt securities of financial sector by sub nationality in % of GDP [1/]	*Dealogic*
		Debt securities of non-financial sector by sub nationality in % of GDP [1/]	*Dealogic*
	Efficiency	*Stock market turnover ratio (value traded/stock market capitalization)*	*World Bank, WDI*

1/ Stock of debt securities. Sub nationality refers to the stock of debt issued by all the firms located inside the country. We take on count all the issuance of national firms and foreign subsidiaries but leaving out the national subsidiaries located abroad.

Building a consistent dataset

To build a consistent dataset across regions and countries, and to obtain the longest possible sample period, we supplement and extrapolate the data where feasible. The data conversions also help with achieving a balanced panel.

We supplement the data with national sources: from central banks and national statistic agencies. Alternative, the Federal Reserve Bank of St. Louis and the World Federation of Exchanges were used. Nonetheless, most of the data came from the IMF's Financial Sector Assessment Program reports (FSAPs). For those countries that we could not find any data to fill the gaps, we use a linear interpolation procedure: that is the same as to fill the gaps with a linear projection between two available data points.

We identify outliers using two methods that take on count the trending nature of most of the series. Taking one country and one variable at the time, we estimate the trend component in the series and calculate the gap between the actual and the trend[11]. We define an outlier as a point in time that is 3 standard deviations above or below our calculated gap.

In some rare cases, however, where 2 or 3 outliers stand close to each other, this method did not single them out of the estimated trend; instead, these values pull the estimated trend closer to them. Hence, we run a second procedure: we calculate the growth rate of the variables, and taking one variable per country at the time, we define an outlier as a point where the growth rate exceeds 3 standard deviations of the sample period. Finally, we drop all the outliers and replace them with the linear interpolation method —just as we did at the beginning.

A clean database with no gaps and with unbalanced samples was still not adequate to carry out principle components analysis for aggregation. Thus, we extrapolate the data backwards using a method called *exponential smoothing*[12]. We apply this method to every variable per country back to 1995. We also tried other methods instead, but this last seemed to be the most conservative of all. To extrapolate forward, in each case, we simply use the last observation available in the sample to replace the missing values forward. There were not many cases that needed forward extrapolation; typically only one year forward. Table A2 shows the number of available observations per region per year.

Table A2: Regions and Coverage

Region	Countries Per year	Total obs.
East Asia Pacific	13	247
Europe and Central Asia	43	817
Latin America	22	418
Middle East and North Africa	12	228
North America	2	38
South Asia	6	114
Sub-Sahara Africa	24	456
Total	122	2,318

The index constructed this way was aggregated as described using principle component and factor analysis as well as equal weights. The factor weights are theoretically most appropriate as the goal of the exercise is to identify the common factor underlying the movements in the variables (see also Amidžić, Massara, and Mialou (2014) and Cámara and Tuesta (2014) on the discussion of theoretical advantages of common factor analysis for weights construction). However, since the results turned out to be very similar (Table A2) for simplicity we present the results for the index with equal weights.

The main differences between the index employed in this paper and that constructed in Sahay and others 2015a can be summarized as follows:

[11] The estimation of the trend component and the cycle uses a Hodrick-Prescott (HP) filter with a lambda equal to 6.25.

[12] See for example Holt (2004) and the references therein.

- Our index is supplemented with additional data from IMF Financial Sector Assessment Programs and country reports. We extend the data back to 1995 while Sahay and others 2015a extend the missing series back to 1980.

- We use exponential extrapolation method in contrast to the average growth rates of all the non-missing observations of the variable employed in Sahay and others 2015a.

- We employ a different procedure for eliminating outliers, namely, we eliminate observations that exceed three standard deviations above or below the trend while Sahay and others 2015a eliminate observations below the 5^{th} and above the 95^{th} percentiles. To fill in the resulting gaps from dropped outliers we use simple linear interpolation technique while Sahay and others 2015a employ a winsorization technique, which replaces the outliers with the values for the 5^{th} and the 95^{th} percentiles, respectively.

- We use equal weights while Sahay and others 2015a employ principle component analysis for index construction.

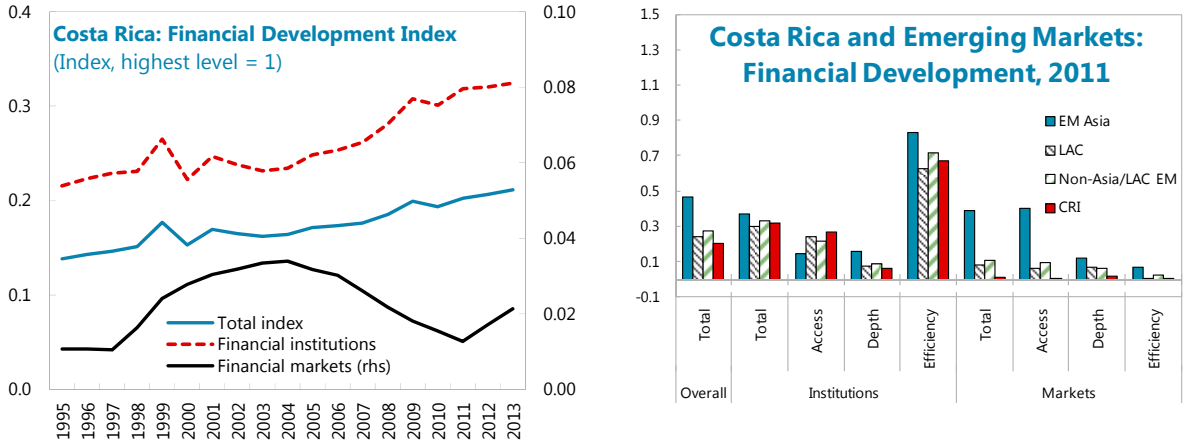
APPENDIX 2: AN EXAMPLE OF FRAMEWORK APPLICATION TO COSTA RICA

This Appendix examines how the framework presented in the paper can be applied in the case of particular country such as Costa Rica.

Where Does Costa Rica Stand?

Costa Rica's financial system deepened notably in the past decade but continues to lag behind those of other emerging markets. The improvements came from growth in financial institutions, in particular, better institutional access and improved efficiency. In contrast, market development stagnated. Despite the recent progress, Costa Rica continues to lag behind other emerging markets on many dimensions. In particular, it lags other EM groups on all of the subcomponents of financial market development. It is also behind other EMs on some aspects of institutional development, though performance varies by component. In fact, Costa Rica compares favorably on institutional access, outperforming all other EM country groupings. Good access reflects a relatively wide network of ATMs and bank branches per 100,000 adults. However, the country lags behind other EMs on institutional efficiency, though it slightly exceeds the LAC average on this component. Low efficiency reflects high interest rate spreads, high overhead costs, and high net interest margins. Finally, Costa Rica is behind all other country groupings on institutional depth due to the low level of credit and deposits to GDP as well as small mutual fund and insurance industries.

Figure A2-1. Costa Rica: Financial Sector Development

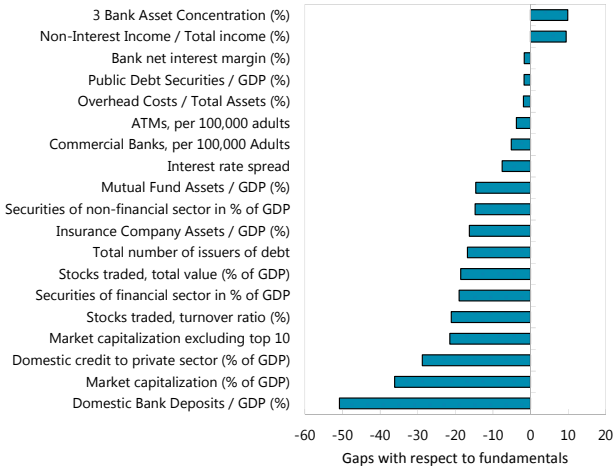


Source: IMF Staff calculations.

Costa Rica's financial development is also below the levels predicted by country's fundamentals. A simple cross-country comparison above does not account for differences in the underlying macroeconomic conditions. Financial development gaps—the deviation of the financial development index from a prediction based on economic fundamentals, such as income per capita, government size, and macroeconomic stability—can help identify potential under or overdevelopment of Costa Rica, compared to countries with similar fundamentals. These gaps suggest that Costa Rica's financial development is below the

levels predicted by its macroeconomic fundamentals on all but two subcomponents. The exceptions are two narrow measures of institutional efficiency, namely, 3-bank asset concentration and non-interest income. Other measures, however, including lending-deposit spread, bank interest margin, and overhead cost, point to inefficiencies in the banking sector. To the extent that the negative gaps reflect distortions or market frictions, they need to be addressed. For example, high interest rate spreads are likely a reflection of the substantial presence of public banks, which lack strong incentives to improve efficiency. The relatively low credit-to-GDP ratio at least to some extent reflects a weak legal collateral framework, which was in place before 2015, and was probably one of the causes of the high collateral-to-loan ratio.

Figure A2-2: Costa Rica's Financial Development Gaps



Source: IMF Staff estimates.

Costa Rica has not yet reached the levels of institutional and market development that yield maximum benefits to growth and stability. Costa Rica is still far away from reaping the maximum benefits to growth and stability, in particular, in terms of financial market development. In the longer term, reaping maximum benefits from financial development for growth and stability would require improving Costa Rica's macroeconomic fundamentals.

Conclusions and Policy Recommendations

- Costa Rica's financial system deepened notably in the past decade, but continues to lag behind those of other emerging markets as well as the level of development implied by its macroeconomic fundamentals.

- Given that the fundamentals are sticky in the short term, Costa Rica should aim at removing distortions that prevent the country from reaching its full financial development potential given the current state of macroeconomic fundamentals.

  - To facilitate deepening on the side of financial institutions, Costa Rica should follow through on the modernization of its collateral framework while balancing it with proper regulation and supervision. In 2015, the country adopted a new secured transactions law that establishes a functional secured transactions system and a modern, centralized, notice-based collateral registry. The law also broadened the range of assets that can be used as collateral, including intangibles such as intellectual property rights, allowed a general description of assets granted as collateral and permitted out-of-court enforcement of collateral. Nevertheless,

careful monitoring is warranted at this stage to hinder abuse as the new system is being tested.

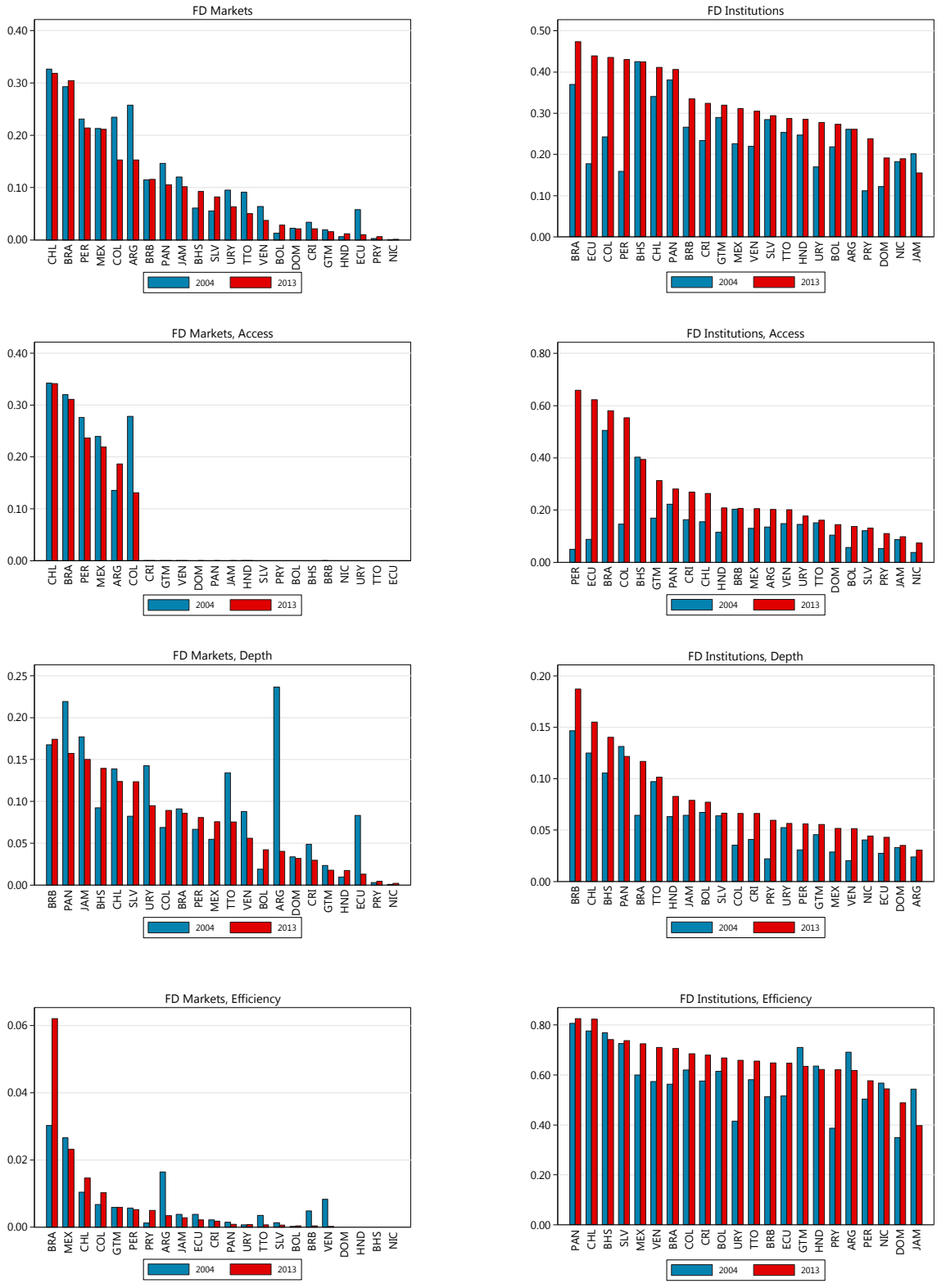
- To improve efficiency of financial intermediation it should ensure *a level playing field for private banks compared to public banks*. An important first step would be to remove the explicit guarantee currently given by the state to all colon-denominated deposits in state banks.

- Costa Rica could benefit from following *market-friendly debt management and issuance strategies* to help foster secondary markets for government securities, such as the use of standardized simple instruments with conventional maturities, as well as strengthening legal and regulatory frameworks.

- To promote the development of the stock market Costa Rica would certainly gain from *a more robust macroeconomic environment, as well as stronger institutional and legal frameworks, which promote investor rights, information disclosure, as well as policies that increase market size, in particular, those supporting the development of an institutional investor base* In recent years, an important step has been taken by allowing private participation into the insurance sector where it used to be a state monopoly but more could be done to encourage further entry. Strengthening protection of minority investors – an area where Costa Rica does not score well in Doing Business indictors - could also help. Finally, reviewing tax treatment of securities issuance and investment to make the tax system more attractive to issuers may be warranted as long as it does not jeopardize fiscal sustainability objectives.

- In the longer term, as fundamentals continue to evolve, including toward a higher income per capita, further financial development would be advantageous for Costa Rica in terms of growth and stability, provided there is adequate regulatory oversight to prevent excesses.

Figure A2-3: Financial Development Indices and Sub-indices by Country



Source: IMF Staff calculations.

Table A2-1 Index Components

Variable[1]	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)	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
Non-Interest Income / Total income (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
Overhead Costs / Total Assets (percent)	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
3 Bank Asset Concentration (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
Total number of issuers of debt (domestic and external, NFCs and Financial)	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
Market capitalization excluding top 10 companies to total market capitalization (percent)	29.9	-	-	46.9	-	55.0	20.9	-	-	-	-	-	-	34.1	-	-	38.4	-	-	-	-	-
Market capitalization of listed companies (percent of GDP)	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
Stocks traded, total value (percent of GDP)	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
Outstanding International Public Debt Securities / GDP (percent)	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
Debt securities of financial sector by local firms in percent of GDP[1]	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
Debt securities of non-financial sector by local firms in percent of GDP[1]	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
Stock market turnover ratio (value traded/stock market capitalization)	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
2004																						
Automated teller machines (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
Non-Interest 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
3 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, NFCs 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 (percent)	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[2]	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	2.3	4.2
Debt securities of non-financial sector by local firms in percent of GDP[2]	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: ARG = Argentina, BHS = 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, PER = Peru, PRY = Paraguay, SLV = El Salvador, TTO = Trinidad and Tobago, URY = Uruguay, VEN = Venezuela.

[1]For index construction missing values were replaced with imputed values using procedures described in Appendix 1.

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

Table A2-2: Weight Comparison

Variable	Description	Weights		Difference
		Factor	Equal	
F_factor_lev	FD Total	1.00	1.00	0.00
F_factor_index3	FD Institutions	0.54	0.50	0.04
F_factor_index3_IA	FD Institutions, Access	0.33	0.33	0.00
F_factor_index3_ID	FD Institutions, Depth	0.34	0.33	0.01
F_factor_index3_IE	FD Institutions, Efficiency	0.32	0.33	-0.01
F_factor_index4	FD Markets	0.46	0.50	-0.04
F_factor_index4_MA	FD Markets, Access	0.35	0.33	0.01
F_factor_index4_MD	FD Markets, Depth	0.33	0.33	-0.01
F_factor_index4_ME	FD Markets, Efficiency	0.33	0.33	-0.01
FIA1_norm	Automated teller machines (ATMs) (per 100,000 adults)	0.50	0.50	0.00
FIA2_norm	Number of Branches Per 100,000 Adults, Commercial Banks	0.50	0.50	0.00
FID1_norm	Domestic credit to private sector (% of GDP)	0.27	0.25	0.02
FID2_norm	Mutual Fund Assets / GDP (%)	0.23	0.25	-0.02
FID3_norm	Insurance Company Assets / GDP (%)	0.23	0.25	-0.02
FID4_norm	Domestic Bank Deposits / GDP (%)	0.27	0.25	0.02
FIE1_norm	Interest rate spread (lending rate minus deposit rate, %)	0.21	0.20	0.01
FIE2_norm	3 Bank Asset Concentration (%)	0.18	0.20	-0.02
FIE3_norm	Overhead Costs / Total Assets (%)	0.24	0.20	0.04
FIE4_norm	Bank net interest margin (%)	0.20	0.20	0.00
FIE5_norm	Non-Interest Income / Total income (%)	0.18	0.20	-0.02
FMA1_norm	Total number of issuers of debt (domestic and external, NFCs and Financial)	0.50	0.50	0.00
FMA2_norm	Market capitalization excluding top 10 companies to total market capitalization	0.50	0.50	0.00
FMD1_norm	Market capitalization of listed companies (% of GDP)	0.21	0.20	0.01
FMD2_norm	Stocks traded, total value (% of GDP)	0.19	0.20	-0.01
FMD3_norm	Outstanding International Public Debt Securities / GDP (%)	0.17	0.20	-0.03
FMD4_norm	Debt securities of financial sector by sub nationality in % of GDP	0.21	0.20	0.01
FMD5_norm	Debt securities of non-financial sector by sub nationality in % of GDP	0.21	0.20	0.01
FME1_norm	Stocks traded, turnover ratio (%)	1.00	1.00	0.00

Table A2-3: Regression Variables, Source and Transformation

Regression	Variable	Transformation	Source
Gaps regression	Initial GDP per capita	logs, average 1995-2000	World Bank, WDI: GDP per capita, PPP (constant 2011 international $)
	Government consumption	logs, 5-year averages, 1995-2013	World Bank, WDI: General government final consumption expenditure (% of GDP)
	Population growth	5-year averages, 1995-2013	World Bank, WDI: Population, total
	Inflation rate	log(1 + inflation/100), 5-year averages, 1995-2014	World Bank, WDI: Inflation, consumer prices (annual %)
	Trade to GDP	logs, 5-year averages, 1995-2013	World Bank, WDI: Trade (% of GDP)
	Average years of schooling	5-year averages, 1995-2013	World Bank, Education Statistics, Barro and Lee, Average years of secondary schooling, 25+, total
	Size of the shadow economy, ranking	5-year averages, 1995-2013	Schneider, F., A. Buehn and C.E. Montenegro. 2010. World Bank, Policy Research Working Paper, No. 5356.
	Financial Openness Index	5-year averages, 1995-2013	Chinn-Ito index: Chinn, Menzie D. and Hiro Ito (2006).
	Rule of Law Index	5-year averages, 1995-2013	The Worldwide Governance Indicators (WGI), Rule of Law, Estimate.
	Legal origins	Dummy variable for each legal origin 1/	La Porta, R., F. Lopez-de-Silanes and A. Shleifer (2008).
Financial Instability regression	Initial GDP per capita	logs, average 1995-2000	World Bank, WDI: GDP per capita, PPP (constant 2011 international $)
	GDP per capita growth rate	5-year averages, 1995-2013	World Bank, WDI: GDP per capita (constant LCU)
	Government consumption	logs, 5-year averages, 1995-2013	World Bank, WDI: General government final consumption expenditure (% of GDP)
	Dummy for offshore countries	5-year averages, 1995-2013	IMF, offshore list.
	Exchange Regime (Coarse Class.)	5-year averages, 1995-2013	Official IMF classification of the exchange rate arrangement, published annually in the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).
	Private capital inflows (% of GDP)	5-year averages, 1995-2013	IMF, Balance of Payments statistics.
	Political Stability	5-year averages, 1995-2013	The Worldwide Governance Indicators (WGI), Political Stability and Absence of Violence/Terrorism, Estimate.
Growth volatility regression	Initial GDP per capita	logs, average 1995-2000	World Bank, WDI: GDP per capita, PPP (constant 2011 international $)
	GDP per capita growth rate	5-year averages, 1995-2013	World Bank, WDI: GDP per capita (constant LCU)
	Growth of terms of trade	5-year averages, 1995-2013	World Bank, WDI: Net barter terms of trade index (2000 = 100)
	Government consumption	logs, 5-year averages, 1995-2013	World Bank, WDI: General government final consumption expenditure (% of GDP)
	Trade to GDP	logs, 5-year averages, 1995-2013	World Bank, WDI: Trade (% of GDP)
	Dummy for offshore countries	5-year averages, 1995-2013	IMF, offshore list.
	Exchange Regime (Coarse Class.)	5-year averages, 1995-2013	Official IMF classification of the exchange rate arrangement, published annually in the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).
	Private capital inflows (% of GDP)	5-year averages, 1995-2013	IMF, Balance of Payments statistics.
	Political Stability	5-year averages, 1995-2013	The Worldwide Governance Indicators (WGI), Political Stability and Absence of Violence/Terrorism, Estimate.
Growth regression	Initial GDP per capita	logs, average 1995-2000	World Bank, WDI: GDP per capita, PPP (constant 2011 international $)
	Government consumption	logs, 5-year averages, 1995-2013	World Bank, WDI: General government final consumption expenditure (% of GDP)
	Population growth	5-year averages, 1995-2013	World Bank, WDI: Population, total
	Inflation rate	log(1 + inflation/100), 5-year averages, 1995-2014	World Bank, WDI: Inflation, consumer prices (annual %)
	Trade to GDP	logs, 5-year averages, 1995-2013	World Bank, WDI: Trade (% of GDP)
	Average years of schooling	5-year averages, 1995-2013	World Bank, Education Statistics, Barro and Lee, Average years of secondary schooling, 25+, total
	FDI, net inflows (% of GDP)	5-year averages, 1995-2013	World Bank, WDI: Foreign direct investment, net inflows (% of GDP)
	Size of the shadow economy, ranking	5-year averages, 1995-2013	Schneider, F., A. Buehn and C.E. Montenegro. 2010. World Bank, Policy Research Working Paper, No. 5356.
	Financial Openness Index	5-year averages, 1995-2013	Chinn-Ito index: Chinn, Menzie D. and Hiro Ito (2006).

1/ Original variable take 4 values: English origin = 1, French origin = 2, german origin= 4, Scandinavian origin = 5.

LIST OF COUNTRY ACRONYMS

Argentina	ARG
Bahamas	BHS
Bolivia	BOL
Brazil	BRA
Barbados	BRB
Chile	CHL
Colombia	COL
Costa Rica	CRI
Dominican Republic	DOM
Ecuador	ECU
Guatemala	GTM
Guyana	GUY
Honduras	HND
Haiti	HTI
Jamaica	JAM
Panama	PAN
Peru	PER
Paraguay	PRY
El Salvador	SLV
Trinidad and Tobago	TTO
Uruguay	URY
Venezuela	VEN

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