

# Latin America Macroeconomic Outlook A Global Perspective

Macroeconomic Vulnerabilities in an Uncertain World: One Region, Three Latin Americas

BROOKINGS GLOBAL | CERES Economic and Social Policy in Latin America Initiative

B

SEPTEMBER 2014

Ernesto Talvi

## Latin America Macroeconomic Outlook A Global Perspective

Macroeconomic Vulnerabilities in an Uncertain World: One Region, Three Latin Americas

#### **ERNESTO TALVI**

Nonresident Senior Fellow and Director Brookings Global-CERES Economic and Social Policy in Latin America Initiative

**SEPTEMBER 2014** 

Brookings Global-CERES Economic and Social Policy in Latin America Initiative (ESPLA)

Brookings Global-CERES Economic and Social Policy in Latin America Initiative

## CONTENTS

| Acknowledgements  | iii |  |  |  |  |
|---|-----|--|--|--|--|
| Executive Summary   | iv  |  |  |  |  |
| I. Growth Phases 2004-2014: Boom and Cooling-Off in Latin America         | 1   |  |  |  |  |
| II. The Global Outlook and Its Implications for Latin America             | 6   |  |  |  |  |
| Box I. What if Tail Risks Materialize?                                    | 11  |  |  |  |  |
| Box II. Why is Mexico Different?  | 12  |  |  |  |  |
| III. Key Macroeconomic Challenges for Latin America                       | 13  |  |  |  |  |
| International Liquidity Vulnerability                                     | 14  |  |  |  |  |
| Inflation Vulnerability   | 16  |  |  |  |  |
| Fiscal Vulnerability  | 19  |  |  |  |  |
| Banking Vulnerability   | 22  |  |  |  |  |
| Box III. Latin America's Bank Soundness Under Stress                      | 26  |  |  |  |  |
| IV. Overall Macroeconomic Vulnerability: One Region, Three Latin Americas | 27  |  |  |  |  |
| V. Final Thoughts and Policy Challenges                                   | 29  |  |  |  |  |
| References  | 31  |  |  |  |  |
| Appendix I. External Factors Model for Latin America                      | 33  |  |  |  |  |
| Appendix II. Public Debt Dynamics in Latin America                        | 35  |  |  |  |  |
| Appendix III. A Simple Mortgage Model of Nonperforming Loans              |     |  |  |  |  |

## **ACKNOWLEDGEMENTS**

This report was written with the invaluable collaboration of my colleague Guillermo Vuletin, fellow at the Brookings Global-CERES Economic & Social Policy in Latin America Initiative (ESPLA), and the support and outstanding job of the very talented team of CERES research associates—Santiago García da Rosa, Rafael Guntin and Rafael Xavier—and research assistants—Federico Ganz and Mercedes Cejas. To all of them my deepest appreciation for their dedication, their technical skills and for our insightful discussions during the preparation of this report.

I would also like express my appreciation to Christina Golubski for her excellent editing and for overseeing the production of this report. Last but not least, Julia Ruiz, research assistant at ESPLA, did a wonderful job in proofreading the final version of the report and also provided very valuable comments.

Ernesto Talvi

## EXECUTIVE SUMMARY

Depending on the vantage point, Latin America could be seen as either one, two or three regions. From a *business cycle perspective*, it could be thought of as a single region. From the ease of *access to international financial markets and multilateral financing perspective*, Latin America could be thought of as two different regions, one with full access and the other with limited access. From a *macroeconomic vulnerability perspective*, the region should be thought of as three distinct regions with three very different sets of policy challenges. In light of these complexities, this report intends to characterize and understand both the similarities and the heterogeneities among countries in the region.

#### The Business Cycle

During the previous decade, Latin America (LAC-7) displayed a period of uninterrupted growth with the sole exception of the post-Lehman crisis year.<sup>1</sup> Yet, two very distinct growth phases immediately catch the eye. Between 2004 and 2011-excluding the temporary interruption following the Lehman crisis-LAC-7 countries grew at an average of 6.1 percent per year, substantially above the historical average of 3.7 percent since the early 1990s. However, since 2012, growth rates cooled off significantly, and now the region is expected to grow at a meager 2 percent in 2014. This pattern of expansion and deceleration was, to a greater or lesser extent, displayed by every country in the region, with Venezuela, Argentina, and Brazil experiencing the largest growth reversals and Mexico, the smallest.

What lies behind Latin America's cycle of boom and subsequently sharp deceleration? The striking pattern of co-movement in the region's economic fluctuations points to the relevance of external factors. This report develops an empirical model that focuses on the role of external factors in explaining output fluctuations in Latin America. These factors include growth rates in advanced economies, growth rates in China, prices of the commodities that LAC-7 both produces and exports, and the cost of international financing for emerging economies. Containing very few external factors, this model does surprisingly well in tracking LAC-7's output performance and accounts for more than 65 percent of output fluctuations in the region. It also can mimic both the boom and cooling-off periods with digital precision.

#### The New Global Context

Thus, no attempt to assess the region's macroeconomic outlook can be made without first assessing the outlook for the key external drivers of Latin America's business cycle. Although global risks are not in short supply, this report rules out the occurrence of extreme events: the possibility that U.S. interest rates might rise more sharply and abruptly than expected; the fragility of the recovery in the eurozone once again triggering concerns about the viability of the euro; property prices collapsing in China and leading to financial distress and a severe decline in growth rates; or geopolitical tensions leading to a sharp increase in oil prices and a world recession.

<sup>1</sup> LAC-7 refers to the seven largest Latin American countries namely, Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which together account for 93 percent of the region's GDP. Henceforth, the terms LAC-7, "the region" and Latin America will be used interchangeably.

The underlying assumption of this report on the global outlook is given by current market expectations on growth in advanced economies and China, commodity prices and U.S. interest rates.

First, the U.S. is expected to grow at an average rate of 2.7 percent in 2014-2018, close to its historical average of 3 percent, while eurozone growth is expected to be substantially below its historical average. In spite of the fact that current output is still significantly below what was predicted before the financial crisis, monetary policy is highly stimulative and interest rates are close to zero, the eurozone is not able to replicate its historical average growth rate, and the U.S. is merely able to do so. These trends point to an underlying weakness that has led many experts to start talking about "secular stagnation" as the new normal.

Second, the outlook for China points toward a gradual deceleration in growth rates due to an unsustainable investment-led-credit-propelled model of growth that followed the collapse in export growth after the global crisis.

Third, the outlook for growth in advanced economies and China is consistent with an expected softening in commodity prices that LAC-7 countries both produce and export and a gradual increase in U.S. interest rates leading in turn to a gradual increase in the cost of international financing for emerging markets.

What does this global outlook imply for Latin America? The projections of the empirical model developed for this report are consistent with the market's consensus forecast of 3.3 percent average growth rate for 2014-2018, close to the region's historical average since the 1990s, close to estimates of potential output growth of 3.6 percent, and substantially below the boom period of 2004-2011. The latter holds true for every Latin American economy with the notable exception of Mexico.

# Implications of the New Global Context: Growth and Macroeconomic Vulnerabilities

After a decade of high expectations about the region's future, the new and less complacent global context indicates a return to mediocre growth rates. This reduction in the cruising speed of the region has not been innocuous. Mediocre growth rates are already generating increasing social discontent, as evidenced by spontaneous protests that have recently exploded in many countries in the region. These protests, mostly convened through social media, reflect the concerns of an emerging but still vulnerable middle class that not only fears for its economic well-being, but is also dissatisfied with the quality of government services and personal security. This malaise is also reflected in the dramatic drop in the popularity of outgoing presidents during the cooling-off period relative to the popularity of outgoing presidents during the boom period.

The new and less complacent global context also implies significant macroeconomic challenges for some countries in the region. But good news first: According to the analysis of this report, the tightening of the regulation and supervision of the region's banking systems during the last decade appears to have paid off. As a result, banks in the region are in a strong position to endure deterioration in the global context and more adverse economic conditions, such as rising interest rates, lower commodity prices, depreciating currencies and lower growth rates. Ruling out extreme events, the more adverse economic conditions are not expected to result in a banking crisis in any of the major countries in the region. Thus, from a macroeconomic perspective, this time, the weak link does not appear to be the banking system.

The picture is more heterogeneous and less rosy for the inflation and fiscal outlook, and for the strength of the international liquidity position of countries in the region. Assessing overall macroeconomic vulnerability in these three macroeconomic dimensions divides the region into three prototypical clusters.

The first group—**Chile, Colombia, Peru** and **Mexico**—has full access to international markets and strong macroeconomic fundamentals—i.e., a strong international liquidity and fiscal position and a positive inflation outlook.

The second group—**Argentina** and **Venezuela** has limited access to international financial markets and weak macroeconomic fundamentals, indicating a vulnerable international liquidity and fiscal position, and a negative inflation outlook.

Finally, **Brazil** can be classified as a third and intermediate case. It has full access to international financial markets but displays vulnerabilities in some macroeconomic dimensions—especially on the fiscal front—that although quantitatively distinct to those of countries with weak macroeconomic fundamentals, is not exactly aligned with the group of countries with strong fundamentals. Interestingly, the growth outlook of LAC-7 countries for the five-year period of 2014-2018 according to market consensus forecasts clusters these seven countries into the same three groups previously described. The first group of countries with sound macroeconomic fundamentals—Chile, Colombia, Peru and Mexico—are expected to perform above the LAC-7 mean forecast, while the second group of countries with weak macroeconomic fundamentals— Argentina and Venezuela—are expected to perform substantially below the LAC-7 mean forecast. The growth outlook for Brazil, which is part of the intermediate group with mixed fundamentals, is also below the LAC-7 mean growth forecast but expected perform better than Argentina and Venezuela.

#### **Policy Challenges**

From a macroeconomic vulnerability perspective, these three distinct groups of countries face very different sets of policy challenges. For the countries with strong macroeconomic fundamentals (Chile, Colombia, Mexico and Peru), the key challenge is to consolidate macroeconomic stability in more trying times. Although the task will not be easy, these countries are extremely well positioned in the years to come to be considered for graduation in macro policy management.

For the countries with weak macroeconomic fundamentals, the challenges are humongous. As the global context becomes less friendly, Argentina urgently needs to restore confidence to stop capital outflows and the drain on international reserves, and resuscitate its ailing economy. In order to do so, Argentina will need to normalize its relations with international creditors and multilateral organizations to remove itself from a position of technical default and restore normal access to credit markets, eliminate exchange controls and controls on capital outflows, unify the exchange rate market, phase out a host of other distortions of the price system (especially public utilities), make the necessary corrections to public finances to restore solvency, and put an end to inflationary financing of fiscal deficits. If Argentina starts moving in this direction it could start to recover rather rapidly from its current situation. There are plenty of examples in many countries in which these kinds of apparently insurmountable problems were resolved in a relatively short period of time.

The challenges for Venezuela, although qualitatively similar to those of Argentina, are many orders of magnitude larger. For starters, Venezuela has three official exchange rates and a much larger fiscal deficit, and it is in arrears with a host of creditors except with foreign bond holders. More importantly, restoring confidence in Venezuela will probably take much more than just moving towards more reasonable and credible macroeconomic policies, since it is the decision-making process itself—Venezuela's institutions, governance, and system of checks and balances—that has broken down.

For countries with mixed macroeconomic fundamentals such as Brazil, the challenge is to react in a timely fashion to correct any incipient deterioration. In the case of Brazil, this mostly involves avoiding a rapid rise in public debt that might eventually compromise its credit rating and lead to higher financing costs and a shortening of debt maturities. This, in turn, would feed back into an even more accelerated rise in public debt, and a further weakening in the international liquidity position. If this vicious cycle is to be avoided, Brazil should react sooner rather than later.

The shift to a less favorable global context also means that the region cannot count on favorable external tailwinds to grow at high rates. Pro-growth reforms will be needed in every country in the region—those with strong and weak macroeconomic fundamentals—to revitalize what otherwise will be a mediocre growth performance in the years to come. Mexico has recently given new impetus to the reform process. Other countries in the region must now join the fray.

Although the challenges ahead appear to be huge, these are exactly the times for optimism. With favorable tailwinds facilitating very high growth rates in the region for close to a decade, the incentive to pursue politically complex and politically debilitating macroeconomic adjustments and/or reforms was low. After all, most countries were doing well without them.

In a more adverse global context, with deteriorating macroeconomic fundamentals and mediocre growth ahead of us, incentives for change might improve significantly. In fact, it is in bad times that politically complex decisions are usually made. Whether we agree or not with the policies pursued, major macroeconomic adjustments and reforms in countries of peripheral Europe are a recent testimony to that assertion. As a famous economist once wrote, it is in bad times that "the politically impossible, becomes politically inevitable." It remains to be seen if the new crop of leaders in the region is up to the task.

## I. GROWTH PHASES 2004-2014: BOOM AND COOLING-OFF IN LATIN AMERICA

During the previous decade, Latin America (LAC-7) displayed a period of uninterrupted growth with the sole exception of the post-Lehman crisis year.<sup>2</sup> Yet, two very distinct growth phases immediately catch the eye (see Figure 1, panel a). Between 2004 and 2011 and excluding the temporary interruption following the Lehman crisis, LAC-7 countries grew at an average of 6.1 percent per year—substantially above the historical average of 3.7 percent since the early 1990s.<sup>3</sup> However, since 2012, growth rates cooled off significantly, and the region is expected to grow at a meager 2 percent in 2014. This pattern of expansion and deceleration was, to a greater or lesser extent, displayed by every country in the region with Venezuela, Argentina and Brazil experiencing the largest growth reversals and Mexico, the smallest (see Figure 1, panel b).

What lies behind Latin America's cycle of boom and subsequently sharp deceleration? The first step in providing a meaningful answer to this question is to recognize the very high degree of co-movement in economic fluctuations displayed by LAC-7 countries, which suggests that common factors must be playing a key role in driving this phenomenon (see Figure 2, panel a).<sup>4</sup> Moreover, this co-movement underlies the usefulness of carrying out the analysis from a regional perspective. Although not every country will fit the regional pattern perfectly, there is a sufficient degree of commonality for the regional analysis to become a useful abstraction. As we shall see in the next sections of this report, either by similarity or by contrast, this abstraction serves as a benchmark to gauge the behavior of individual countries.

2 LAC-7 refers to the seven largest Latin American countries namely, Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which together account for 93 percent of the region's GDP. Henceforth, the terms LAC-7, "the region" and Latin America will be used interchangeably.

<sup>3</sup> The average growth rate for LAC-7 is calculated using the simple average instead of a weighted average to avoid over-representing larger economies. The goal is to assess the performance of the average Latin American country.

<sup>4</sup> The high degree of co-movement in economic fluctuations among LAC-7 countries is strongly supported by a battery of statistical tests. First, the principal component analysis shows that a single principal component or underlying factor behind LAC-7 countries' growth rates explains about 45 percent of total variance. If the second principal component is also included, such variance explanation would increase up to 65 percent. The fact that two components can explain 65 percent of total variance provides strong evidence that LAC-7 countries to a very large extent display a common pattern in growth performance. A similar pattern emerges if pairwise correlations are calculated. For example, using the Spearman correlation test, more than 80 percent of LAC-7 countries' growth rate correlations are statistically significantly different from zero at a 5 percent confidence level.



#### Figure 1. Growth Phases in Latin America 2004-2014

#### b. Country Growth Rates (Annual GDP Growth)



Notes: LAC-7 is the simple average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which account for 93 percent of Latin America's GDP.

Data sources: National statistics and FocusEconomics for 2014.









Notes: LAC-7 is calculated using the simple average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which account for 93 percent of Latin America's GDP. The First Principal Component (FPC) for LAC-7 countries is estimated using each country's year-over-year growth rate. In panel b, predicted GDP growth corresponds to the External Factors Model prediction using the observed external factors from Q1.1991 to Q1.2014. For details of the LAC-7 External Factors Model methodology see Appendix I.

Data sources: National statistics, IMF World Economic Outlook, Bloomberg and own calculations.

The second step is to identify the prime suspect behind the high degree of commonality in economic fluctuations displayed by LAC-7 countries. In the early 1990s, a seminal paper by Calvo, Leiderman and Reinhart (1993), later expanded in various dimensions by Izquierdo, Romero and Talvi (2008), points to the relevance of external factors in accounting for macroeconomic performance in the region.

In this report, we develop an empirical model that focuses on the role of external factors in explaining output fluctuations in Latin America.<sup>5</sup> These factors include growth rates in advanced economies, growth rates in China, prices of the commodities that LAC-7 both produces and exports, and the cost of international financing for emerging economies.<sup>6</sup> Containing very few external factors, this model does surprisingly well in tracking LAC-7 output performance and accounts for more than 65 percent of output fluctuations in the region (see Figure 2, panel b).

To further understand the crucial role played by external factors, we look behind the scenes and display the dynamics of the key external drivers for the two relevant time periods. During the expansion phase, 2004-2011, global growth accelerated mostly due to a sharp acceleration in China's growth relative to the preceding period of 1998-2003 (see Figure 3, panel a). Commodity prices rose both continuously and exponentially, and almost guadrupled during the expansion phase (see Figure 3, panel b). The cost of international financing declined both continuously and significantly from an average of 13.1 percent in 1998-2003 to an average of 7.1 percent in 2004-2011 as a consequence of the decline in world interest rates and risk premiums for emerging markets (see Figure 3, panel c).





a. World Growth Rates





c. International Financing Costs (EMBI+ yield)



Notes: World refers to the Purchasing Power Parity weighted average of all countries as defined by the IMF's World Economic Outlook. Primary Commodity Prices refers to the IMF's all commodities index. EMBI+ refers to J.P. Morgan's Emerging Markets Bond Index Plus. Data sources: IMF World Economic Outlook, IMF Primary Commodity Prices, Bloomberg and Federal Reserve.

5 The model is an extension of Izquierdo, Romero and Talvi (2008) and very closely follows its methodology. See Appendix I for a detailed description of the empirical model.

6 As measured by JP Morgan's Emerging Market Bond Index Plus (EMBI+).

In contrast, during the cooling-off phase, 2012-2014, global growth decelerated back to the 1998-2003 levels mainly due to a sharp deceleration in China's growth rates, which was barely compensated for by an anemic recovery in advanced economies following the financial crisis, most notably in the EU (see Figure 3, panel a). Commodity prices also ceased to increase and actually declined slightly in 2012-2014, albeit still maintaining relatively high levels (see Figure 3, panel b). International financing costs for emerging economies continued to decline until the U.S. Federal Reserve's tapering announcement in May 2013, when financing costs interrupted a decade-long decline and gradually started to edge up, although still remaining at historically low levels (see Figure 3, panel c). The combination of slower global growth, commodity prices that still remained high but had ceased their skyrocketing rise, and international financing costs that remained low but interrupted their marked decline are enough to explain the sharp cooling-off in growth rates that the region experienced in 2012-2014.<sup>7</sup>

To summarize, external factors played a crucial role in explaining economic performance in the region, and no attempt to assess the region's macroeconomic outlook can be made without first assessing the outlook for the key external drivers.

<sup>7</sup> See Talvi and Munyo (2013) for an in-depth discussion on the changes in the external environment and the end of the boom period for Latin America.

## II. THE GLOBAL OUTLOOK AND ITS IMPLICATIONS FOR LATIN AMERICA

Global risks are not in short supply. Concerns about the possibility that U.S. interest rates might rise more sharply and abruptly than expected; uneasiness about the fragility of the recovery in the eurozone and even the viability of the euro; fears that property prices might collapse in China, leading to financial distress and a severe decline in growth rates; or that geopolitical tensions might trigger a sharp increase in oil prices and a world recession are all part of the everyday financial news landscape. For the sake of this report, however, we rule out the occurrence of these extreme events. Should any of them materialize, the impact on Latin America would be severe (see Box I).

This report's underlying assumption on the global outlook is given by current market expectations on growth in advanced economies, growth in China, commodity prices, and U.S. interest rates for the 2014-2018 five-year period.

Let us begin with the outlook for advanced economies. In 2014-2018, the U.S. is expected to grow close to its historical average, while eurozone growth is expected to perform substantially below its historical average (see Figure 4, panels a and b). In spite of the fact that current output is still significantly below what was predicted before the financial crisis, monetary policy is highly stimulative and interest rates are close to zero, the eurozone is not able to replicate its historical average growth rate and the U.S. is merely able to do so. These trends point to an underlying weakness that has led many experts to start talking about "secular stagnation" as the new normal.<sup>8</sup>

8 For a fascinating discussion on secular stagnation, see Teulings and Baldwin (2014).





b. Economic Activity in Europe (EA-17, annual GDP growth and forecasts)

#### c. Economic Activity in China (Annual GDP growth and forecasts)







d. Primary Commodity Prices (All commodities, actual prices and forecasts, Jan-04 = 100)

#### e. International Financing Costs (EMBI+ yield and forecasts)





Notes: Forecasts for U.S. real GDP are obtained from the Congressional Budget Office. Forecasts for the euro area and China GDP are obtained from the IMF's World Economic Outlook. Primary Commodity Prices refers to the IMF's all commodities index. EMBI+ refers to J.P. Morgan's Emerging Markets Bond Index Plus. EMBI+ forecasts are based on U.S. 10-year Treasury yields forecasts by the Cleveland Federal Reserve Survey of Professional Forecasters and own calculations.

Data sources: Congressional Budget Office, IMF World Economic Outlook, IMF Primary Commodity Prices, Bloomberg, Federal Reserve and Cleveland Federal Reserve Survey of Professional Forecasters.

The outlook for China points toward a gradual deceleration in growth rates (see Figure 4, panel c). The export-led supersonic growth rates displayed by China prior to the outbreak of the financial crisis in the U.S. and Europe in 2007/2008, gave way to an increasingly investment-led-credit-propelled growth. Since 2008, investment rose from 42 percent to 50 percent of GDP, and bank credit almost doubled from 130 percent to 233 percent of GDP. Moreover, the size of the shadow banking system multiplied by seven and now represents around 30 percent of the banking system. The guality of investment projects has been questionable, as it led to overcapacity in the real estate sector and a surge in spending by local governments in ambitious but in many cases low-productivity infrastructure projects. Such a policy of financing questionable investment projects cannot continue indefinitely without compromising the health of the financial system. Eventually, this investment-led-credit-propelled growth model must come to an end, leading sooner or later to a contraction in credit flows and, in the best case scenario, to the gradual deceleration in growth rates that markets currently expect.9

The outlook for growth in advanced economies and China described above is consistent with an expected softening in commodity prices (see Figure 4, panel d) and only a gradual increase in U.S. interest rates leading in turn to a gradual increase in the cost of international financing for emerging markets (see Figure 4, panel e).

What does this global outlook imply for Latin America? Plugging in these inputs into the empirical model developed in this report, LAC-7 output is forecasted to grow at an average rate of 3.2 percent for the period 2014-2018. This is consistent with the market consensus forecast of 3.3 percent for the same period (see Figure 5 and Figure 6, panel a). The region is thus expected to grow at a rate that is close to its historical average since the 1990s, close to estimates of potential output growth of 3.6 percent and substantially below the boom period 2004-2011.<sup>10</sup> The latter holds true for every Latin American economy with the notable exception of Mexico (see Figure 6, panel b and Box II).

# Figure 5. Forecast of Economic Activity for Latin America

(LAC-7 real GDP annual index, Dec-13 = 100)



Notes: The Model Forecasts are those of the External Factors Model assuming external factors evolve according to market expectations. For details of the External Factor Model see Appendix I. The consensus forecast is calculated using FocusEconomics data, and the consensus forecast spectrum is constructed using the standard deviation of individual forecasters' data for each LAC-7 country.

Data sources: Own calculations based on national statistics, IMF World Economic Outlook, Cleveland Federal Reserve Survey of Professional Forecasters and FocusEconomics.

<sup>9</sup> See CLAAF (2014) for an excellent discussion of the outlook for China and its implications for Latin America.

<sup>10</sup> Potential output growth of 3.6 percent represents the mid-range estimation for the average of Brazil, Chile, Colombia, Mexico, Peru and Venezuela, based on calculations by Sosa, Tsounta and Kim (2013).



#### Figure 6. Growth Forecasts for Latin America 2014-2018

a. Regional Growth Rates (LAC-7 annual GDP growth)

#### b. Country Growth Rates (Annual GDP growth)



Note: LAC-7 is the simple average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which account for 93 percent of Latin America's GDP.

Data sources: National statistics and FocusEconomics for forecasts.

In summary, in a global context in which adverse extreme events are ruled out by design and, although not as complacent as it was during 2004-2011 still relatively benevolent, Latin America's growth rates are expected to be rather mediocre. The return to lackluster growth rates after a decade of high growth and rising expectations has not been innocuous. Mediocre growth rates are already generating increasing social discontent, as evidenced by spontaneous protests that exploded in many countries in the region. These protests, mostly convened through social media, reflect the concerns of an emerging but still vulnerable middle class that not only fears for its economic well-being, but is also dissatisfied with the quality of government services and personal security.

This malaise is also reflected in the drop in the popularity of outgoing presidents during the cooling-off period relative to the popularity of outgoing presidents during the boom period. During the boom period, Chile's Michelle Bachelet, Brazil's Lula da Silva, Colombia's Alvaro Uribe, and Argentina's Cristina Fernández de Kirchner ended their terms with approval ratings of 80, 75, 70 and 64 percent, respectively. In contrast, during the cooling-off period, Chile's Dilma Rousseff, and Argentina's Cristina Fernández de Kirchner II, finished or are finishing their terms with approval ratings between 24 and 40 percentage points below those of their predecessors during the bonanza (see Table 1).<sup>11</sup>

#### Table 1. Latin America's Presidential Approval Ratings at the End of the Term

| (LAC-7 | Countries) |
|--------|------------|
|        |            |

|           | Boom Period Presidents<br>(2004-2011) |     | Cooling-Off Period Presidents<br>(2012-2015) |     | Change |
|-----------|---------------------------------------|-----|--|-----|--------|
| Argentina | Cristina Fernández                    | 64% | Cristina Fernández                           | 32% | -32%   |
| Brazil    | Luiz Inácio Lula Da Silva             | 75% | Dilma Rousseff                               | 35% | -40%   |
| Chile     | Michelle Bachelet                     | 80% | Sebastián Piñera                             | 50% | -30%   |
| Colombia  | Álvaro Uribe                          | 70% | Juan Manuel Santos                           | 46% | -24%   |

Notes: LAC-7 refers to Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Boom Period Presidents refers to presidents that ended their terms during 2004-2011. Cooling-Off Period Presidents refers to presidents that ended or will end their term during 2012-2015.

Data sources: National polls.

#### Box I. What if Tail Risks Materialize?

In order to assess the impact of the materialization of one of the many possible tail risks on Latin America, we analyze the impact of a severe and permanent slowdown in China's growth rate, falling abruptly from its current levels of 7.5 percent to 4 percent.

To simulate the impact on LAC-7 growth rates we make use of the External Factors Model of Output Fluctuations in Latin America described in Appendix I. Figure BI.1 shows the results of the simulation should a severe and permanent slowdown in China materialize. Growth rates in Latin America would decline from an expected 3.5 percent (the model forecast in the absence of tail risks) to 2.3 percent for the period 2015-2018, with an output gap (with respect to the model forecast) of -5.2 percent in 2018. This is due mainly to the direct impact of China's slowdown and the indirect impact of declining commodity prices.

The reassessment of risk for Latin America could be significant if a severe slowdown in China materializes. This reassessment is not fully captured by the interactions in the External Factors Model. Thus, for the purpose of simulating the joint impact of a severe slowdown in China together with a severe albeit temporary increase in risk, we assume the previous slowdown in China's growth rate together with an average increase of EMBI+ spreads by 500 bps in the first year that dissipates after two years. Figure BI.1 shows that the joint impact will result in a major slowdown in growth rates in Latin America to 1.7 percent for the 2015-2018 period, with an output gap of -7.2 percent in 2018.

Figure BI.1. Tail Risks and Economic Performance in Latin America



b. Growth Level Forecasts: 2015-2018 (LAC-7 real annual GDP growth)



Notes: The Model Forecast is that of the External Factors Model, assuming external factors evolve according to market expectations. China's Severe Slowdown represents a permanent shock to China's growth rate, slowing down from current levels to a 4 percent rate. The combined shock corresponds to a combination of a China Severe Slowdown shock with a reassessment of risk that produces an average increase of EMBI+ spreads of 500 bps in the first year that dissipates after two years. All shocks are assumed to materialize in 2015. Data sources: Own calculations based on national statistics, IMF World Economic Outlook and Cleveland Federal Reserve Survey of Professional

Latin America Macroeconomic Outlook: A Global Perspective

Forecasters

#### Box II. Why is Mexico Different?

In contrast to the rest of the LAC-7 countries, Mexico is very closely interconnected with the U.S. economy through trade, foreign direct investment and remittances (see Figure BII.1, panels a-c). As a consequence of that dependence, Mexico suffered the greatest adverse impact in the aftermath of the U.S. financial crisis: Mexico's economy contracted by 4.7 percent in 2009, while the rest of the LAC-7 economies contracted by an average 0.3 percent. Moreover, Mexico is the smallest net commodity exporter among LAC-7 countries (see Figure BII.1, panel d) and thus was bound to benefit to a lesser extent from the commodity price boom that was only temporarily interrupted by the Lehman crisis. In fact, for the whole boom period, Mexico displayed the slowest growth rate among LAC-7 countries.<sup>12</sup>



#### Figure BII.1 Mexico's Exposure to the United States

Notes: FDI refers to gross inflows. FDI data for Brazil is for the year 2009 due to lack of data. Venezuela is excluded from panel b due to lack of data of FDI inflows by origin. Net Commodity Exports is the difference between exports and imports of commodities. Data sources: World Bank World Integrated Trade Solution, World Bank and national statistics.

As the global context shifts towards higher growth in the U.S., lower growth in China and lower commodity prices, all the external factors that adversely affected Mexico's economy in the aftermath of the Lehman crisis will start working in its favor. As a result, Mexico is the only LAC-7 country expected to perform better in the 2014-2018 period than during the boom period 2004-2011.

12 This holds true even without considering the 2009 contraction.

## III. KEY MACROECONOMIC CHALLENGES FOR LATIN AMERICA

Even in a less complacent but still relatively benevolent global context, some countries in the region face significant macroeconomic challenges. Others however, display a surprisingly strong macroeconomic position, revealing an important heterogeneity that we intend to both characterize and understand below.

To characterize this heterogeneity, we separate the countries in the region in two categories that will prove to be extremely useful as an analytical device: countries with (i) full access and (ii) limited access to international capital markets and multilateral financing. The first group is composed of Brazil, Chile, Colombia, Mexico and Peru (henceforth, LAC-5). International financing costs in U.S. dollars for this group of countries varies between a low of 3.8 percent for Chile and a high of 4.6 percent for Brazil. The second group is composed of Argentina and Venezuela with significantly and consistently higher international financing costs in U.S. dollars of 9 percent and 12 percent respectively (see Figure 7, panels a and b).



Figure 7. International Financing Costs for Latin America

Notes: EMBI refers to J.P. Morgan's Emerging Markets Bond Index. Full Access countries are defined as those with normal access to international financial markets and multilateral financing. Limited Access countries are defined as those with virtually no access to international financial markets and multilateral financing.

Data source: Bloomberg.

With this characterization in mind, we will assess the vulnerability of macroeconomic fundamentals in four dimensions: (i) international liquidity, (ii) inflation, (iii) public finances and (iv) banking.

#### International Liquidity Vulnerability

a. Countries with Full Access

to International Financial Markets

Since the beginning of the cooling-off period in mid-2011, there has been a sharp contrast in the behavior of international reserves between countries with full access and those with limited access to international financial markets. While international reserves have continued to rise, albeit at a slower pace in LAC-5 countries, they have declined very significantly in Argentina and Venezuela (see Figure 8, panels a and b).

b. Countries with Limited Access

to International Financial Markets

#### Figure 8. Cooling-Off Phase and International Reserves in Latin America (International Reserves, millions of US\$)



Note: LAC-5 refers to the sum of the stock of international reserves of Brazil, Chile, Colombia, Mexico and Peru. Data sources: National statistics.

Given the recent pattern of behavior of international reserves, we assess the strength of the international liquidity position for both these groups of countries. Doing so is a particularly important piece of the puzzle in identifying macroeconomic vulnerabilities. Recurrent episodes of international financial turbulence have often resulted in sharp reversals of capital flows to emerging economies and in serious disruptions in capital markets that prevented the normal rollover of maturing debt. A strong liquidity position is an effective cushion to weather these episodes and prevent financial distress.

To evaluate the strength of the international liquidity position of every LAC-7 country we compute an International Liquidity Ratio (ILR) using a modified version of the Guidotti-Greenspan rule.<sup>13</sup> The ILR is defined as the ratio of short-term debt obligations of the public sector—both domestic and external and including the stock of central bank sterilization instruments—and short-term external debt obligations of the corporate non-financial private sector due in the next 12 months to international reserves.<sup>14</sup> An additional modification was made, however: We added to the international reserves of each country the already agreed ex-ante contingent credit lines and potential credit lines that could be negotiated in times of international financial turmoil with multilateral or regional financial institutions.<sup>15</sup> An ILR below 1 indicates a strong international liquidity position, enough to cover debt repayments due in the next year. An ILR above 1 indicates a weak international liquidity position with reserves and credit lines falling short of upcoming debt obligations.<sup>16</sup>

Figure 9 shows computations of the ILR. What emerges is that the group of LAC-5 countries with full access to international financial markets and access to multilateral financing are safely below the critical threshold of 1 and have a strong liquidity position—with the only exception of Brazil, which is slightly below the critical level. In contrast, the group of countries with limited access to international financial markets has an ILR that is significantly above the critical level of 1 and has a weak liquidity position.<sup>17</sup>



Notes: The ILR is calculated as the ratio of short-term domestic and external principal payments of the public sector and short-term external principal payments of the non-financial private sector due in the next 12 months to the sum of international reserves and potential credit lines from multilateral organizations. A value below (above) 1 denotes a strong (weak) international liquidity position. Data sources: Own calculations based on national statistics, IMF, IADB, CAF and FLAR.

13 See Greenspan (1999) and Guidotti (2000).

14 See Izquierdo and Talvi (2009) and Talvi, Munyo and Pérez (2012) for a detailed discussion on these liquidity measures.

15 For LAC-5 countries includes already negotiated contingent credit lines with the International Monetary Fund (IMF), the Inter-American Development Bank, CAF-Development Bank of Latin America and the Latin America Reserve Fund, as well as the possibility of access to the IMF's Flexible Credit Line up to a maximum of 1000 percent of quota.

16 According to the empirical literature, variants of this indicator are a robust predictor of financial crises in that greater short-term exposure is associated with a larger probability of a large reversal in capital flows and a larger output contraction. Moreover, the probability of a crisis increases exponentially when the ratio of short-term debt to international reserves exceeds the threshold of 100 percent. See for example Rodrik and Velasco (1999).

17 Forced rollover of certain types of public debt—typically holdings of government bonds by domestic banks and pension funds—could significantly decrease these ratios. Forced rollover, however, should be considered a policy measure and therefore should not be included in the computation of the ILR.

In other words, a heterogeneous picture arises in which some countries have very weak international liquidity positions (e.g., Argentina and Venezuela) while some others have extraordinarily strong liquidity positions (e.g., Chile, Colombia, Mexico and Peru) to face a prolonged disruption in international capital markets.

#### Inflation Vulnerability

Since the beginning of the cooling-off period in mid-2011, there has also been a sharp contrast in the behavior of inflation between countries with full access and limited access to international financial markets. While inflation has remained relatively stable and in single digits in the LAC-5 countries since the beginning of the cooling-off period—albeit not always within the target range specified by the central banks—it accelerated significantly in both Argentina and Venezuela, reaching extremely high levels (see Figure 10 panels a and b). In fact, current inflation rates range from a low of 2.9 percent in Colombia to a high of 6.4 percent in Brazil in the first group, while they hover around 40 percent in Argentina and 60 percent in Venezuela.

#### Figure 10. Inflation in Latin America (CPI, year-over-year change)



# b. Countries with Limited Access to International Financial Markets



Notes: LAC-5 is the simple average of Brazil, Chile, Colombia, Mexico and Peru. Dashed lines are the median of LAC-5 central banks upper and lower bound for inflation targeters.

Data sources: National statistics and private sector estimations for Argentina.

It is worth mentioning that the group of LAC-5 countries with low inflation and full access to international financing have inflation targeting regimes, while countries with very high inflation and limited access to international financing have monetary arrangements characterized by multiple exchange rates and capital and exchange rate controls. Both in Argentina and Venezuela, the gap between the official exchange rate to the U.S. dollar and the "black market" exchange rate is very significant (see Figure 11).





Notes: Argentina's black market exchange rate refers to the "Blue" exchange rate. Venezuela's official exchange rate refers to the CONCEX. Data sources: National statistics for official exchange rates, Ambito Financiero for Argentina's black market exchange rate and Liberal Venezolano for Venezuela's black market exchange rate.

In order to assess the inflation outlook, we consider that a country has a positive outlook for inflation if it is expected to remain or fall below 4 percent in the next three years. Conversely, a country has a negative outlook for inflation if it is expected to remain or rise above 4 percent in the next three years.<sup>18</sup>

With the prior definition in mind and in order to evaluate the inflation outlook for every LAC-7 country in a way that is comparable across countries and indicators, we develop an Inflation Vulnerability Indicator (IVR). The IVR is defined as the ratio of projected inflation at the end of 2016 to a 4 percent inflation threshold. An IVR below 1 indicates a positive inflation outlook. Conversely, an IVR above 1 indicates a negative inflation outlook, meaning that in the absence of policy measures inflation is expected to remain high.

Figure 12, panels a-c, show inflation forecasts and the computations of the IVR. For LAC-5 countries with full access to international financial markets, inflation is on average expected to gradually decline below the 4 percent threshold in the next three years. As a result, LAC-5 countries' IVR is expected to remain below 1 with the exception of Brazil, which misses the mark by a relatively small margin.

<sup>18</sup> Four percent inflation represents the median of the upper target ranges set by the central banks in countries with inflation targeting regimes and single-digit inflation.



# Notes: LAC-5 is the simple average of Brazil, Chile, Colombia, Mexico and Peru. Dashed lines in panels a and b depict the 4 percent inflation threshold. IVR is defined as the ratio of projected inflation at the end of 2016 to a 4 percent inflation threshold. A value below (above) 1 denotes a positive (negative) inflation outlook.

Data sources: National statistics and private sector estimations for Argentina. Forecasts are obtained from FocusEconomics and Econviews for Argentina.

18

In contrast, in Argentina and Venezuela, with limited access to international financial markets, inflation is expected to remain high and well above the 4 percent threshold in the next three years. As a result, the IVR for Argentina and Venezuela is expected to be significantly above the critical level of 1.

In other words, once again a heterogeneous picture arises in which some countries have a very negative inflation outlook (e.g., Argentina and Venezuela) and face the need to make substantial policy adjustments, while some others have an extraordinarily strong and sustained track record of very low and relatively stable inflation rates (e.g., Chile, Colombia, Mexico and Peru).

#### **Fiscal Vulnerability**

How vulnerable are fiscal positions in Latin America to the new and less complacent global context? To begin to answer this question we compute the public debt dynamics for LAC-7 countries over the next 15 years for a given trajectory of primary fiscal deficits, real interest rates, growth rates and the real exchange rate.

Before presenting the public debt dynamics computations, one important conceptual clarification is in order. For the computations of the public debt dynamics, we use gross public debt as percent of GDP as the relevant concept. We acknowledge this is a contentious issue. However, using net public debt (by subtracting the stock of international reserves held by the central bank from gross public debt) would, in our view, result in double counting. Our reasoning is that interest rates on sovereign debt implicitly take into account the country's international reserve position. International reserves are a source of liquidity and could be used in periods of international financial turbulence to pay both interest and/or amortizations coming due even if capital markets are temporarily closed to issuers. By reducing default risk, the stock of international liquidity affects the interest rate at which lenders are willing to provide financing to the public sector. Therefore, it would be misleading to use net debt and at the same time to use market interest rates-that already incorporate the level of international reserves-to compute the debt dynamics. To do so would de facto imply double counting the effect of international reserves. If net rather than gross debt were to be considered in the computation of debt dynamics, then interest rates should be higher in order to account for the higher risk associated with having no international reserves.

Figure 13 shows the public debt dynamics computations.<sup>19</sup> For the group of LAC-5 countries with full access to international financial markets, public debt remains on average relatively stable. In contrast, Argentina and Venezuela, with limited access to international financial markets, display non-convergent public debt dynamics in spite of making heavy use of inflation tax revenues. In fact, while we estimate inflation tax revenues in excess of 5 percent of GDP per year for Venezuela and 2.5 percent of GDP for Argentina, they actually hover around 0.2-0.3 percent of GDP for LAC-5 countries.<sup>20</sup>

19 See Appendix II for details.

20 Inflation tax revenues are calculated as  $IT = \left(\frac{\pi}{1+\pi}\right)^* m$  where  $\pi$  is the inflation rate and *m* is the monetary base in percent of GDP.

Figure 13. Debt Dynamics in Latin America





#### b. Countries with Limited Access to International Financing



Notes: LAC-5 is the simple average of Brazil, Chile, Colombia, Mexico and Peru. Public Debt corresponds to Non-Financial Public Sector Gross Debt in percent of GDP. Dashed lines depict the upper and lower bound projections. For details on debt dynamics computations see Appendix II. Data sources: Own calculations based on national statistics and IMF World Economic Outlook.

To assess the strength of the fiscal position we will define fiscal vulnerability in a very precise way. For the purposes of this report, we consider a fiscally vulnerable position as one in which public debt remains or rises above 50 percent of GDP over the next 15 years, assuming inflation tax revenues are low and equal to 0.3 percent of GDP for every country.<sup>21,22</sup>

With the prior definition of fiscal vulnerability in mind and, once again, to evaluate the strength of the fiscal position for every LAC-7 country in a way that is comparable across countries and indicators, we develop a Fiscal Vulnerability Ratio (FVR). The FVR is defined as the ratio of projected debt to GDP over 15 years (assuming identical inflation tax revenues for every country) to a 50 percent debt to GDP threshold. An FVR below 1 indicates a strong fiscal position. Conversely, an FVR above 1 indicates a weak fiscal position, meaning that in the absence of fiscal policy measures, public debt is expected to remain or to rise above 50 percent over the next 15 years.

Figure 14 shows the computations of the FVR. For LAC-5 countries with full access to international financial markets, public debt remains comfortably below the 50 percent of GDP threshold over the next 15 years. As a result, LAC-5 countries' FVR is safely below the critical threshold of 1 with the notable exception of Brazil.



Notes: The FVR is defined as the ratio of projected debt to GDP in 15 years (assuming identical inflation tax revenues for every country) to a 50 percent debt to GDP threshold. A value below (above) 1 denotes a strong (weak) fiscal position. Peru's FVR is truncated at zero since debt dynamics computations indicate that gross debt will reach 0 percent of GDP in 10 years.

Data sources: Own calculations based on national statistics and IMF World Economic Outlook.

21 The 50 percent debt-to-GDP threshold is based on IMF World Economic and Financial Surveys (2003). The survey finds empirical evidence that "the response of primary surpluses weakens as the debt-to-GDP ratio rises in emerging market economies, and this response stops altogether when debt exceeds 50 percent of GDP" suggesting that the conduct of fiscal policy is not consistent with ensuring debt sustainability.

22 Inflation tax revenues of 0.3 percent of GDP are based on the revenues generated by LAC-5 countries with low and relatively stable inflation rates.

In contrast, Argentina and Venezuela, with limited access to international financial markets display non-convergent public debt dynamics, with public debt expected to rise well above 50 percent of GDP over the next 15 years. As a result, the FVR for Argentina and Venezuela is significantly above the critical level of 1.

In other words, a heterogeneous picture arises in which some countries present very vulnerable fiscal positions (e.g., Argentina and Venezuela), facing the need to make substantial policy adjustments to stabilize the dynamics of public debt, while some others have extraordinarily strong fiscal positions (e.g., Chile, Colombia and Peru). In the latter case, countries could decide to either (i) continue to reduce public debt and further strengthen their financial position, (ii) use fiscal margins to increase public spending in productivity enhancing projects, and/or (iii) carry out countercyclical policies if necessary.

#### **Banking Vulnerability**

The indicators of bank solvency in LAC-7 countries are picture perfect. After a string of banking crises, debt restructurings and financial distress that the region went through—in the aftermath of the Russian/ LTCM 1998 crisis; the burst of the dot-com bubble in early 2001; and Argentina's default in 2002, which resulted in a significant and prolonged reassessment of risk for emerging as well as for U.S corporate high-yield bond markets—the health of the financial system has improved very significantly due to many factors. First, total public and private debt in percent of GDP for LAC-5 countries with full access to international financing is no higher than it was in 2001 and, if anything, is substantially lower in Argentina (see Figure 15, panel a). Though higher than in 2001, Venezuela's total debt is the second-lowest in the region. Second, liability dollarization in LAC-5 countries has greatly diminished from an average of 54 percent of total debt in 2001 to 34 percent currently—making balance sheets more resilient to abrupt exchange rate depreciation (see Figure 15, panel b). An even more pronounced de-dollarization of total debt has been observed in Argentina, and ,although to a lesser extent, de-dollarization also occurred in Venezuela.

More specifically on the banking system and according to the IMF Financial Soundness Indicators, nonperforming loans (NPL) are currently very low ranging from a low of 0.7 percent in Venezuela to a high of 3.7 percent in Peru (see Figure 16, panel a). Loan loss provisions (LLP) are currently well above NPL, and bank capital is at more than adequate levels, in every case in excess of the Basel III recommendations (see Figure 16, panels b and c)<sup>23</sup>. This is true for LAC-5 countries as well as for Argentina and Venezuela.

<sup>23</sup> The Basel III accord recommends that banks maintain a Capital to Risk-Weighted Assets ratio of at least 8 percent. See International Regulatory Framework for Banks (2010-2011).



#### Figure 15. Indebtedness and Currency Composition in Latin America

Notes: LAC-5 is the simple average of Brazil, Chile, Colombia, Mexico and Peru. Total debt is the sum of public and private debt. Public debt includes domestic and external liabilities. Private debt includes domestic credit to the private sector and the non-financial private sector's foreign liabilities. Dollarization is defined as the ratio of total debt denominated in foreign currency to total debt. Argentina's total debt and dollarization figures are for the year 2000 to avoid distortions due to the bank run in 2001.

Data sources: Own calculations based on national statistics, World Bank World Development Indicators, and IMF World Economic Outlook.





Notes: LAC-5 is the simple average of Brazil, Chile, Colombia, Mexico and Peru. The Basel III accord recommends that banks maintain a Capital to Risk-Weighted Assets ratio of at least 8 percent. In panel c, Venezuela data refer to 2013.

Data sources: IMF Financial Soundness Indicators, Basel Committee on Banking Supervision and national statistics for Venezuela.

However, the current picture of the banking system might give us a misleading picture of banking vulnerability given that, as previously mentioned, a less favorable global context and more adverse economic conditions are expected, i.e., higher interest rates, lower commodity prices, exchange rate depreciation and lower growth rates.

In order to assess the banking outlook we develop a Banking Vulnerability Ratio (BVR) defined as follows: The BVR is the ratio of projected nonperforming loans to maximum nonperforming loans.

Maximum NPL is defined as the level at which LLP and bank capital are completely exhausted. To estimate projected NPL in a scenario with rising interest rates, lower commodity prices, depreciating currencies and lower growth rates, we constructed a simple mortgage model and calibrated it for each of the LAC-7 countries. Assuming that an average

individual borrows 25 percent of his/her permanent income in a 15-year mortgage loan, we compute the indebtedness that such an individual would take if he/she assumes that the high growth rates, low interest rates and the appreciated real exchange rates prevailing during the boom period 2004-2011 were to last for the entire duration of the loan. We then compare the level of indebtedness of the latter to that of an individual with perfect foresight of future economic conditions, i.e., a boom period followed by a cooling-off period. Such a comparison gives us a simple yet instructive estimate of NPL that may develop as a consequence of an unexpected adverse change in economic prospects, namely higher interest rates, lower growth rates and a more depreciated currency than anticipated when the loan was originally agreed upon.24

A BVR below 1 indicates a sound banking system, meaning that the maximum NPL is larger than the es-

<sup>24</sup> See Appendix III for details. To estimate NPL we assume a uniform distribution between informed individuals who perfectly anticipate the change in economic conditions during the cooling-off period relative to the boom period and uninformed individuals who do not. Since informed individuals can perfectly foresee the change in economic conditions, they do not take on debt that exceeds 25 percent of their permanent income and consequently do not have to default. Uninformed individuals are assumed to default on that part of the debt that exceeds the maximum debt acceptable when economic conditions change. Maximum acceptable debt is given by the level of debt that generates a monthly mortgage payment equal to 25 percent of annual permanent income.

timated NPL, and that current levels of LLP and bank capital are adequate to withstand the expected increase in NPL. Conversely, a ratio above 1 indicates a fragile banking system, implying that the maximum NPL is smaller than the estimated NPL, and that current levels of LLP and bank capital are insufficient to withstand the expected increase in NPL.

Figure 17 shows the BVR for every LAC-7 country. Surprisingly, the BVR is below 1 for each and every country in the region, both for the group of countries with full access to international markets, low inflation and a strong international liquidity and fiscal position, as well as for Argentina and Venezuela, countries with limited access to international financial markets, high inflation, and a weak international liquidity and fiscal position. The salient feature of the banking vulnerability analysis is that every country in the region appears to be resilient to a less favorable global context in which extreme events are ruled out but worsening domestic economic conditions are expected (see Box III for an analysis of the region's banking vulnerability under more stressful conditions).

In summary, the tightening of the regulation and supervision of the region's banking systems observed during the last decade appears to have paid off.<sup>25</sup> As a result, banks in the region are in a strong position to endure deterioration in the global context and in domestic economic conditions. Ruling out extreme events, more adverse economic conditions are not expected to result in a banking crisis in any of the major countries in the region. Thus, from a macroeconomic perspective, this time around the weak link does not appear to be the banking system.



Notes: The BVR is defined as the ratio of projected nonperforming loans to maximum nonperforming loans. Maximum nonperforming loans is defined as the level at which bank capital and loan loss provisions are completely exhausted. For details on projected nonperforming loans see Appendix III. A value of BVR below (above) 1 denotes a sound (fragile) banking system.

Data sources: Own calculations based on the IMF Financial Soundness Indicators and national statistics for Venezuela..

#### Box III. Latin America's Bank Soundness Under Stress

Can Latin American banks withstand severe stress? In order to answer this question we make use of the Banking Vulnerability Ratio (see Section III for a description). To estimate how nonperforming loans behave in a typical systemic banking crisis in emerging markets, we use the results reported by Laeven and Valencia (2012) who document every banking crisis since 1970. The paper defines a systemic banking crisis as an episode in which the following two conditions are met: (i) Significant financial distress is imposed on the banking system (including bank runs, bank losses and liquidations), and (ii) policy interventions in response to financial turbulence are enacted by the government.

Peak nonperforming loans stand at 20 percent of total loans in the median emerging market systemic banking crisis since 1994.<sup>26</sup> Should a banking crisis materialize and nonperforming loans skyrocket to 20 percent, the representative bank existing loan loss provisions and bank capital in LAC-5 and Argentina would be enough to weather the storm (see Figure BIII.1). The only exception is Venezuela. Due to its significant leverage—as measured by the ratio of gross loans to bank capital—the highest in the region, a median banking crisis in Venezuela would exhaust loan loss provisions and bank capital.<sup>27</sup>





Notes: LAC-5 is the simple average of Brazil, Chile, Colombia, Mexico and Peru. The BVR is defined as the ratio of historical peak nonperforming loans to maximum nonperforming loans. Historical peak nonperforming loans refer to the median of peak nonperforming loans for every emerging market banking crisis since 1994. Maximum nonperforming loans is defined as the level at which bank capital and loan loss provisions are completely exhausted. A value of BVRbelow (above) 1 denotes a sound (fragile) banking system.

Data sources: Own calculations based on Laeven and Valencia (2012), IMF Financial Soundness Indicators and national statistics for Venezuela.

26 Out of the total sample of emerging countries in Laeven and Valencia (2012) we consider a sample of 37 emerging market countries equivalent to the one considered in Talvi, Munyo and Perez (2012). This sample covers more than 88 percent of the GDP of all emerging countries. 27 Venezuela's previous banking crisis in 1994 was even worse than the median, with nonperforming loans reaching 24 percent of total loans.

## IV. OVERALL MACROECONOMIC VULNERABILITY: ONE REGION, THREE LATIN AMERICAS

In order to assess overall macroeconomic vulnerability under a less complacent global context and more adverse domestic economic conditions, we map together the three vulnerability indicators in which a subset of countries in the region show a weak flank, namely, the ILR, the IVR and the FVR (see Figure 18).

When assessing overall macroeconomic vulnerability, the region clusters into 3 groups.<sup>28</sup> The first group is composed of Chile, Colombia, Peru and Mexicocountries with full access to international markets and strong macroeconomic fundamentals, and so a strong international liquidity and fiscal position, and a positive inflation outlook. The second group is composed of Argentina and Venezuela-countries with limited access to international financial markets and weak macroeconomic fundamentals, and so a vulnerable international liquidity and fiscal position, and a negative inflation outlook. Finally, the third and intermediate group composed of Brazil, with full access to international financial markets but displaying vulnerabilities in some macroeconomic dimensions-especially on the fiscal front-that although quantitatively distinct from those of countries with weak macroeconomic fundamentals is not exactly aligned with the group of countries with strong fundamentals.

Interestingly, the growth outlook of LAC-7 countries for the five-year period of 2014-2018 according to



Notes: The ILR is calculated as the ratio of short-term domestic and external principal payments of the public sector and short-term external principal payments of the non-financial private sector due in the next 12 months to the sum of international reserves and potential credit lines from multilateral organizations. IVR is defined as the ratio of projected inflation at the end of 2016 to a 4 percent inflation threshold. The FVR is defined as the ratio of projected debt to GDP in 15 years (assuming identical inflation tax revenues for every country) to a 50 percent debt to GDP threshold. Data Sources: Own calculation based on national statistics, IMF, FocusEconomics and Econviews.

<sup>28</sup> A formal cluster analysis was performed using data of the ILR, IVR and FVR for LAC-7 countries. Using agglomerative hierarchical clustering three country groups emerge: a first group composed of Argentina and Venezuela, a second group composed of Chile, Colombia, Mexico and Peru, and a third group composed of Brazil.

market consensus forecasts clusters these seven countries into the same three groups previously described. The first group of countries with sound macroeconomic fundamentals—Chile, Colombia, Peru and Mexico—are expected to perform above the LAC-7 mean forecast, while the second group of countries with weak macroeconomic fundamentals—Argentina and Venezuela—are expected to perform substantially below the LAC-7 mean forecast. The growth outlook for Brazil, which is part of the intermediate group with mixed fundamentals, is also below the LAC-7 mean growth forecast but expected perform better than Argentina and Venezuela (see Figure 19).



#### Figure 19. The Growth Outlook for Latin America 2014-2018 (Annual GDP growth forecasts, 2014-2018 average)

Note: LAC-7 is the simple average of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. Data source: FocusEconomics.

## V. FINAL THOUGHTS AND POLICY CHALLENGES

In the years to come Latin America will be facing a less favorable external environment and more adverse economic conditions than it did in the previous decade. Higher interest rates, lower commodity prices, weaker currencies and slower growth rates will be the norm rather than the exception.

Such a significant shift in the region's outlook together with the social discontent that has emerged as a result will pose very significant macroeconomic challenges for policymakers. The magnitude of these challenges will depend on whether the countries belong to the cluster of those with strong, mixed or weak macroeconomic fundamentals.

For the countries with strong macroeconomic fundamentals (Chile, Colombia, Mexico and Peru) the key challenge is to consolidate macroeconomic stability in more trying times. Although the task will not be easy, these countries are extremely well positioned in the years to come to be considered for graduation in macro policy management.<sup>29</sup>

For the countries with weak macroeconomic fundamentals, the challenges are humongous. As the global context becomes less friendly, Argentina urgently needs to restore confidence to stop capital outflows and the drain on international reserves, and resuscitate its ailing economy. In order to do so, Argentina will need to normalize its relations with international creditors and multilateral organizations to remove itself from a position of technical default and restore normal access to credit markets, eliminate exchange controls and controls on capital outflows, unify the exchange rate market, phase out a host of other distortions of the price system (especially public utilities), make the necessary corrections to public finances to restore solvency, and put an end to inflationary financing of fiscal deficits. If Argentina starts moving in this direction it could start to recover rather rapidly from its current situation. There are plenty of examples in many countries in which these kinds of apparently insurmountable problems were resolved in a relatively short period of time.

The challenges for Venezuela, although qualitatively similar to those of Argentina, are many orders of magnitude larger. For starters, Venezuela has three official exchange rates and a much larger fiscal deficit, and it is in arrears with a host of creditors except with foreign bond holders.<sup>30</sup> More importantly, restoring confidence in Venezuela will probably take much more than just moving towards more reasonable and credible macroeconomic policies, since it is the decision-making process itself—Venezuela's institutions, governance, and system of checks and balances—that has broken down.

For the countries with mixed macroeconomic fundamentals such as Brazil, the challenge is to react in a timely fashion to correct any incipient deterioration. In the case of Brazil this reaction mostly involves avoiding a rapid rise in public debt that might eventually compromise its credit ratings and lead to higher financing costs and a shortening of debt

<sup>29</sup> For a very interesting discussion on the graduation of various Latin American countries in the conduct of fiscal policy over the business cycle see Frankel, Végh and Vuletin (2013).

<sup>30</sup> See Hausmann and Santos (2014) for a recent and fascinating discussion on Venezuela.

maturities that would feed back to an even more accelerated rise in public debt and further weakening in the international liquidity position. If this vicious cycle is to be avoided Brazil should react sooner rather than later.

The shift to a less favorable global context also means that the region cannot count on favorable external tailwinds to grow at high rates. Pro-growth reforms will be needed in every country in the region, those with strong and weak macroeconomic fundamentals, to revitalize what otherwise will be a mediocre growth performance in the years to come. Mexico has recently given new impetus to the reform process. Other countries in the region must now join the fray.

Although the challenges ahead appear to be huge, these are exactly the times for optimism. With favor-

able tailwinds facilitating very high growth rates in the region for close to a decade, the incentive to pursue politically complex and politically debilitating macroeconomic adjustments and/or reforms is low. After all, most countries were doing well without major reforms. In a more adverse global context, with deteriorating macroeconomic fundamentals and/or mediocre growth ahead of us, incentives in favor of action might change significantly. In fact, it is in bad times that politically complex decisions are usually made.<sup>31</sup> Whether we agree or not with the policies, the ongoing macroeconomic adjustment and reform processes in the countries of peripheral Europe are a recent testimony to that assertion. As a famous economist once wrote, it is in bad times that "the politically impossible, becomes politically inevitable." It remains to be seen if the new crop of leaders in the region is up to the task.32

31 This issue has been thoroughly studied in the academic literature. For a useful survey see Tommasi and Velasco (1996).

32 See Talvi (2014)

### REFERENCES

Basel Committee on Banking Supervision. 2010-2011. "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems." Basel: Bank for International Settlements.

Calvo, G., A. Izquierdo and E. Talvi. 2003. "Sudden Stops, the Real Exchange Rate and Fiscal Sustainability: Argentina's Lessons." NBER Working Paper. Cambridge, Mass.: National Bureau of Economic Research.

Calvo, G., L. Leiderman and C. Reinhart. 1993. "Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors." IMF Staff Papers 40(1): 108-151. Washington: International Monetary Fund.

CLAAF. 2014. "Enter the Dragon: Risks from China to Latin America." Statement 31. http://www.claaf.org/ documents/31-statement.pdf.

Frankel, J., C. Végh and G. Vuletin. 2013. *"On Graduation from Fiscal Procyclicality."* Journal of Development Economics. Vol. 100(1), pages 32-47.

Greenspan, A. 1999. *"Currency Reserves and Debt."* Speech at World Bank Conference on Recent Trends in Reserves Management, Washington.

Guidotti, P. 2000. "On Debt Management and Collective Action Clauses." In Reforming the International Monetary and Financial System, edited by Kenen P. and A. Swoboda. Washington: International Monetary Fund.

Hausmann, R. and M. A. Santos. 2014. "Should Venezuela Default?" Project Syndicate http://www.projectsyndicate.org/commentary/ricardo-hausmann-and-miguel-angel-santos-pillory-the-maduro-government-fordefaulting-on-30-million-citizens--but-not-on-wall-street.

Izquierdo, A., R. Romero and E. Talvi. 2008. *"Booms and Busts in Latin America: The Role of External Factors."* IADB Research Department Working Paper 631. Washington: Inter-American Development Bank.

Izquierdo, A. and E. Talvi. 2009. "Policy Trade-Offs for Unprecedented Times: Confronting the Global Crisis in Latin America and the Caribbean." Monograph, IDB Research Department.

Jácome, L. and E. Nier and P. Imam. 2012. "Building Blocks for Effective Macroprudential Policies in Latin America: Institutional Considerations". IMF Working Papers 12/183. Washington: International Monetary Fund.

Laeven, L. & F. Valencia. 2012. "Systemic Banking Crises Database: An Update." IMF Working Papers 12/163. Washington: International Monetary Fund.

Lütkepohl, H., and M. Kratzig. 2004. *"Applied Time Series Econometrics."* Cambridge University Press. New York, United States.

Rodrik, D., and A. Velasco. 1999. "Short-Term Capital Flows." NBER Working Paper. Cambridge, Mass.: National Bureau of Economic Research.

Sosa S., E. Tsounta and H.S. Kim. 2013. *"Is the Growth Momentum in Latin America Sustainable?"* IMF Working Paper No. 13/109. Washington: International Monetary Fund.

Talvi, E., I. Munyo and D. Perez. 2012. *"Latin America Macroeconomic Outlook: A Global Perspective."* BBrookings-CERES Macroeconomic Report." The Brookings Global-CERES Economic & Social Policy in Latin America Initiative (ESPLA). Washington: Brookings Institution. http://www.brookings.edu/research/ reports/2012/10/latin-america-macroeconomic.

Talvi, E., and I. Munyo. 2013. *"Latin America Macroeconomic Outlook: A Global Perspective. Are the Golden Years for Latin America Over?"* The Brookings Global-CERES Economic & Social Policy in Latin America Initiative (ESPLA). Washington: Brookings Institution. http://www.brookings.edu/research/reports/2013/06/ latin-america-macroeconomic-outlook-talvi-munyo

Talvi, E., and H. Trinkunas. 2013. *"The Upcoming Electoral Cycle in Latin America in the Midst of Social Unrest: What Lies Ahead?"* The Brookings Global-CERES Economic & Social Policy in Latin America Initiative (ESPLA). http://www.brookings.edu/blogs/up-front/posts/2013/10/28-electoral-cycle-latin-america-talvi-trinkunas

Talvi E. 2014. *"Latin America's Decade of Delopmentless Growth."* in K. Dervis and H. Kharas (editors) "The Growth, Convergence and Divergence Debate.", forthcoming.

Teulings, C., R. Baldwin. 2014. *"Secular Stagnation: Facts, Causes and Cures."* VoxEU.org Book. CEPR Press. http://www.voxeu.org/content/secular-stagnation-facts-causes-and-cures

Tommasi, M. & A. Velasco. 1996. *"Where Are We in the Political Economy of Reform?"* Journal of Economic Policy Reform, Taylor & Francis Journals, vol. 1(2), pages 187-238.

World Economic and Financial Surveys. 2003. "World Economic Outlook: Public Debt in Emerging Markets." IMF Staff Survey. Washington: International Monetary Fund.

## APPENDIX I. EXTERNAL FACTORS MODEL FOR LATIN AMERICA

This appendix presents the technical details of the empirical model developed in this report to explore the role of external factors in accounting for Latin America's growth performance. To that end, a Vector Error Correction Model (VECM) specification was developed using the same methodology as in Izquierdo, Romero and Talvi (2008). The variables included in the model were the following: Latin America's GDP (*GDP\_LAC7*) as well as a set of external variables including the GDP of G-7 countries (*GDP\_G7*) and China (*GDP\_China*), LAC-7's average terms of trade (*TOT*), and international financial conditions measured by the EMBI+ spreads (*EMBI*).

After checking that the five variables are non-stationary, the existence of one cointegration relation and one lagged term (using the Dickey–Fuller test, Johansen Cointegration test and Lag Length Standard test respectively), the model can be specified and estimated as follows:

 $\Delta Y_{t} = c + \alpha \beta' Y_{t-1} + \Gamma \Delta Y_{t-1} + \varepsilon_{t}$ 

Where  $Y_t = [GDP\_LAC7 GDP\_G7 GDP\_China TOT EMBI]$  is a 5x1 vector,  $\alpha$  is a 5x1 vector that contains the error-correction-adjustment coefficients,  $\beta$  is a 5x1 vector that contains the error correction terms,  $\Gamma$  is a 5x5 matrix that contains the short-rundynamics coefficients, and  $\varepsilon$  is a 5x1 error term vector.

Following Izquierdo, Romero and Talvi (2008), it is assumed that LAC-7 growth rate doesn't affect external factors. In order to nullify the effects of LAC-7 growth rate on external factors, restrictions in longand short-run interactions were imposed.

Given the technical difficulties involved in the efficient estimation of the VECM with restrictions both in error correction coefficients and short-term parameters, the Lütkepohl and Kratzig (2004) methodology was followed. In a first stage, the cointegrating vector (including restrictions in  $\alpha$  as indicated above) was estimated, and, in a second stage, the short-run parameters were estimated by feasible generalized least squares, imposing both exclusion restrictions in  $\alpha$  and  $\Gamma$  and using the values obtained for  $\beta$  in the first stage. Treating the first-stage estimator of  $\beta$  as fixed in the second-stage estimation can be justified on the grounds that the convergence of cointegrating parameters is faster than that of short-term parameters.

It is important to notice that for the purpose of shocking the model variables, the exogeneity order assumed in the Cholesky Decomposition is as follows: GDP\_G7, GDP\_CHINA, TOT, EMBI and GDP\_LAC7, Latin America's GDP being the least exogenous variable.

## DATA

The data that was used in the model estimations has a quarterly frequency ranging from 1991:Q1 through 2014:Q1. Variables were constructed as follows:

Latin America's GDP (*GDP\_LAC7*): Calculated as the log of the simple average of seasonally adjusted real GDP indices of each of the LAC-7 countries. *Sources: National statistics.* 

G-7 economic performance (GDP\_G7): Calculated using the log of the weighted average of the seasonally adjusted real GDP of G7 countries. *Sources: National statistics.* 

China's economic performance (*GDP\_China*): Calculated using the log of seasonally adjusted real GDP of China. *Sources: National statistics.* 

Latin America's terms of trade (*TOT*): Calculated using the log of the simple average of the terms of trade index of LAC-7 countries. *Sources: National statistics, except for Venezuela, for which terms of trade are computed based on export price data from national statistics and import prices from International Financial Statistics of the IMF.* 

International financial conditions (*EMBI*): It is Measured by JP Morgan EMBI+ spreads. *Source: Bloomberg.* 

## APPENDIX II. PUBLIC DEBT DYNAMICS IN LATIN AMERICA

This appendix presents the technical details of the debt dynamics computations presented in Section III. Below, there is a detailed description of data sources and assumptions for each of the variables used in the analysis. Table AII.1 presents a set of selected parameters.

#### Definitions

**Initial Debt Stock**: Ratio of non-financial public debt to GDP as of December 2013 (in the Argentinean case the ratio corresponds to September 2013). *Sources: National statistics and IMF World Economic Outlook. Argentina's public debt does not include untendered debt.* 

**Dollarization**: Ratio of foreign currency denominated public debt to total public debt. *Sources: National statistics and IMF World Economic Outlook.* 

**Interest Rates**: Domestic currency annual real interest rate is defined as the domestic currency yield on 10-year bonds issued in domestic currency deflated by the expected average annual domestic inflation rate for the 10-year period (2014-2024). Average expected domestic inflation for the 2014-2024 is calculated based on FocusEconomics consensus forecast for the period 2014-2018. Inflation is assumed to remain at the 2018 level thereafter. For Argentina forecasts by Econviews were used instead of FocusEconomics. Foreign currency annual real interest rate is defined as the 10-year EMBI yield deflated by the average U.S. expected inflation rate for the 10-year period (2014-2024). Average expected U.S. inflation for the 2014-2024 is calculated based on Cleveland Fed forecasts.

Real average interest rate is the average of domestic and foreign currency interest rates weighted by the percent of debt denominated in domestic and foreign currency, respectively.

Sources: Nominal interest rates are based on own calculations using data from national statistics, Bloomberg and IMF Article IV Consultation Reports. Expected inflation rates are calculated using FocusEconomics projections, with the exception of Argentina for which Econviews is used. Cleveland Fed data is used for the U.S. annual expected inflation rates.

**Real GDP Growth**: Annual growth rate of GDP in constant local currency. *Sources: National statistics.* 

**Primary Surplus**: Ratio of fiscal revenues minus primary fiscal expenditure of the non-financial public sector to GDP. *Sources: National statistics and IMF World Economic Outlook.*  **Real Exchange Rate Depreciation**: Annual bilateral real exchange rate depreciation vis-à-vis the U.S. dollar. *Sources: Own calculations based on national statistics.* 

**Inflation Tax**: Defined as  $\frac{\pi}{1 + \pi} \cdot m$ , where  $\pi$  is the expected average domestic annual inflation rate for the period 2014-2024 and *m* is the ratio of monetary base to GDP as of December 2013. *Sources: Own calculations based on national statistics.* 

#### Assumptions

Domestic and foreign currency interest rates in countries with full access to international financing increase linearly during the five-year period 2014-2018 as a result of a gradual increase in the 10-year U.S. Treasury bonds yield which, according to market projections, will reach 4.5 percent in 2017. They are assumed to remain constant thereafter.

Foreign currency nominal interest rates in Argentina and Venezuela are assumed to reach 800 and 900 basis points spread in 2018 with respect to the 10year U.S. Treasury bonds yield, respectively. Domestic currency nominal interest rates for Argentina and Venezuela are assumed to be equal to foreign currency nominal interest rates plus a risk premium equivalent to the average spread between domestic and foreign currency yields on Brazil's 10-year bonds.

Initial domestic and foreign currency denominated debt stocks pay a fixed interest rate during the entire period 2014-2028 equivalent to the implicit interest rate on total public debt in 2013, calculated as the ratio of interest payments to public debt stock in 2013. Potential growth rate is assumed to be equal to the historical growth rate, calculated as the average real annual growth rate for the period 1992-2012.

Fiscal revenues for the 2014-2028 period are calculated assuming an elasticity of revenues to GDP equal to 1.

Primary expenditures real annual growth rate is assumed to be equal to potential GDP growth for the period 2014-2028.

Real annual depreciation rate is calculated as the depreciation rate necessary to balance the current account deficit. The current account deficit adjustment is assumed to be uniformly distributed during the 2014-2018 period. This calculation follows the same methodology as in Calvo, Izquierdo and Talvi (2003).

Amortization Schedule of the Initial Debt Stock: For the years in which data was available, the reported amortization schedule for the non-financial public debt was used. For those years in which there was no information on the amortization schedule, it is assumed that the remaining portion of the original debt is uniformly amortized through 2028.

New debt issued from 2014 onwards: Two amortization schedules are assumed. First, all new debt is amortized within a year, and, second, all new debt matures after 2028. The true amortization schedule will lie somewhere in between the two extreme scenarios. Interest rates paid on new debt are the projected market interest rate for each period as defined above.

| Variable  | Debt Stock  | Real Avg.<br>Interest Rate                             | Potential Real<br>Growth Rate                        | Primary Surplus   | Dollarization   | Inflation Tax<br>Revenues                            |
|---|---|--|--|---|---|--|
| Definition  | In % of GDP   | Weighted<br>average real<br>interest rate              | Real annual GDP<br>growth rate                       | In % of GDP   | Foreign currency<br>denominated<br>debt in % of total<br>debt | In % of GDP  |
| Reference   | 2013  | 2013   | Avg. 1992-2012                                       | 2013  | 2013  | 2013   |
| Argentina<br>Brazil<br>Chile<br>Colombia<br>Mexico<br>Peru<br>Venezuela | 32.8%<br>65.7%<br>11.7%<br>31.8%<br>35.8%<br>19.2%<br>49.8% | 10.3%<br>6.6%<br>2.1%<br>2.4%<br>2.9%<br>3.1%<br>13.6% | 3.7%<br>3.1%<br>5.2%<br>3.7%<br>2.7%<br>5.2%<br>2.7% | -0.7%<br>1.9%<br>0.0%<br>1.8%<br>-0.4%<br>1.8%<br>-6.4% | 54.2%<br>11.7%<br>6.2%<br>23.4%<br>28.5%<br>52.1%<br>60.7%    | 2.4%<br>0.3%<br>0.2%<br>0.1%<br>0.2%<br>0.3%<br>7.3% |

#### Table All.1 Debt Dynamics: Selected Initial Parameters

Notes: See Appendix text for details of debt dynamics computations.

Data sources: National statistics, IMF World Economic Outlook and Bloomberg.

## APPENDIX III. A SIMPLE MORTGAGE MODEL OF NONPERFORMING LOANS

This appendix presents the technical details of the simple mortgage model used to estimate the projected nonperforming loans (NLP) as a percentage of total loans in the banking sector of LAC-7 countries.

The model assumes the representative individual gets a 15-year variable interest rate mortgage equivalent to 25 percent of his permanent income. The 15-year period can be divided into two sub-periods: the first 4 years characterized by high income growth and low borrowing costs (boom period) and the remaining 11 years characterized by low income growth and high borrowing costs (cooling-off period).

For each country, the boom period growth rate was calculated as the 2004-2011 average GDP growth and the cooling-off period growth rate was calculated using the 2012-2018 average. The boom period interest rate was calculated as the 2010-2013 average real EMBI yields, while for the cooling-off period an upward trajectory of the EMBI yields was assumed (for detailed assumptions on interest rates see Appendix II).

In order to estimate the projected NPL, we contrast two types of individuals: Uninformed individuals who assume boom conditions will endure for the 15year lifetime of the loan, and informed individuals with perfect foresight regarding lower future income growth and higher future borrowing costs. Since maximum tolerable debt levels depend on permanent income, and given that both a reduction in the income growth rate and an increase in borrowing costs reduce permanent income, the uninformed individuals will take a larger loan (loan<sub>1</sub>) than informed individuals (loan<sub>2</sub>), since the uninformed individuals overestimate permanent income.

Considering that the mortgage payment cannot exceed the 25 percent of permanent income threshold, under the projected conditions  $loan_2$  is the maximum tolerable indebtedness, since it perfectly internalizes the dynamics of all the relevant variables. Any excess of debt with respect to  $loan_2$  would be defaulted. Hence, the NPL ratio to actual indebtedness for the uninformed individuals is calculated as

$$\frac{\mathsf{loan}_1 - \mathsf{loan}_2}{\mathsf{loan}_1} \bullet$$

In order to calculate aggregate NPL, a uniform distribution is assumed between informed individuals who perfectly anticipate the change in economic conditions during the cooling-off period relative to the boom period and uninformed individuals who do not. NPL for each country is then calculated as the average of NPL of uninformed individuals  $\frac{10an_1 - 10an_2}{10an_1}$  and 0 percent for informed individuals.



## BROOKINGS

1775 Massachusetts Avenue, NW Washington, DC 20036 202-797-6000 www.brookings.edu/global

## CERES

Antonio Costa 3476 11300 Montevideo Uruguay +598 26287644 www.ceres-uy.org