



# Latin America's Deceleration and the **EXCHANGE RATE BUFFER**







# LATIN AMERICA'S DECELERATION AND THE EXCHANGE RATE BUFFER

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1818 H Street NW, Washington DC 20433  
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ISBN (electronic): 978-1-4648-0115-0

DOI: 10.1596/978-1-4648-0115-0

Cover design: Kilka Diseño Gráfico.

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## *Foreword*

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This semiannual report — a product of the Office of the Chief Economist for Latin America and the Caribbean Region of the World Bank — examines the short and medium-term challenges for Latin America and the Caribbean (LAC) as the external factors that were instrumental in the region's recent performance recede. In particular, we address the role of the exchange rate as a counter-cyclical policy tool to buffer adverse external shocks.

As is customary in this series, Chapter 1 starts by providing an overview of the global economy and its implications for the short and medium-term prospects of the LAC region. It also examines the vulnerabilities of the region as tailwinds recede. Chapter 2 describes the new role of the exchange rate as a shock absorber in LAC amid the important transformations observed in the region in the past decade on the Macro-financial front. Finally, Chapter 3 gives a detailed look at exchange rate-smoothing policy interventions.

This report was led by Augusto de la Torre, Regional Chief Economist, Eduardo Levy Yeyati, and Samuel Pienknagura, Research Economist. Tatiana Didier and Sergio Schmukler kindly helped in preparing several parts of this report. Substantive inputs were provided by Maria Bru, Andrea Coppola, Tito Cordella, Tatiana Didier, Alain Ize, Daniel Lederman, Melanie Marie Laloum, Julio Ricardo Loayza, Zafer Mustafaoglu, Marcelo Olarreaga, Rong Qian, Marcela Sanchez-Bender, Peter Siegenthaler, and Julio Velasco, as well as members of the Regional Leadership Team from the Vice Presidency for Latin America and the Caribbean of The World Bank. Nicolas Kohn and Tanya Taveras, members of the LCRCE Macro team, provided outstanding research assistance. Finally, we would like to gratefully acknowledge the help provided by Christian Daude and Guido Sandleris in sharing data used in several parts of this report.

**October 2013**



## *Executive Summary*

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*Economic and financial news in the past six months confirm that the external tailwinds that propelled economic activity in Latin America and the Caribbean (LAC) over the past decade continue to recede. The softening of Chinese growth and its implications for the terms of trade of natural resource-abundant LAC, and the seemingly inevitable normalization of monetary policy in the U.S. have moved to the center of attention for policy makers in the region. The external setting for LAC is significantly complicated by the convergence of “the great deceleration”—affecting emerging economies across the board—, the pronounced steepening of the U.S. yield curve, and the nervous overreactions of financial markets to changing perceptions on the timing and implications of the tapering of quantitative easing (QE) in the U.S. Some consolation does come from the fact that the U.S. economic recovery appears on firmer footing (although besieged by high policy uncertainty associated with vitriolic political impasses) and that the European Union seems to have hit economic bottom. Overall, however, the global environment is no longer friendly to emerging markets in general and LAC in particular.*

*The growth deceleration in the region is indeed part of a synchronized (in timing and magnitude) slowdown across emerging economies (EMs)—including the middle-income countries in Eastern Europe, East Asia, and LAC, as well as China—whereby growth rates have declined by about 3 percentage points from their 2010 peaks to the present. In the case of LAC, the growth rate has fallen from about 6 percent in 2010 to around 3 percent in 2012 and to an estimated 2.5 percent in 2013. While the EM synchronization clearly indicates that a weakening of common (global) drivers of growth is at work, it is also the case that the variance in growth performance has been on the rise—as common factors lose strength, country specific factors play a bigger role. LAC is no exception in this regard. Growth forecasts for 2013 vary widely across countries in the region. They go from rates at or below 1 percent for Jamaica and Venezuela, to Asian-style growth rates of 5.5 and 8 percent for the two best performers in the region in the past decade, Peru and Panama, respectively. Reassuringly, a good number of mid-sized LAC countries (such as Chile, Colombia, Costa Rica, Ecuador, Guatemala, and Uruguay) are beating the regional average, with growth rates in the 3-4 percent range. Regrettably, the region’s giants, Brazil and Mexico, are growing below the LAC average, with Mexico’s growth falling below 2 percent despite the ongoing wave of reforms that is fueling investor optimism.*

*The great deceleration and intensification of volatility in capital flows and asset prices—including local bond yields and currencies—have sparked a wave of pessimism over the region’s future. Expressions such as “submerging economies” and “the party is over” have become common in analysts’ and investors’ parlance and, while mainly applied to the BRICS (Brazil, Russia, India, China, and South Africa), have contaminated perceptions about LAC. This marks a major turnaround in sentiment which not too long ago had nothing but praises for the region’s decade of stellar economic and social progress. Skeptics now argue that such progress was largely a mirage—i.e., that the region metabolized the terms of trade gains and capital inflows bonanza into a consumption-driven, credit-fueled (ultimately unsustainable) expansion that concealed (and fed) underlying macro-financial weaknesses—and a missed development opportunity of dramatic proportions—i.e., that the region failed to seize the favorable external conditions to build the foundations for productivity growth. In its stronger version, this pessimistic view predicts that the ongoing deterioration of the external environment will expose the region’s fragile dependence on speculative foreign finance and, as a result, the downturn will end up in tears, that is, in the type of macroeconomic and financial havoc that the region tended to experience in the 1990s following sudden stops and reversals in capital flows.*

*Is this gloomy prognosis justified? This report assesses this crucial question and comes out with a relatively optimistic yet nuanced view. For starters, it argues that the region’s last decade of social and economic progress is far from an illusion. To this end, it suffices to set right a few crucial facts about the region’s last decade of growth with equity. First, while growth was indeed driven by domestic demand (and not by external demand as in Asia), it was not—contrary to popular belief—a mere consumption story. A vigorous expansion in investment was a crucial part of the story, to the*

*point that the average rate of investment in the region now compares favorably to that in the East Asian middle-income countries (MICs). (The efficiency of such investment, to be sure, is a different issue that cannot be taken cavalierly and requires more research.) Second, LAC's current account deficits have been largely financed by foreign direct investment (FDI) rather than by short-term portfolio inflows, as is often believed. (Again, the quality of FDI and whether LAC is adequately capturing its positive spillovers is a different issue where concerns may be warranted.) Third, while brisk consumer credit expansion has naturally raised some policy concerns, overall credit growth was moderate in LAC by comparison with other MIC regions, was closely monitored by strict regulatory authorities and, hence, does not pose significant systemic risk worries (except perhaps in financially fragile Caribbean countries). Fourth, the social progress registered in the region over the last decade—whereby some 70 million Latin Americans left poverty and some 50 million joined the middle class—was real enough, and while it may stall and lead to frustrated expectations in a low-growth scenario, it is unlikely to be reversed in the short-run.*

*Most importantly, and this is the main focus of this report, there has been a fundamental improvement in the region's "macro-financial immune system" which should, in a veritable break with history, enable several of the larger countries in the region—particularly those with monetary policy frameworks based on inflation targeting and exchange rate flexibility—to rely on currency depreciations to absorb adverse external shocks and stimulate local economic activity, thereby cushioning the downturn as external tail winds recede. Moreover, given global uncertainties and jittery financial markets, a case can be made that such depreciations will likely have to be accompanied by hands-on interventions by central banks in the foreign exchange market so as to limit excessive currency volatility.*

*Two fundamental changes explain why inflation-targeting LAC countries can now embrace currency depreciations without fear in times of cyclical downturns. The first is the de-dollarization of financial contracts, which has substantially reduced the adverse (solvency) effects of currency depreciations on the balance sheets of debtors (households, firms, government). The second is the substantial decline in the so called "exchange rate pass through", a decline that reflects a more credible monetary policy that is better able to coordinate expectations in a forward looking manner—i.e., around the inflation target preannounced by the central bank—thereby breaking the old tendency for prices and wages to be set in a backward looking manner—i.e., indexed to past inflation and devaluation.*

*By leaving the fear of depreciation behind, inflation-targeting LAC countries stand now ready, arguably for the first time in their monetary history, to savor the text-book benefits of a currency depreciation during a downturn. These benefits could not be fully had during the 2008-2009 crisis because of its globally systemic nature (there was nowhere to export the recession to despite the sharp currency corrections) but may be had now that foreign demand for LAC exports (from China and the U.S.) is growing—not as vigorously as in pre-crisis years, but growing after all. First, flexible exchange rates make possible an independent and countercyclical monetary policy, whereby central banks can lower the interest rate to stimulate domestic economic activity in the context of falling external demand. Second, the depreciation of the currency in a downturn can help keep the external current account under control and, at the same time, boost domestic output and employment, not just by encouraging exports but also the production of goods and services for the local market. (Whether the elasticity of supply in the region is strong enough for these positive effects to significantly materialize is, of course, yet to be seen and some room for doubt is warranted.) Third, a depreciation of the currency can, by quickly adjusting the relative values of foreign and domestic assets, mitigate capital outflows, including by promoting "bargain hunting" inflows.*

*Naysayers may retort by pointing to the fact the inflation-targeting central banks in LAC intervene heavily in foreign exchange markets, which presumably raises doubts as to whether currencies are truly flexible. This report presents evidence showing that the intervention motives are justifiable. For starters, central banks in LAC accumulate reserves*





*for self-insurance purposes. In addition, and this is the focus of this report, such interventions can no longer be characterized as efforts to defend the indefensible—where central banks lose big time and are forced to buy dear the dollars that they foolishly sold cheap in a futile effort to sustain an unviable peg. The evidence rather shows that inflation-targeting central bankers now intervene not to fight against fundamentals but mainly to mitigate excess volatility—they buy dollars (accumulate international reserves) when the exchange rate is overvalued relative to its equilibrium level, and sell dollars (draw down international reserves) when it is undervalued. Because sterilized intervention is thus motivated, the worries about its potentially large quasi fiscal costs are exaggerated. The report in effect shows that once capital gains and losses are appropriately taken into account, sterilized intervention by LAC inflation targeters over the past decade has yielded rather small costs or, in a few cases, profits—although the efficiency of intervention cannot be judged solely by financial returns. Moreover, while gauging the effectiveness of interventions remains an empirical challenge, recent research suggests that interventions can in fact influence currency movements—by dampening deviations and overshootings.*

*Given this fundamentally changed macro-financial policy setup, the depreciations of LAC currencies should no longer be interpreted as a sign of financial distress and harbinger of a crisis. They should rather be seen, at least for the inflation targeting LAC countries, as a salutary part of a more efficient and employment-friendly process of macroeconomic adjustment to a downturn induced by adverse external developments. Indeed, a case can be made that externally-driven economic slowdowns or recessions in the region will increasingly look more like the down phases of run-of-the-mill business cycles typical of advanced economies. In this sense, the tendency to analyze LAC's macro-financial vulnerability today using categories that were applicable to the LAC of the 1990s is deeply flawed, for it ignores the silent institutional and policy reconfiguration that has led to a very different and much improved macro-financial immune system.*

*That is the good news for LAC. The bad news, of course, is that not all, not even most, countries in the region partake of this improved macro-financial resiliency. To be sure, inflation targeting LAC countries are, in some sense, the region's backbone—they include at least Brazil, Chile, Colombia, Mexico, and Peru, which jointly account for 70-80 percent of LAC's population and GDP. But they represent only a small fraction of the total number of countries in the region. Unfortunately, non-inflation targeting countries will have a much more reduced capacity to cushion the downturn. This group includes countries in Central America and the Caribbean that are too small and open to be able to realistically develop an independent monetary policy, a situation that is aggravated where the room for countercyclical fiscal policy is also nonexistent due to government over indebtedness and/or financial system fragility. Some countries in South America will also find themselves with little or no monetary policy maneuvering room, as they have not developed the institutional and policy matrix to support full-fledged inflation targeting and yet are significantly integrated into international financial markets. Other South American countries like Bolivia, while not full-fledged inflation targeters, are insulated in a different way—by being much less financially globalized and by having built strong fiscal savings that can be tapped in case of need.*

*In sum, when it comes to shock-absorption capacity vis-à-vis the souring of the external environment, pessimism does not seem warranted. Rather, a cautious optimism appears more appropriate, based on the obvious improvements in much of the region's macro-financial immune system. The associated ability to let the exchange rate depreciate without fear and conduct countercyclical monetary policy can definitely help cushion the cyclical component of the downturn, but it is by itself vastly insufficient to solve the deep-seated structural deficiencies that hinder LAC's ability to move to a higher growth path. Indeed, for all its virtues, low macro-financial vulnerability may coexist with anemic growth over long periods of time—a sort of low savings-low productivity-low growth trap that would put the brakes on the pace of social progress that LAC achieved in the past decade. Absent a big push in the productivity agenda, the region risks falling into such a trap in the years to come. This, rather than the macro-financial ghosts of the 1990s, remains the main regional challenge looking forward.*





## **PART 1: LATIN AMERICA'S DECELERATION AND THE EXCHANGE RATE BUFFER**



## Chapter 1: The Downturn

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For almost a decade, the larger emerging economies (EMs), including several countries in Latin America and the Caribbean (LAC), were regarded by economic analysts and investors alike as the new engines of growth in the global economy. The strong growth rates and remarkable social progress (including a major expansion of the Latin American middle classes) observed in EMs in the period preceding the global financial crisis sparked a love affair that, after a short pause in the heights of the 2008 crisis, was further cemented by the vigorous recovery of EMs in 2009 and 2010. The strong performance of EMs in the 2000s was seen by many as durable—the consequence of deep structural changes, both domestic and global, that had increased these countries’ resilience and potential.

However, in the past few months this enthusiasm for the emerging world has soured: a pronounced economic slowdown in EMs across the board has i) cast doubts on the sustainability of the high growth rates of the past decade and ii) revived old ghosts of macro and financial turbulence in EMs. Indeed, headlines such as “submerging economies,” the “the emerging party is over,” and worries about an “echo crisis” with a “lost decade” for emerging economies have become common in economic and financial periodicals in recent months.<sup>1</sup>

Is this turnaround in analysts’ sentiment exaggerated? Or is it solidly warranted? A beginning of an answer must take into account that the *view* of emerging economies (and emerging markets as an asset class) has been typically pro-cyclical: overhyped in good times and left for dead in times of stress. Nowhere is this cyclicity of views more striking than when applied to BRICs, the first of a number of catchy but economically misleading acronyms that characterized the fashionable search for the next big thing in the developing world. With the exception of the ineffable China (still growing but always raising worries that it may be on the verge of a hard landing), India, Brazil, and Russia (as well as South Africa, a newcomer to the BRIC family) have indeed been exhibiting a combination of slowing growth and widening external deficits (and, as result, weakening currencies), which has led many analysts to place them at the top of the list of countries vulnerable to a change in the direction of global winds. In fact, Morgan Stanley has already coined a new acronym which has resonated in the media: “The Fragile Five BIITS (Brazil, India, Indonesia, Turkey, and South Africa.”<sup>2</sup>

In light of the pro-cyclicity of opinions regarding EMs it is doubly important to ask how much of the current pessimism is founded in true fundamentals and vulnerabilities, and how much is the product of the effervescence and mood swings of economic analysts and financial markets. And, more important for our purposes: **Is LAC’s growth deceleration the preamble of a lost decade?**

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<sup>1</sup> The economic website Project Syndicate, for instance, has put together a collection of articles analyzing the future of EMs called “Submerging Economies?” There, renowned economists such as Harvard professors Kenneth Rogoff and Ricardo Hausmann use some of the terminology quoted above. In September 2013 Bloomberg posted the article “Are Emerging Economies Entering a Lost Decade?” written by Anders Aslund from the Peterson Institute.

<sup>2</sup> See [http://www.morganstanley.com/institutional/research/pdf/FX\\_Pulse\\_20130808.pdf](http://www.morganstanley.com/institutional/research/pdf/FX_Pulse_20130808.pdf).

## **Are Latin American economies still vulnerable to a 1990s-type boom and bust cycle as some are suggesting?**

This report aims at partially answering this question. To that end, it is useful to deconstruct the logic used by analysts when discussing the fate of EMs in general and of LAC in particular. A concise list of negative arguments frequently advanced by analysts would include the following:

### **1) Sluggish growth:**

Growth in EMs is slowing down, and will slow further, as the tailwinds that propelled these countries growth over the past ten years recede. Indeed, much of the previous success was a simple reflection of an extraordinarily supportive global environment. As a result, a softer Chinese economy, the deterioration of terms of trade, and the normalization of monetary policy in the U.S. will all confabulate to slow down more permanently the pace of economic activity of EMs, likely bringing them back to square one.

### **2) Macro-financial vulnerabilities:**

- a. In some middle income countries (MICs), including those in LAC, the strong tailwinds that characterized the 2000s and early 2010s led to a boom in domestic demand, especially domestic consumption, fueled by credit growth, which increased the demand for imported goods, fundamentally eroding these countries' current accounts. As a result, countries that have fallen into this dynamic are now heavily reliant on external financing.
- b. Rapid credit growth and a strong reliance on external financing could ultimately lead to an amplification spiral similar to the one observed in the 1990s, constraining monetary authorities to return to the past pattern of having to act in a pro-cyclical manner, thereby exacerbating the down cycle.<sup>3</sup>

In the rest of this section we revise these arguments in light of the evidence, and evaluate what in our view are the main exposures and vulnerabilities of the region and their implications as global tailwinds continue to recede.

## ***LAC's New Normal: Slower Growth and Weaker Currencies***

That EMs have entered a phase of slower growth is undisputable and has been repeatedly highlighted in previous reports in this series.<sup>4</sup> Gone are the days of the high growth rates observed in

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<sup>3</sup> For example, Gene Frieda, a global strategist for Moore Europe Capital Management argues that “The higher interest rates rise to stabilize emerging markets’ currencies, the more severe their crises will be. Ultimately, even if emerging economies manage to diversify their funding away from foreign currencies, they will remain hostages to US monetary-policy cycles.”

<sup>4</sup> See for instance the October 2012 report in this series “The Labor Market Story Behind Latin America’s Transformation” and the April 2013 report in this series “LAC as Tailwinds Recede: In Search of Higher Growth.”

the pre-crisis period and in the recovery from the global financial crisis.<sup>5</sup> Indeed, growth in many middle-income countries (MICs) such as China, the Eastern European MICs and the South East Asian MICs has decelerated and is expected to be in 2013 between 2.5 and 3.5 percentage points below the 2010 peak growth rates (**Figure 1.1, Panel A**). LAC is no exception to this synchronized deceleration among MIC regions—the most recent consensus forecasts put the region’s growth for 2013 at about 2.5 percent compared to the 3 percent observed in 2012, that is, 3 percentage points below the 6 percent rate of growth registered in 2010.

An important part of the recent deceleration across EMs, and more specifically in LAC, can be attributed to the weakening of the formidable tail winds that benefited the region in the last decade. To be sure, the extent to which the current deceleration in LAC and other EMs is of cyclical or structural nature is still being debated. Nevertheless, it is hard to deny that the fortunes and misfortunes of LAC in recent years have been tightly linked to global drivers: growth in advanced economies and in China supported the external demand for, and the international price of, Latin American natural resources-intensive goods, and low international interest rates helped reduce the cost of external financing and lure international capital into higher-yielding local currency assets. In turn, the economic and trade collapse and the spike in risk aversion in late 2008 and early 2009 triggered a sharp movement in the opposite direction, inducing capital flight and exchange rate depreciation, and sinking the region into a significant, albeit short-lived, economic slowdown. Even at this panoramic level of analysis, the fact that the global crisis was not accompanied by domestic financial crises already points at a critical difference in the way the region is able to cope with global swings now as opposed to the 90s.

One must not forget, however, that there is still a large degree of heterogeneity within the region in terms of macro-financial fundamentals and policy space, which implies that the vulnerability to an adverse external environment varies across countries in the region. This heterogeneity is already manifested in the growth forecasts for 2013 (**Figure 1.1, Panel C**).<sup>6</sup> Expected growth varies from as low as 0 and 1 percent for Venezuela and Jamaica, respectively, to the “Asian-style” rates of 5.5 percent estimated for Peru and Guyana, 8 percent for Panama, and the 12 percent for Paraguay (bouncing back from a *negative* 1 percent growth in 2012). Others, like Bolivia, Chile and Colombia, continue to beat the regional average with reasonably robust and stable growth rates of 4-5.5 percent. In contrast, two of LAC’s largest economies, Brazil and Mexico, are estimated to underperform the regional average, with growth forecasts of 2.4 and 1.5 percent, respectively. Brazil is struggling to revive its economic activity after posting a sluggish 0.9 percent growth in 2012, while Mexico has suffered a non-negligible slowdown in the first two quarters of 2013 which proved disappointing after the robust 3.9 percent growth rate in 2012.

The mentioned heterogeneity notwithstanding, the fact remains that the growth slowdown in LAC (measured by the difference between the 2010 and 2013 growth rates) is comparable in magnitude to that in other emerging regions (although regions differ on the levels of their growth rates). This suggests that global factors are most likely to be at work. To explore this, we compare the average

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<sup>5</sup> It is worth pointing that, at least in the case of LAC, this high growth rates were not necessarily a sign of high growth potential. Cyclical factors, such as the recovery of Brazil and Argentina following the crises of 2000 and 2002, respectively, were indeed an important reason behind LAC’s high growth rate.

<sup>6</sup> Needless to say, growth forecasts reflect internal factors such as growth fundamentals, the position of each country along the business cycle, and country specific shocks. Nevertheless, it is undisputable that part of the heterogeneity arises from different degrees of vulnerability to external conditions.

growth rate of the countries in the region vis-à-vis the average predicted by an econometric model where cyclical growth rates are a function of three external drivers, namely, external demand (captured by G7 and Chinese growth), commodity terms of trade (proxied by the CRB, a commodity price index), and international liquidity (as measured by the yield for the 10-year U.S. Treasury bill).<sup>7</sup>

Several conclusions emerge from this simple econometric exercise. First, while prior to 2003 the average growth rate in LAC was typically more volatile than that predicted by external factors, since 2004, perhaps due to a combination of lower idiosyncratic volatility and more pronounced global swings, regional growth has closely mirrored the growth rate predicted by the model (**Figure 1.1, Panel B**). Second, global factors carried a large weight in explaining the recent deceleration in the region, as illustrated by the steady decline in both the average observed and predicted growth rates in LAC since the first quarter of 2010.<sup>8</sup>

This does not deny the heterogeneity of growth performance within LAC. Note, for example, the dispersion in the distance between what the model predicted for the last 4 quarters for which we have data, on the one hand, and the growth rate actually realized, on the other. Clearly, some countries are doing better and some are doing worse than what global drivers would suggest, and by a large difference, which points towards the nontrivial importance of country-specific factors and policies in the observed growth outcomes (**Figure 1.1, Panel D**).

Looking forward, the phenomenon of receding tail winds that we envisioned in our April 2013 report has already materialized, and now is moving in a direction that may expose the region to a more protracted deceleration. But what are the specific risks that this scenario brings forward? **In a nutshell, we see two global downside risk triggers (the slowdown in China and the normalization of U.S. monetary policy), and three channels of regional exposure (higher financing costs, a stronger dollar, and lower commodity prices).** However, as argued extensively in the April 2012 report in this series (“Latin America Copes with Volatility, The Dark Side of Globalization”), exposure to external shocks is not equivalent to vulnerability to such shocks. This is simply because shock absorption and policy response capacity creates a wedge between exposure and vulnerability. We in fact showed in that report that a number of countries in LAC that are highly integrated into international trade and financial markets and, at the same time, have a relatively strong macro-financial immune system (i.e., a relatively wide room for counter-cyclical policy maneuver) are actually much less vulnerable to external shocks than some of the region’s less internationally integrated countries.

Be it as it may, let us now consider each of the two global triggers of downside risks to LAC. Regarding the first trigger, there is growing consensus that the Chinese economy is gradually

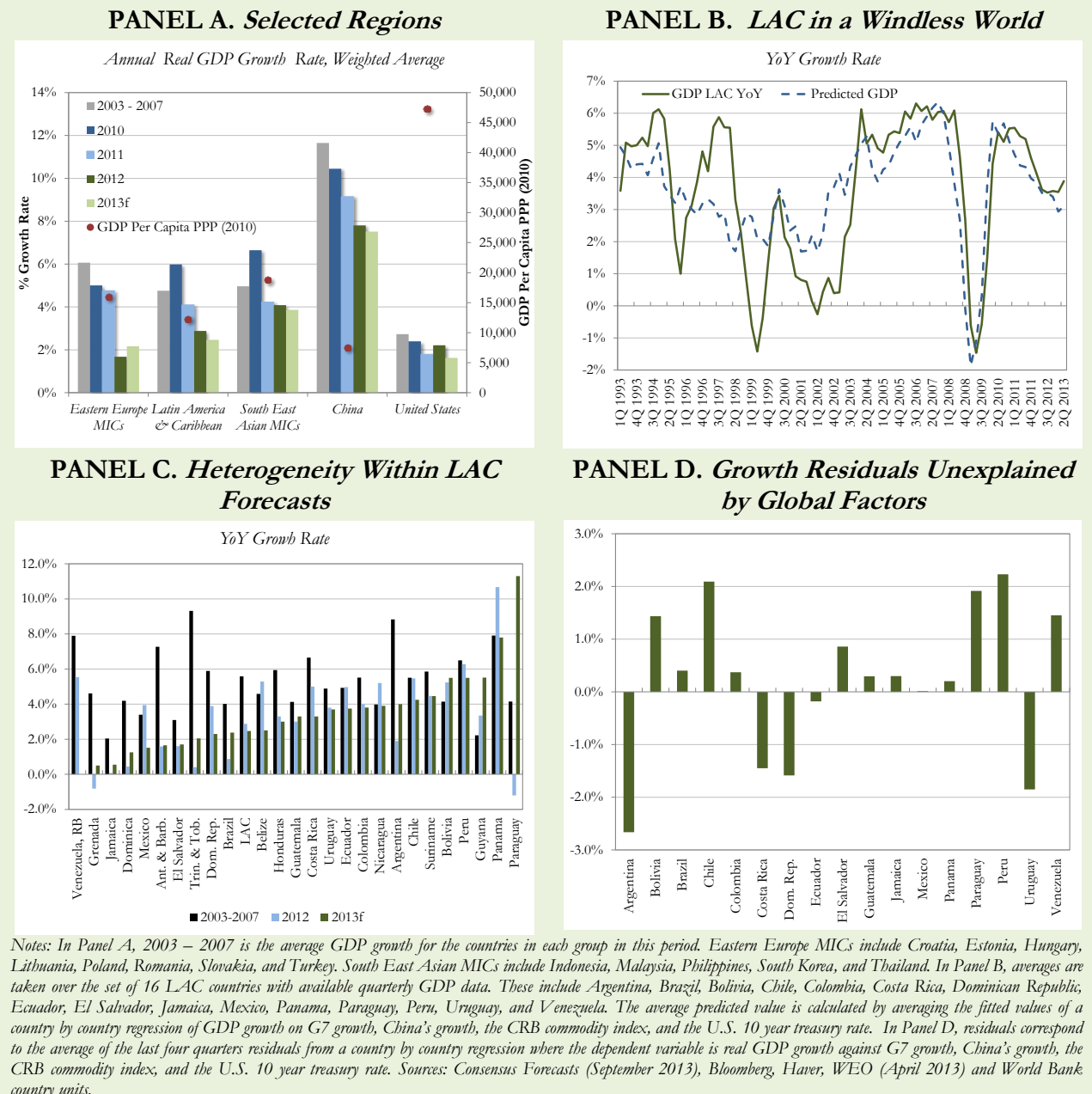
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<sup>7</sup> The Thomson Reuters/Jefferies CRB Index (TR/J CRB) was originally designed to provide dynamic representation of broad trends in overall commodity prices. In order to ensure that it continued to fulfill that role, its components and formula have been periodically adjusted to reflect changes in market structure and activity. There is evidence that both the correlation of G7 and Chinese growth and their incidence on developing economies have differed significantly (Levy Yeyati and Williams, 2012); therefore, we look at them separately.

<sup>8</sup> The median R-squared for LAC from the country-by-country regressions is 34 percent; that is, global factors explain around one third of the variability of growth in the median LAC. The same result is found using a panel regression.



**FIGURE 1.1. Growth Rates and Forecasts Across Regions and Within LAC: Global or Local?**



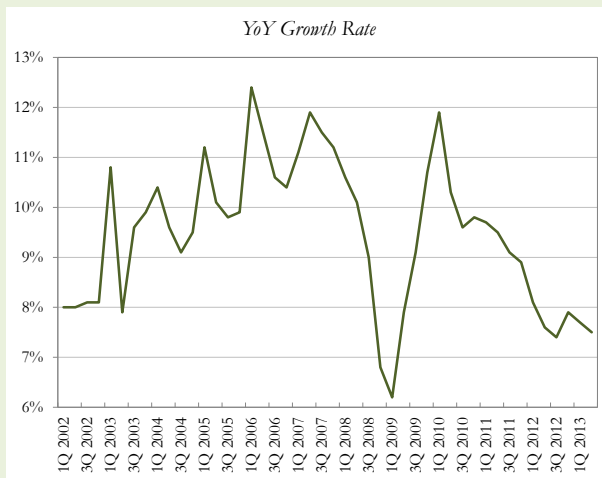
transitioning towards a consumption-driven growth model (as opposed to the export-led, investment intensive model of the past two decades). This view militates in favor of seeing the current slowdown in China to a 7-7.5 percent growth rate as reflection of structural change, rather than a purely cyclical deceleration (**Figure 1.2, Panel A**). This interpretation is consistent with the evolution of the consensus forecasts for Chinese growth for 2013 and 2014 (**Figure 1.2, Panel B**). Contrary to other regions, where forecasted 2014 growth rates have steadily declined but remain 0.4 percentage points higher than the rates estimated for 2013, growth forecasts for the Chinese economy in 2014 have converged to those for 2013. Moreover, the variability of the forecasts for

the Chinese economy in 2013 and 2014 has shrank, as the structural soft landing hypothesis has gained supporters (**Figure 1.2, Panel C**).

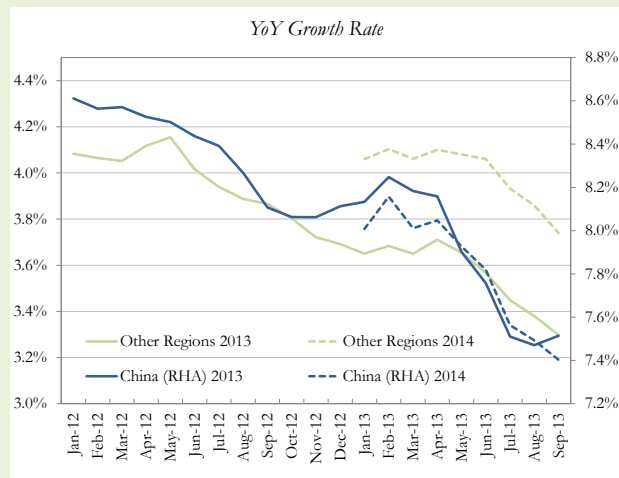
A soft landing of growth in China to a lower trend would have two clear implications for the near future of LAC economies. First, it may result in a reconfiguration in the composition of the external demand faced by LAC commodity exporters—away from metals and in favor of agricultural commodities and other manufacturing goods. From a static perspective, metal exporters like Peru or Chile may be initially hurt both by the Chinese slowdown and by the changes in the composition of its demand, whereas countries like Argentina, Brazil or Uruguay may feel a milder impact. In the long-run, however, the impact will depend on the extent to which each country is able to

**FIGURE 1.2. The Soft Landing of the Chinese Economy**

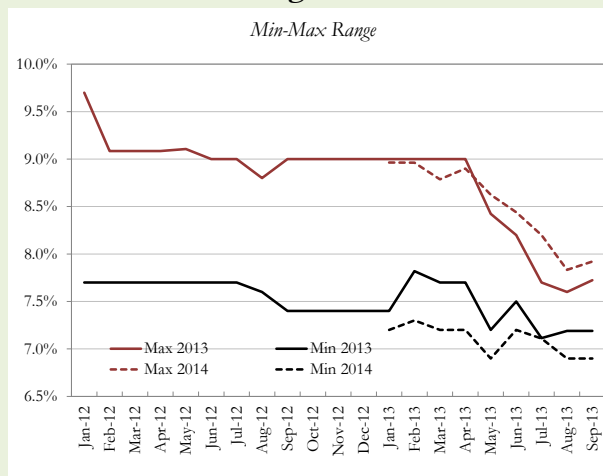
**PANEL A. China's Growth Rate**



**PANEL B. Evolution of Forecasts for 2013 and 2014**



**PANEL C. Forecast Range for the Chinese Economy**



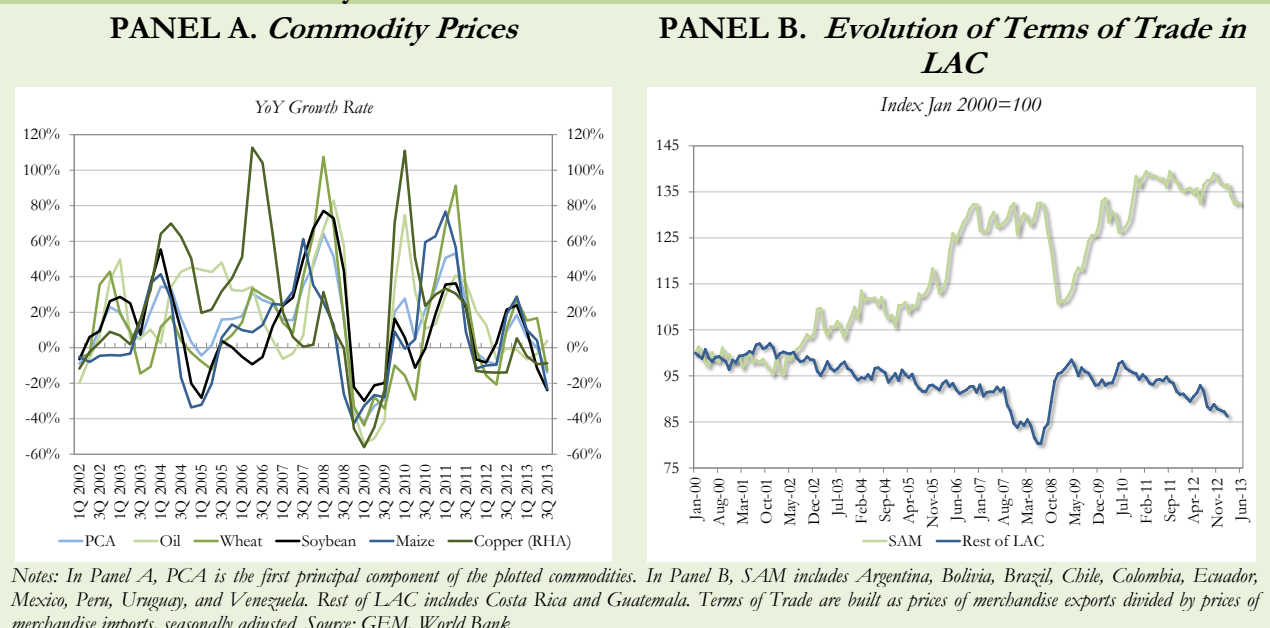
Notes: In Panel B, Other Regions include, LAC-6, comprised by Argentina, Brazil, Chile, Colombia, Mexico, and Peru; South East Asian MICs, comprised by Indonesia, Republic of Korea, Malaysia, Philippines, and Thailand; PCEs, comprised by Australia, Canada, New Zealand, Norway, and Sweden, and Others, which include India, Israel, and South Africa. Sources: Consensus Forecasts (September 2013), IFS, and WDI.

differentiate their export baskets, improve their productivity and achieve the dual goal of serving China's growing domestic demand and competing in third markets with an increasingly costly China as an exporter of labor-intensive manufacturing goods (the case, most notably, of Mexico for the U.S. market, but also a key challenge for Central American countries).

At any rate, the deceleration of China can affect LAC through its repercussions on commodity prices and hence the terms of trade of the region. In effect, with the exception of oil prices, which have been affected by geo-political factors like the conflict in Syria, commodity prices have ceased to increase significantly over the past year, with some commodity prices rather posting negative rates in the second and third quarters of 2013 (**Figure 1.3, Panel A**).<sup>9</sup> While, as was mentioned earlier, the price of some commodities, especially agricultural commodities, may experience stronger growth in the medium term, the general picture emerging from the data is that the super cycle of commodity prices that LAC enjoyed in the past decade has reached its peak and may be reverting. To be sure, terms of trade for commodity exporting countries in the region are still at historic highs (**Figure 1.3, Panel B**). But the attention has clearly focused on whether and at what speed will terms of trade decline.

The adverse effects on the region of China's growth deceleration may be partially offset by the strengthening of economic activity in the U.S. and Europe. Indeed, growth in the U.S. and Europe, which remain important components of the external demand for LAC exports, appears to be accelerating. Recent data for the U.S. points at a recovering housing market and declining unemployment, both signs that the U.S. economic growth may be gaining momentum. Similarly, after 18 months of negative growth, the Eurozone posted a slightly positive growth in the second quarter of 2013.

**FIGURE 1.3. Commodity Prices and Terms of Trade**



<sup>9</sup> In the medium term, however, the price of oil may experience downward pressures coming from an expansion of the world supply due to the extraction of shale oil in the US and China.

To be sure, the economic outlook for the U.S. and Europe is uncertain. The recovery in Europe remains tentative, highly unequal, and mined by political obstacles. There are unresolved issues on the fiscal front in the U.S. that remain as a source of downside risks. Examples of this unstable political outlook are the sequester of fiscal expenses at the beginning of 2013, the threat of a congressional impasse every September on the approval of the federal government's budget and debt ceiling, and the complications due to polarized partisan positions on the new health care act.

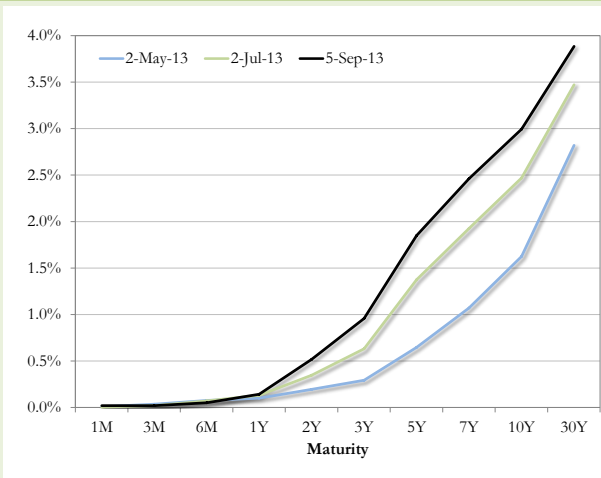
The main focus of global concern in recent months, however, has been the timing and pace of the unwinding of quantitative easing (QE) and normalization of interest rate policy by the U.S. Federal Reserve Board. In effect, the prospect of this normalization is clearly depicted in the steepening of the yield curve observed since May (**Figure 1.4**).

The sensitivity of EM asset prices to the remarks made by the Fed Chairman Ben Bernanke has been higher than many expected. In May and June, Bernanke's remarks over the possible tapering of QE immediately sparked a sizeable retrenching of financial flows from emerging markets, including LAC, which led to a substantial correction in EM currencies and sovereign spreads. This is illustrated for the Brazilian Real and the Mexican Peso around the June 19<sup>th</sup> announcement in **Figure 1.5, Panel A**. While the correction was partially undone immediately after the September 18<sup>th</sup> decision of the Federal Open Markets Committee to maintain the pace of the Fed's bond purchases (**Figure 1.5, Panel B**), there is growing consensus that the end of the highly accommodative monetary stance that has been in place in the U.S. for over five years may be coming to an end. A normalization of monetary policy in the U.S. will have, without doubt, important implications on the pace of economic activity of the region. After all, the accommodative monetary stance of the Fed prior to and after the global financial crisis, together with improved fundamentals, led to large non-FDI capital flows to LAC and low international financing costs.

The overreaction of financial markets to the news, and the resulting asset price volatility, is not something specific to the recent events. A look at the evolution of nominal exchange rates and real effective exchange rates over the past five years shows that currencies have been highly responsive to developments in the global economy (**Figure 1.5, Panel C and Panel D**). Summits, speeches, and announcements have resulted in major asset price swings in the post-Lehman world. This tight connection translates into a high correlation among EM currencies—the reflection of news-dependent decisions by professional investors—as shown in **Figure 1.5, Panels C and D**. Much of the volatility in asset prices and currencies reflects the rapid and pronounced shift in the portfolios of international funds, reflecting the behavior of underlying investors and fund managers, which are quite sensitive to news and herd effects, as discussed in **Appendix 1**.

It follows from the previous discussion that the current uncertainty about the path and the timing of monetary policy in the U.S. may expose countries in LAC to a large degree of volatility in capital flows—and, as a result, in their exchange rates—in the coming months. This type of exposure is the natural consequence of embracing a world where financial markets are increasingly integrated. The challenge of policy makers then is to find ways to mitigate the adverse effects of this excessive external financial volatility—including through exchange rate policies, which are at the core of chapters 2 and 3 of this report. In the medium term, the inevitable normalization of monetary policy in the U.S. will most likely lead to lower capital flows (at least of the non-FDI type) to EMs which,

**FIGURE 1.4. Steeper Yield Curve in the U.S.**



*Note: The selected dates May 2, 2013 and September 5, 2013, correspond to the minimum and maximum values, respectively, of the U.S. 10-year Treasury rate so far in 2013. July 2, 2013, was selected as an intermediate date to illustrate the steepening of the U.S. yield curve. Source: Bloomberg.*

in turn, will be reflected in higher borrowing costs (unambiguously negative for economic activity in the region) and weaker local currencies (which may arguably be a blessing in disguise).

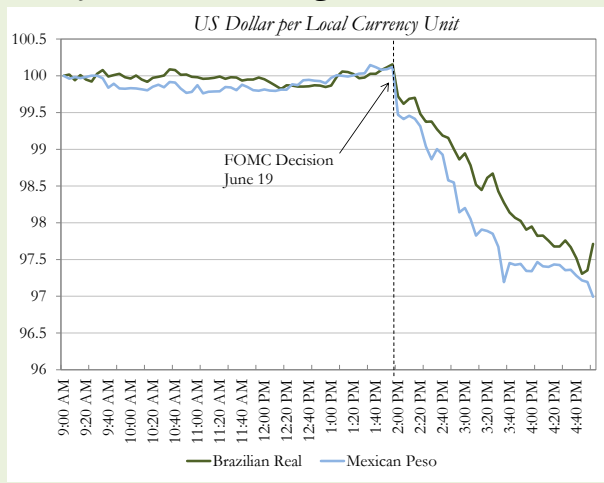
As U.S. yields increase the financing costs for EMs in international capital markets will also increase. **Table 1.2** reports the results of a simple model of sovereign spreads that illustrates the effect of a steepening of the U.S. Treasury yield curve on Latin America's sovereign (dollar-denominated) debt spreads.<sup>10</sup> It suggests that a rise in the 10-year U.S. Treasury yield leads to a less than proportional but strong compression in Latin debt spreads (i.e., a significant rise in yields). More importantly, it also translates, albeit partially, into higher yields in LAC's local currency-denominated sovereign debts, perhaps a more relevant result given that most of the funding in the region is channeled through local currency borrowing in domestic markets and that a large share of mutual and pension funds are invested in local-currency denominated government bonds. Note that, in addition to this direct effect on local yields, there is the indirect impact through higher monetary policy rates at home, higher inflation expectations due to the partial pass through of a weaker currency and, possibly, increased exchange rate volatility. Thus, while the link of economic activity in LAC to international interest rates may have weakened with the deepening of the region's domestic debt markets, a steepening and eventual upward shift of the U.S. Treasury yield curve will still result in tighter credit conditions in LAC.

As noted, while the timing and pace is still uncertain, the unwinding of the monetary expansion in the U.S. will likely continue to depreciate EM currencies in the future. However, the effects will likely continue to display significant variance across countries. The recent correction, as the 10-year Treasury rate went from 1.63 percent on May 2 to 2.99 percent on September 5, offers a simple example of the widely dispersed sensitivity of responses: variations over the period ranged from -0.6 percent (China) to 22.8 percent (India). What is behind the heterogeneous response? With the obvious limitations of any casual comparison based on a single episode, **Figure 1.6** confirms an intuitive prior: the extent of the recent depreciation was higher where the current account deficit was

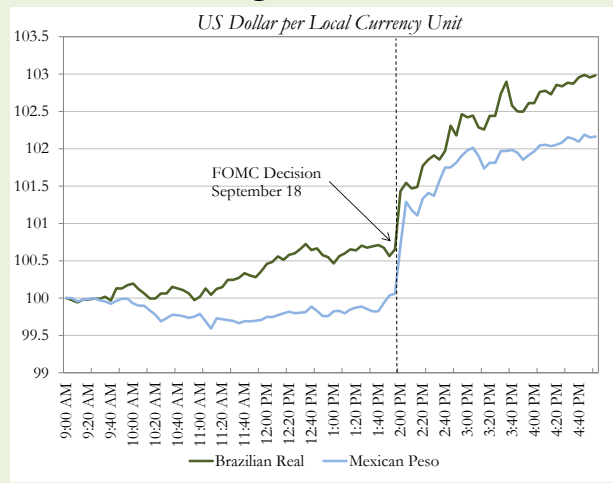
<sup>10</sup> The model includes standard controls for risk appetite (proxied by the spread on high-yield US corporate bonds, or the VIX) as well as the country's credit ratings and international reserves (as summary proxies for idiosyncratic credit risk).

**FIGURE 1.5. Exchange Rate Behavior in LAC**

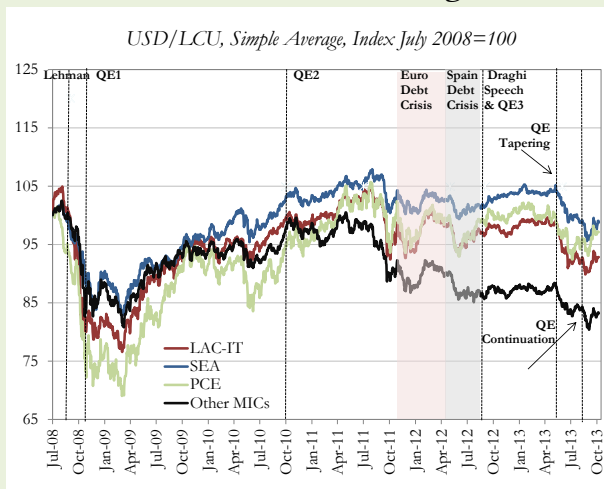
**PANEL A. Bernanke's Tapering Speech in June and Exchange Rates in LAC**



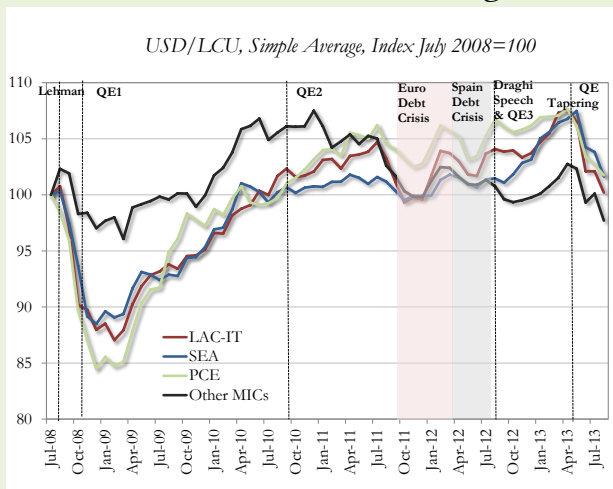
**PANEL B. FOMC September Decision and Exchange Rates in LAC**



**PANEL C. Nominal Exchange Rates**



**PANEL D. Real Effective Exchange Rates**



Notes: Panel A contains the evolution of the Brazilian Real and the Mexican Peso during June 19, 2013, while Panel B contains the same information during September 18, 2013. Both dates corresponded to U.S. Federal Open Market Committee (FOMC) meetings. In all Panels, up means nominal (real, Panel D) appreciation against the U.S. dollar, while down means nominal (real, Panel D) depreciation. In Panels C and D, LAC-IT includes Brazil, Chile, Colombia, Mexico, and Peru. SEA includes Indonesia, Malaysia, Philippines, Thailand, and South Korea. PCE includes Australia, Canada, Norway, New Zealand, and Sweden. Other includes China, India, Israel, Turkey, and South Africa. Sources: Bloomberg, GEM, and IFS.

larger and where the previous appreciation (in the figure, computed over the previous two years) was more pronounced.

Naturally, both aspects are intimately related, to the extent that intense capital inflows (particularly, portfolio investment), flexible (and, in the event, appreciating) currencies, and current account deficits paint different sides of the same phenomenon. Looking forward, one could tentatively speculate that countries more dependent on foreign capital will likely experience greater exchange rate depreciation pressures as capital flows decline or reverse.

**TABLE 1.2. Exposure to U.S. Rates: Foreign and Local Currency Financing Costs**

Dependent Variable	Spread in USD		Local Currency Yield			
	Full Sample	LAC	LAC			
			2 Years		5 Years	
Log Credit Rating	-1.329*** (0.0910)	-3.640*** (0.115)	0.289 (0.257)	0.118 (0.181)	0.860*** (0.135)	0.650*** (0.136)
Log VIX	0.115*** (0.0385)	0.157** (0.0647)	0.234*** (0.0626)	0.144*** (0.0403)	0.0696* (0.0418)	0.0541* (0.0309)
Log High Yield Index	0.648*** (0.0299)	0.692*** (0.0547)	-0.120** (0.0609)	-0.133*** (0.0408)	0.0486 (0.0427)	0.00435 (0.0337)
Log Monetary Policy Rate				0.303*** (0.0425)		0.0602*** (0.0137)
Log Implied Volatility 1yr				0.0706 (0.0434)		0.0843*** (0.0296)
Inflation Expectations				0.154*** (0.0148)		0.0775*** (0.0122)
Log Reserves/GDP	-0.239*** (0.0485)	-0.0429 (0.0476)	0.180* (0.0937)	-0.273*** (0.0836)	-0.400*** (0.0720)	-0.458*** (0.0742)
Log 2yr Yield US			0.162*** (0.0162)	0.0547*** (0.0146)		
Log 5yr Yield US	-0.163*** (0.0122)	-0.0847*** (0.0248)			0.119*** (0.0222)	0.108*** (0.0185)
Constant	7.189*** (0.248)	12.97*** (0.327)	0.893 (0.627)	-0.230 (0.482)	-1.135*** (0.359)	-1.149*** (0.382)
Observations	1,059	552	382	359	215	215
R-squared	0.902	0.852	0.634	0.877	0.889	0.931

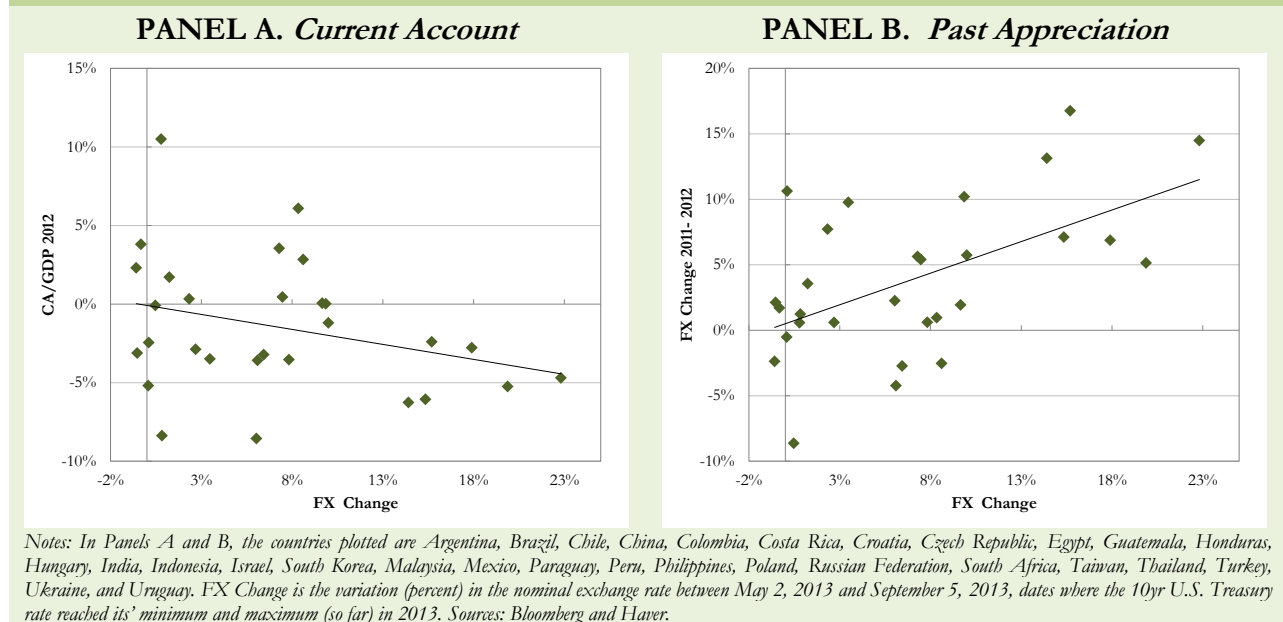
Notes: USD Spread and Local Currency Yield are panel regressions. The dependent variable in the former is the J.P. Morgan's EMBI Spread in U.S. dollars, while the dependent variable in the latter is the local currency yield denominated in local currency for the maturities specified (two and five years). Credit Rating corresponds to the one assigned by credit agency Standard & Poors (as credit ratings are letters, they have been replaced by numerical values). High Yield Index is the BarCap U.S. Corp HY YTW - 10 Year Spread. Implied Volatility 1yr is the implied volatility derived from at-the-money options, while Inflation Expectations corresponds to the 12-month expectations. Standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Sources: Bloomberg, Consensus Forecasts (September 2013) and Haver.

However, as we argue in more detail below, this is not necessarily a negative outcome for LAC, as many analysts seem to believe. Thanks to the gradual de-dollarization process of the past decade and the shift towards becoming a net creditor to the rest of the world, the bad side effects of an exchange rate depreciation (associated mainly with currency mismatches in debtor balance sheets) that were a dominant concern in the 1990s are today virtually gone. In today's circumstances, a depreciation of the currency could help correct the current account imbalance while minimizing the burden of adjustment on employment and economic activity, especially in LAC countries with more mature inflation targeting regimes (Brazil, Colombia, Chile, Mexico and Peru).

In sum, from a short-term growth perspective, the current pessimism surrounding LAC seems to be warranted. LAC, together with other EMs, is entering a new phase of lower growth dynamics. The tailwinds that supported the region (and other EMs) in the past are clearly losing strength and headwinds are in sight for the future. Moreover, there is little evidence that LAC has made big productivity improvements in the bonanza period that would allow the region to grow with the strength of the pre-crisis period. Looking forward, the next few years will find the region battling two fronts simultaneously. On the one hand, there is the long-run challenge to raise potential, non-inflationary growth through productivity enhancements: as was discussed in the April 2013 report of this series<sup>11</sup>, the region still has to find its own path to sustained growth. On the other hand, there is the short-term challenge to find the right policy mix to mitigate the adverse effects of less favorable external conditions without sacrificing the macroeconomic and political stability gained in the 2000s.

<sup>11</sup> "LAC as Tailwinds Recede: In Search of Higher Growth."

**FIGURE 1.6. Exchange Rates Response to the U.S. Interest Rate and Current Account in EMs**



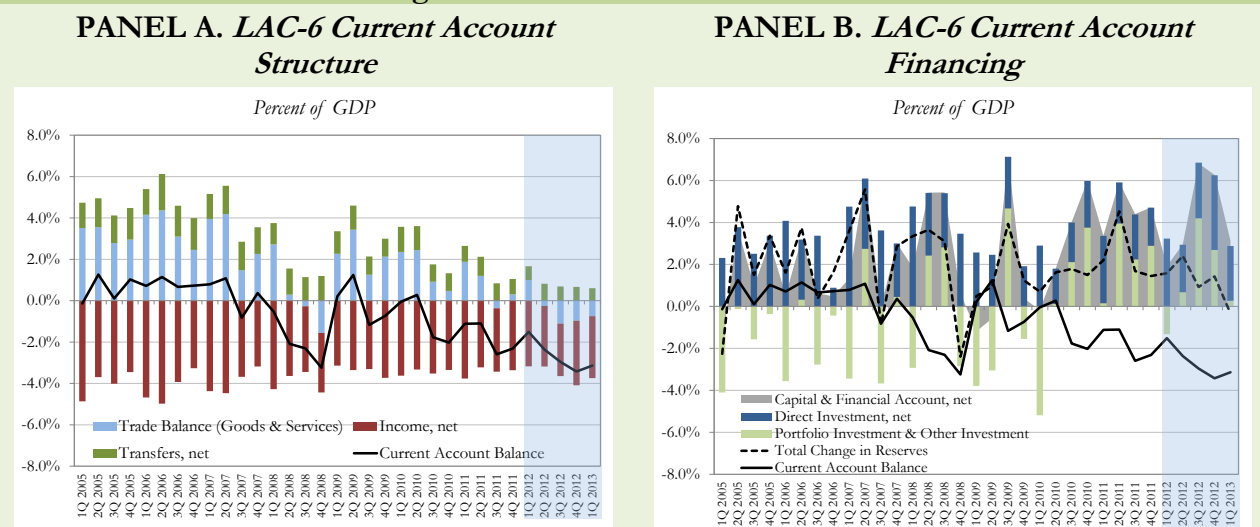
## *LAC's Current Patterns: Growing Investment and FDI, Limited Credit Growth*

As argued in the April 2013 report in this series “LAC as Tailwinds Recede: In Search of Higher Growth,” the benign external conditions experienced by countries in the region in the 2003-2010 period (with the obvious exception of the months following the global financial crisis) led to a very particular economic dynamic of growing domestic demand, expanding services sectors, and an increasing demand for imported goods. The specificity of this dynamic appears clearly in the comparison of the weight of domestic demand on GDP in South America and Mexico (SAM) relative to other emerging regions like the East Asian MICs, or commodity producers such as Australia or Canada (which we grouped as peripheral core economies, or PCE). Domestic demand in SAM grew steadily in the 2000s and stands well above those of the East Asia and PCEs,<sup>12</sup> a pattern that lies at the core of the region’s growth dynamics and translated into a progressive deterioration of the region’s current account and a deepening of its reliance on external financing, despite the commodity bonanza (**Figure 1.7**).

While the broad depiction of LAC’s growth pattern presented above resonates well with the pessimistic arguments, there are some nuances that are worth emphasizing.

<sup>12</sup> As is customary in the reports in this series, we compare LAC against three regions: Eastern European MICs, comprised by Croatia, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia, and Turkey, East Asian MICs comprised by Indonesia, Malaysia, Philippines, Republic of Korea, and Thailand, and Peripheral Core Economies, comprised by Australia, Canada, New Zealand, Norway, and Sweden.



**FIGURE 1.7. LAC's Widening Current Account Deficit**


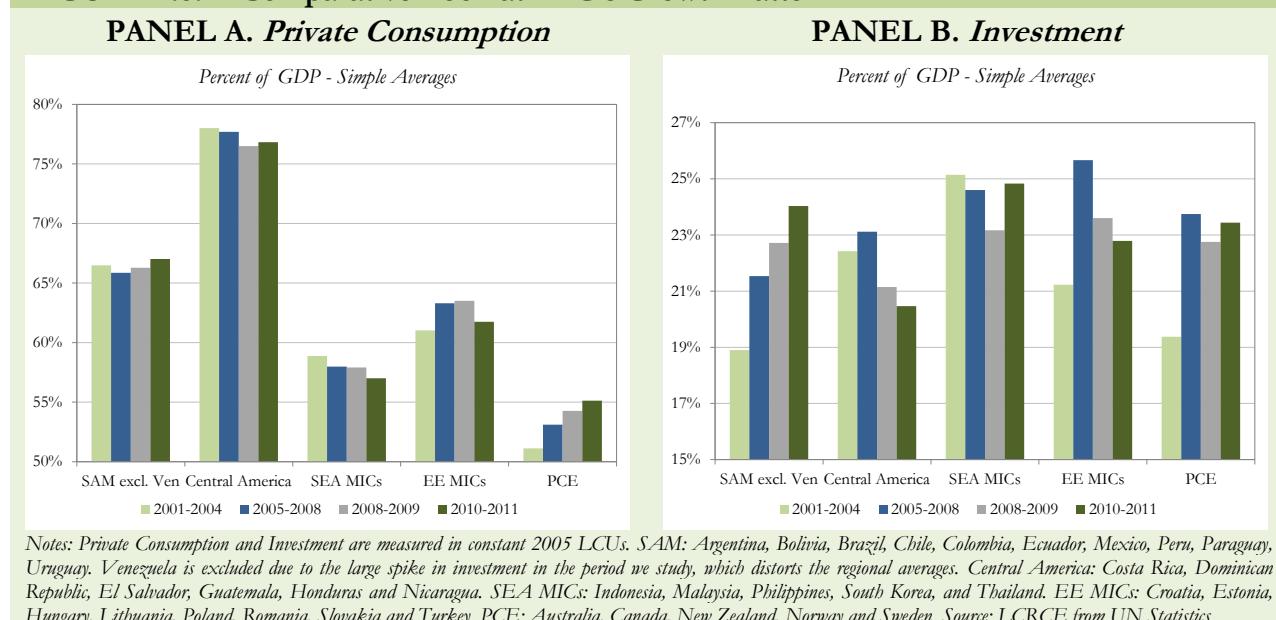
First, contrary to popular belief, the rapid growth of domestic demand experienced in SAM countries over the past decade or so was largely associated with rising investment as opposed to a boom in consumption. In fact, the weight of real investment in real GDP (that is, extracting the price effect induced by changes in terms of trade) increased on average by 5 percentage points in the 2000s, from 19 percent of GDP in the early 2000s to 24 percent of GDP in the early 2010s. This pattern was particularly noticeable in countries like Argentina, Chile, Colombia, and Peru. In contrast, the weight of real consumption in real GDP increased on average by only 1 percentage point over the same period, from 66 percent of GDP to 67 percent of GDP. To be sure, the weight carried by consumption in LAC is still larger than in the East Asian MICs or the PCEs (**Figure 1.8 Panel A and Panel B**). However, the data highlights that, with the possible exception of Brazil, **the boom in domestic demand in SAM countries was largely centered on robust investment rather than on consumption exuberance.**<sup>13</sup>

Going forward, the sustainability of the high investment rates in the short-run will depend crucially on its cyclical response. While a fall in investment is not completely out of the question in the near future, especially if external demand continues to deteriorate and domestic consumption tends to falter, the appropriate use of countercyclical tools by policymakers in the region (for example, lower interest rates) could partially offset this adverse effect. Moreover, investment rates could be propped by FDI, which, as we argue below, has been one of the main drivers of LAC's investment rates in the past decade.

Second, a perfunctory look at the data suggests that the boom in domestic demand observed in SAM countries was not principally fueled by an excessive credit expansion, as many analysts suggest. With the exception of Brazil, which exhibited a mild acceleration in the ratio of private credit over

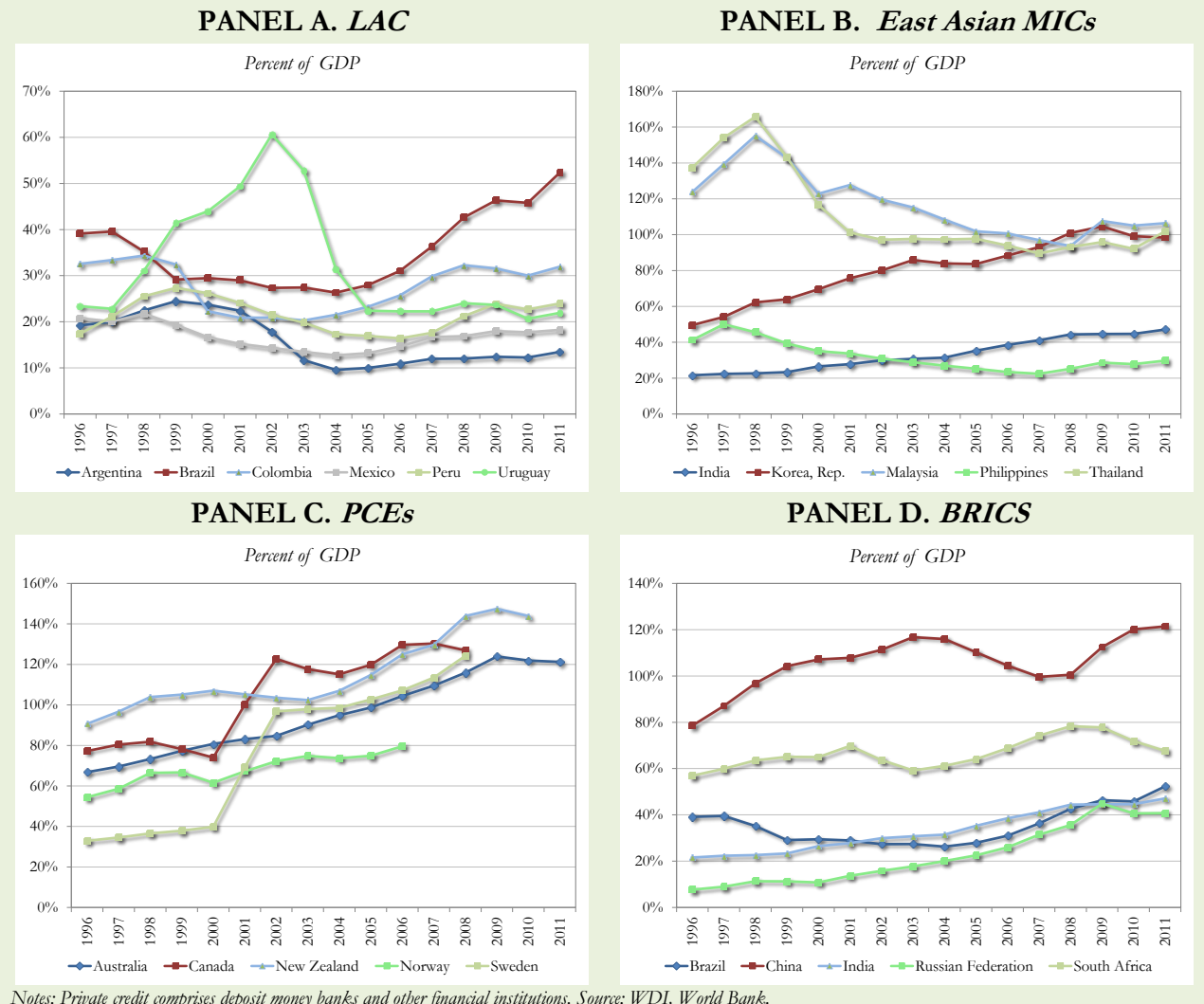
<sup>13</sup> Interestingly, and in contrast to those who fear a construction bubble in LAC, the large expansion in the region's investment appears to be driven by machinery and equipment. Evidence from the three countries in LAC that report disaggregated real investment statistics shows that investment in construction, while still a very important share of total investment, was largely outpaced by investment in machinery and equipment over the 2003-2012 period.

**FIGURE 1.8. A Comparative Look at LAC's Growth Pattern**



GDP, most LAC countries have shown a very light increase from the relatively low initial levels of the early 2000s (**Figure 1.9, Panel A**). This point is further illustrated by comparing the levels of the credit over GDP ratio in LAC with those in other regions. Again, with the exception of Brazil (and Chile, not included in the figure), credit over GDP ratios in LAC lie between 20 and 30 percent. This numbers are comparable to those in Indonesia or Philippines, and stand well below those in PCEs or other East Asian MICs like Korea, Malaysia, or Thailand (all of which report ratios above 100 percent) (**Figure 1.9, Panel B and Panel C**). Even Brazil, the country with highest and fastest growing share of credit over GDP, is on the low side relative to other BRICS: its 50 percent ratio is comparable to Russia and India, and lags behind South Africa (60 percent) and China (120 percent). Moreover, as amply documented in our 2011 Regional Flagship Study on “Financial Development in LAC: The Road Ahead”, while the share of consumer credit did rise much more pronouncedly in LAC compared to other middle-income regions, overall credit depth (measured as bank credit to the private sector as a percent of GDP) in LAC actually declined relative to a carefully constructed international benchmark during the past decade. All of this suggests that, while some countries in LAC may be presenting early signs of a credit boom, this concern cannot be generalized to the region as a whole, where credit growth could be attributed to **a welcome deepening of the region’s typically anemic credit markets rather than to undesirable consequences of excess global liquidity**.

A third important point to highlight is that, against a conventional wisdom that tends to overstate the role of portfolio flows, LAC’s deteriorating current account has been largely financed by (and the result of) FDI flows, as we documented in our April 2013 report in this series. More precisely, LAC’s growth over the past decade has been ultimately funded not so much by the commodity boom or large speculative capital inflows, but rather by **a strong and stable inflow of FDI** which is

**FIGURE 1.9. Evolution of Credit in Selected Regions**


generally viewed as less volatile and dependent of external conditions and has been a driving force behind the investment expansion mentioned above.<sup>14</sup>

In sum, the broad view of LAC as a domestic demand-driven region with a strong reliance on external financing is consistent with the data. However, instead of reflecting a consumption boom and overreliance on cheap consumer imports financed by cheap yet speculative short-term credit inflows, it rather backs a story where international capital finances profitable investment opportunities mainly via FDI which, in turn, supports the expansion of imported intermediate and capital goods.

Needless to say, LAC's good performance in terms of attracting FDI and the investment expansion that this has generated do not necessarily help the region solve its underperformance on the productivity front. Moreover the quality of investment and FDI received by the region is still an

<sup>14</sup> On average 33 percent of total FDI inflows going to LAC-6 goes to the primary sectors, 14 percent goes to infrastructure activities, 22 percent goes to manufacturing, and 25 percent to services.

empirically unsettled question.<sup>15</sup> Neither are we suggesting that the dynamics observed in LAC makes the region immune to the reversal of favorable external winds. Rather, we argue that the pattern observed in LAC presents a different (and less ominous) mix of exposures and vulnerabilities than the one that appears to dominate the popular view of many disenchanted analysts that continue to examine LAC from a perspective that was suitable to the situation in the 1990s but no longer to the present one.

### *Old Ghost Reappear, New Crisis in Sight?*

Does LAC currently has the ability to avoid the boom-bust pattern that has marked the region's history? The experience in the aftermath of the global financial crisis brings hope that LAC is now able to better absorb external shocks and avoid the type of macro-financial crises that characterized the region's past. However, the type of arguments referred to at the beginning of this chapter suggest that many analysts are in a more pessimistic mindset. This raises the question: can the change in external winds push LAC a financial crisis similar to those of the 1990s and early 2000s?

To answer this question it is important to understand the region's past. Historically, financial crises in LAC have been to a large extent self-inflicted. Even when the initial disturbance was completely exogenous—as was, for instance, the 1998 Russian crisis—LAC's macroeconomic and financial vulnerabilities were such that the domestic ripple effects of the external disturbance were substantially amplified. This amplification phenomenon was the result of a risky form of financial integration, characterized by inflexible rate regimes, low levels of international reserves, large volumes of dollarized financial contracts in the local financial system, and foreign debt liabilities of relatively short-term maturities.<sup>16</sup>

The old pattern of LAC's international financial integration was not only fragile in itself, but was also exacerbated by a number of factors that became LAC trademarks, including high and volatile inflation, chronic fiscal and current account deficits, burdensome public debts, and shallow financial systems. Moreover, in a context of pro-cyclical capital flows, the scope for macro policy maneuvering was heavily constrained and policy responses tended to be pro-cyclical. For instance, the fear of letting the exchange rate float reflected the constraints imposed by the widespread dollarization of debts. The resulting lack of exchange rate flexibility implied that central bankers had to raise interest rates in bad times in an effort to arrest capital flight. The amplification phenomenon was thus a sort of trap: domestic weaknesses magnified external shocks and capital flows tended to react pro-cyclically in the face of such weaknesses. The interplay of these factors further induced macroeconomic policies to respond pro-cyclically, which in turn exacerbated the initial magnification effects.

Since the 2000s, however, the region has taken significant steps to reduce the kind of traits that made it vulnerable to external shocks. The gradual but steady financial de-dollarization of most countries in the region and the consolidation of credible inflation-targeting regimes that have

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<sup>15</sup> For example, there is still a heated academic debate on the extent to which FDI generates externalities through positive productivity spillovers in LAC.

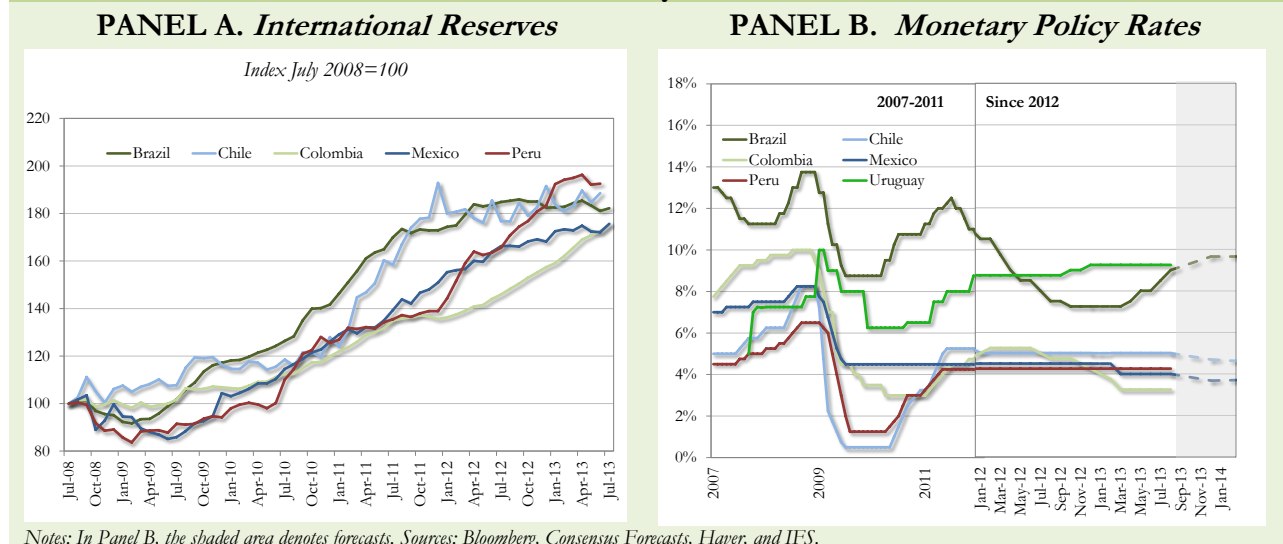
<sup>16</sup> A discussion and review of the literature on the unequal blessings of safe versus unsafe forms of financial globalization, see De la Torre, Levy Yeyati and Schmukler (2002).

reduced significantly the exchange rate pass through, two features that we explore in detail in **Chapter 2**, are perhaps the greatest two achievements of the region on the macro-financial front. This process has resulted in what we have characterized in previous reports in this series as an “improved macro-financial immune system.” In particular, LAC economies have, by and large, reduced the types of constraints that severely affected monetary policy in the past.

**For these reasons we believe that it is wrong to analyze today’s juncture through the lens of the past and assume that LAC will inevitably fall in the same traps that have characterized the region’s economic history.** Today many LAC countries, most notably those with credible inflation targeting regimes, have the ability to use monetary policy in a countercyclical manner to absorb external shocks and mitigate its negative impact on economic activity, breaking free from the so-called “fear of depreciation.” Moreover, many of the monetary buffers that allowed these countries to avert major damages during the global financial crisis have been rebuilt and stand ready to be used should it be necessary. International reserves stand well above their pre-crisis levels and, while monetary policy rates are lower than in the pre-crisis period in some countries, monetary authorities will have no problem in lowering rates in order to stimulate the economy should it be necessary (**Figure 1.10**).<sup>17</sup> In fact, there are already in the region some examples of countries that have started to engage in counter-cyclical policy. All in all, and as was argued in the April 2012 report in this series, exposures do not necessarily imply vulnerabilities, as the ability to use policy counter-cyclically cushions economies from adverse shocks. In this sense the region has been able to move from the crisis management stance that characterized EMs for a long time to a business-cycle management stance which has been more common of advanced economies.

However, there is considerable heterogeneity across countries within the LAC region with respect to their capacity to conduct counter-cyclical macroeconomic policy, especially on the monetary front

**FIGURE 1.10. International Reserves and Policy Rates in LAC**



<sup>17</sup> We abstract from the analysis of the fiscal space of countries in the region for two reasons. First, the objective of this report is to study the scope of exchange rates as a countercyclical policy tools. This is much more related to monetary policy than it is to fiscal policy. Second, there is still a heated academic and policy debate regarding the effectiveness of countercyclical fiscal policy and the type of expansionary fiscal policy that should be used during recessions.

and on their ability countries to use the exchange rate as a shock absorber. First, there is a group of countries with inflation targeting, relatively flexible exchange rates and significantly reduced financial vulnerabilities, who enjoy today sufficient policy space to cushion their economies from external shocks. These are in some sense the region's backbone, accounting for 70-80 percent of LAC's population and GDP, albeit representing only a small fraction of the total number of countries in the region, and are the countries whose experience we are going to discuss in the rest of this report.

In contrast, many countries in Central America and the Caribbean, as well as the non-inflation targeters in South America, have not yet developed a robust policy framework that leaves them sufficient room to maneuver amid unfavorable external conditions.<sup>18</sup> These countries cannot count much on exchange rate depreciations to ease the adjustment, either because of concerns with a high pass through from the exchange rate to prices or a remaining high degree of financial dollarization or both. Three countries in this group deserve special attention given their fully dollarized economies: Ecuador, El Salvador and Panama. All three countries are expected to experience real appreciations as the dollar strengthens vis-à-vis other currencies.

There are, however, some important differences among these economies. Ecuador is likely to suffer relatively more under the current juncture. Apart from facing an appreciating real exchange rate that will put it at a competitive disadvantage vis-à-vis neighboring countries, thereby limiting its ability to take advantage of rising external demand from the U.S. and Europe, it may be relatively more affected by the Chinese deceleration. To be sure, dollarization was fundamental in bringing macroeconomic stability into Ecuador in the early 2000s and actually helped the Andean nation in gaining competitiveness when the currencies of its neighboring countries were appreciating. In the current juncture, however, the competitiveness advantage will likely fade. The case of El Salvador is different in one important aspect. Its close commercial ties with the U.S. will likely compensate some of the loss of competitiveness. Moreover, stronger economic activity in the U.S. will likely increase the flow of remittances to El Salvador.<sup>19</sup> Panama is probably the one with the least exposure to the appreciation of the dollar. This is due to the fact that the way in which Panama is integrated in the global trade and financial network (as a trade and financial hub) makes the Central American country less sensitive to currency appreciations. Moreover, the expected increase in trade volumes due to the recovery of the U.S. economy and the EU, coupled with the expansion of the Panama Canal, will probably add stimulus to what is already the most vigorous growth performer in the region.

## *Taking Stock*

LAC's standing can be assessed from two angles. The first regards the region's vulnerability to the current juncture of receding tailwinds. From this angle the news for LAC (more precisely, for inflation targeting countries in LAC) are great: tremendous progress has been made to build a solid

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<sup>18</sup> In addition to the narrow policy space on the monetary front, the fiscal space of Caribbean economies is rather limited due to their very high debt levels and large fiscal deficits. Moreover, the relatively small size of their economies proves an extra burden absorbing external shocks as they

<sup>19</sup> This effect could be large both due to the effect of the recovery in the U.S. as well as a deceleration of growth in El Salvador. Fajnzylber and Lopez (2008) argue that the flow of remittances depends positively on the level of economic activity of the sending economy and negatively on the level of activity of the recipient economy.

“macro-financial immune system,” which features, among other things, low dollarization levels, safer international financial integration, flexible exchange rates, and credible inflation-targeting regimes. As a result, rather than the excruciating financial pains that would tend to traumatically affect the LAC of the 1990s, several LAC countries appear to be experiencing in the current juncture the symptoms of a more run-of-the-mill business cycle, similar to those traditionally observed in the more advanced economies, and one in which exchange rate flexibility and monetary policy are likely to play a key role in mitigating the inevitable slowdown in the short run.

While the good news of LAC’s stronger macro-financial fundamentals should be praised as one of the greatest accomplishments of the region in the past decade, this does not cure the structural impediments that tend to keep LAC from achieving a higher trend growth over the medium term. Indeed, LAC is a good reflection that one can have strong macro-financial fundamentals and at the same time be trapped in a low savings, low productivity growth, low aggregate growth dynamic.

For this reason, from a growth angle, things are not as rosy. The little progress that LAC has made on the productivity front is a great source of concern, especially as tailwinds recede. The positive side is that policy makers around the region are taking notice and making efforts to tackle this issue, which is crucial to continue the region’s progress on the social front. To some extent all the policy energy that was devoted to improving the region’s macro-financial fundamentals must be geared towards productivity-enhancing reforms.

In the meantime, LAC will have to cope with a less favorable environment which could distract policy makers in the region from their long-run objectives. Fortunately, the region’s newfound ability to cushion external shocks could minimize the level of distraction. The rest of this report discusses the critical role of exchange rates in allowing LAC to tackle its long-term agenda while maintaining the macro stability that the region currently enjoys.





## *Chapter 2:*

# *The Buffering Role of Exchange Rates*

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The depiction of LAC’s current juncture set forth in the previous chapter poses two important challenges for the region. The first has to do with raising LAC’s typically sluggish growth through productivity improvements. This fundamental challenge has been discussed repeatedly in previous reports in this series and will not be explored further here. Instead, we will devote the next sections to analyze a second challenge the region faces—to minimize the adverse impact of a less favorable external environment. In particular, we explore the role of exchange rates in mitigating external shocks.

The standard international economics textbook model, the classical Mundell-Flemming framework, suggests that exchange rate flexibility helps mitigate real (terms of trade) shocks while nominal exchange rate flexibility helps absorb nominal shocks. However, for many years countries in LAC resisted, or where unable, to use the exchange rate as shock absorber. Why was it the case? Is LAC in a better position to do so now? If so, what are the mechanisms through which the exchange rate buffers shocks? The rest of this chapter aims at providing a tentative answer to these questions.

### *Fear of Depreciation?*

What is so wrong with simply letting the exchange rate do the job? If appreciation is mistrusted as it is seen as discouraging local producers and creating potential risk mispricing, why is a full exchange rate correction in the other direction often resisted? Conversely, why commodity exporters like Australia or Canada tend not to worry about full exchange rate flexibility?

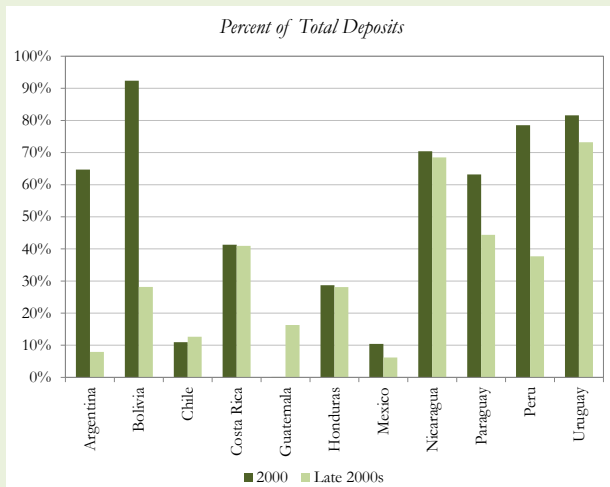
Two specific concerns are often invoked behind the “fear of floating” (namely, the reluctance to let the exchange rate adjust fully to depreciation pressures)—or, perhaps more accurately, the fear of depreciation—that characterized many emerging economies in the 90s. The first is linked to adverse balance sheet effects arising from the presence of currency mismatches (most notably, private and public foreign currency denominated debt, including dollarization of domestic deposits and loans). The second is the concern with the pass-through of a more depreciated exchange rate to inflation (Calvo and Reinhart (2002)).

This situation, however, changed dramatically in the 2000s. Two important structural changes in the region (de-dollarization and low inflation) have rendered these two fears far less relevant in recent years, changing the scope for the exchange rate to play its countercyclical role as in a traditional Mundell-Flemming world for the first time in decades.

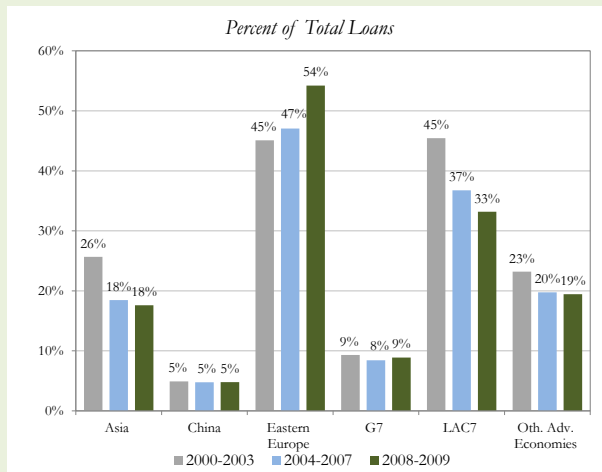
First, the past decade witnessed a gradual but steady financial de-dollarization that reduced and ultimately inverted the foreign currency position of most countries in the region, both at the corporate and banking sector levels as well as at the public sector. Deposit dollarization, for instance, has decreased significantly over the last 10 years in almost every country in the region (**Figure 2.1, Panel A**). To be sure, there are still countries like Costa Rica, Nicaragua, or Uruguay, where deposit dollarization is still high. However, the steady downward trend throughout the region suggests that this is much less of a constraint than it used to be in the past.

**FIGURE 2.1. Financial Dollarization in LAC**

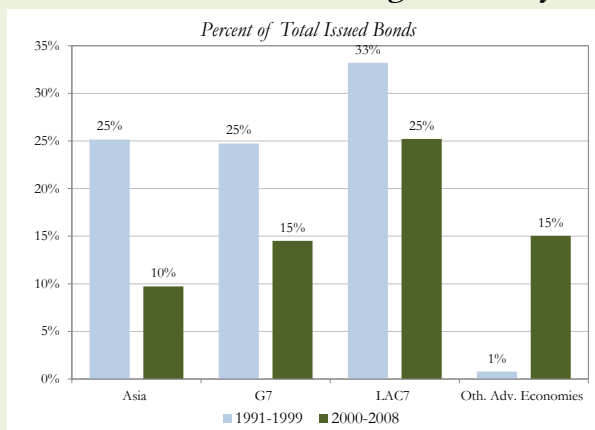
**PANEL A. Deposit Dollarization**



**PANEL B. Loan Dollarization**



**PANEL C. Private Sector Foreign Currency Bonds**



Notes: In Panel A, for most countries, Late 2000s represent 2008-2009. For Bolivia, Costa Rica, Peru, and Uruguay, Late 2000s stands for the 2013 value. Sources: Levy Yeyati (2006); De la Torre, Ize, and Schmukler (2011); BIS, Central Banks of Bolivia, Costa Rica, Peru, and Uruguay; and Dealogic.

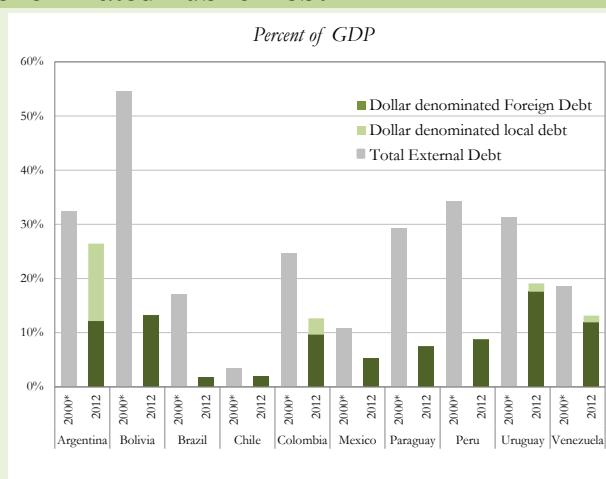
There has also been a significant de-dollarization of the liabilities of LAC's households and the region's corporate sector. This is clearly illustrated by the systematic decline in the share of dollar denominated loans observed in LAC between the early 2000s and the late 2000s (**Figure 2.1, Panel B**). By the late 2000s this ratio stood at 33 percent, down from 45 percent in the early 2000s, a level that stands significantly below that observed in Eastern European countries (54 percent) and is closer to the numbers observed for non-G7 advanced economies and Asian economies. Similarly, the percentage of bonds issued in foreign currency by LAC's corporate sector by the late 2000s is much lower than it was in the early 2000s (**Figure 2.1, Panel C**). It is worth pointing, however, that bond issuance in dollars is still higher than in other emerging and advanced economies, most likely a sign of LAC's shallow local bond market. In sum, the evidence suggests that LAC's corporate sector

has much healthier balance sheets than in the early 2000s and that there is a smaller degree of currency mismatches.<sup>20 21</sup>

Perhaps the most notable process of de-dollarization occurred in the public sector, which in many cases went from being short in dollars (bearing a negative net foreign asset position exposed to a substantial real depreciation) to being long in dollars (a combination of debt deleveraging and “domestication,” reserve accumulation and an increase in partially dollarized income linked to growing commodity exports). This was particularly true for the short-run tranche of public cash flows, typically the ones generating the dollar liquidity shortages that triggered debt and currency crises.

The de-dollarization of the public sector is illustrated in **Figure 2.2**. Countries in the region have systematically reduced the stock of dollar denominated debt relative to GDP and now present levels that not exceed 25 percent of GDP.<sup>22</sup> This suggests that part of the commodity revenue from which many countries in the region have benefitted has allowed them to reduce the stock of outstanding debt. In some sense, the lack of savings of the commodity windfall has been compensated in many countries in the region by a reduction of the country’s dollar-denominated liabilities.

**FIGURE 2.2. Dollar Denominated Public Debt**



Sources: BIS and Dealogic.

<sup>20</sup> This view appears to be shared by rating agencies. A recent assessment of the Brazilian corporate sector by Moody’s provides a similar view. The rating agency sees little impact of the depreciation of the Brazilian real on the credit quality of Brazil’s corporate sector.

<sup>21</sup> In addition to the process of de-dollarization observed in LAC, many countries in the region have steadily changed the structure of their external assets and liability positions, thus making aggregate balance sheet effects work in their favor amid external turmoil (see the April 2012 report in this series “LAC Copes with Volatility, the Dark Side of Globalization”). On average, there has been a switch of net foreign liabilities from debt to equity, while net debt assets in foreign currency were accumulated to levels that exceed foreign debt liabilities. As currencies in LAC depreciate the local currency value of their external assets increase while that of their debt liabilities shrinks. This generates positive wealth effects.

<sup>22</sup> To be sure, Figure 2.2 compares total external debt in the early 2000s, which captures both local and foreign currency debt, with dollar denominated debt in the late 2000s. Since some domestic debt is denominated in dollars and, with some exceptions, external debt is mostly denominated in dollars, the comparison in Figure 2.2 typically understates the decline in dollar denominated public debt.

The second reason behind “fear of depreciation” (perhaps the only one now that financial dollarization concerns have declined considerably) relates to the potential inflationary consequences of a sudden exchange rate correction or, more generally, the pass-through from exchange rates changes into consumer prices. In the context of Latin American economies, this pass-through was due in the past, alternatively, to the impact of exchange rate changes in import prices (the traditional channel usually studied in the literature) as well as to implicit or explicit indexation to the exchange rate in moderate to high inflation environments (the same indexation exploited by exchange rate based stabilization plans until the 90s). But the gradual disappearance of price indexation and the growing credibility of central banks (particularly those embracing inflation targeting) have caused the pass-through to decline in the 2000s, emulating what was a stylized fact also for advanced economies a decade earlier.

Part of the evidence of the decline of the pass-through comes from advanced economies. In Murchison (2009), the author summarizes the results found in other papers for Canada: “while there is some debate about just how large pass-through was pre-1980s, the consensus appears to be that it has fallen dramatically since this time.” In turn, Bouakez et al. (2008), dividing the sample in two (1973Q2-1990Q4 vs. 1991Q1-2006Q2), find that while pass-through to import prices remained stable over time, that for consumer prices declined by 12 percentage points in the short-run, reaching 0 in the second period analyzed (1990s). Some of the main arguments behind this pattern are outlined in Chung et al. (2011)<sup>23</sup>: “the pass-through to final retail prices is considerably smaller than to import prices at the dock, because imported goods include a significant domestic component (transport costs, labor inputs, rents and profit margins for distributors and retailers, etc.), which typically account for around half of the final prices of retail goods.” In addition, in low inflation environments, many of these local costs may move counter cyclically to buffer exchange rate changes, stabilizing prices further.

What about emerging economies? Historically, the characteristically large exchange rate pass-through has been associated with a generalized dollar indexation under chronic inflation, as the exchange rate was used as a nominal reference—even by the government; hence the numerous exchange rate-based stabilization plans from the 1970s to the early 1990s. But as fiscal deficits were reigned in (eliminating the monetization of the deficit as a key source of inflation) and central bank gained independence and reputation, the exchange rate anchor was replaced by an inflation target anchor.<sup>24</sup> This not only eliminated dollar indexation but also decoupled current and past inflation from expected inflation, reducing inflation inertia and making price setting more forward looking (particularly in inflation targeting regimes). In this context, it is not surprising that emerging economies gradually emulated advanced ones in their taming of exchange rate pass-through. **Table 2.1** reports the results of a BIS survey among central banks on their assessment of pass-through, documenting these points (in Mihaljek et al. (2008)).

The evidence for LAC points in the same direction, pass-through has systematically fallen throughout the region in the 2000s. Indeed, **Figure 2.3** shows the results of a country-by-country

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<sup>23</sup> The authors based their conclusion upon pass-through estimates for Australia.

<sup>24</sup> Messina and Sanz de Galdeano (2011) show how Central Bank Credibility has radically changed the process of wage formation in Brazil and Uruguay. In the 1990s and early 2000s wage adjustments followed closely movements in the minimum wage and the exchange rate; in contrast in the late 2000s wage adjustments follow closely the inflation target.

**TABLE 2.1. BIS Questionnaire on Pass-Through**

Central Bank Assessments of Exchange Rate Pass-Through			
Country	Recent estimate of PT coefficient (1)	Has PT coefficient declined recently?	Main reason for the decline of PT
Hong Kong		No evidence that PT decline	
India	8-17%	Yes, since the 1990s	Declined in inflation; lower tariffs
Malaysia		No; PT relatively stable in 1990-2006	
Philippines	1.2%	Yes, from 23% before 1993	
Singapore	3%		
Thailand	Small	Increased slightly	ER flexibility
Colombia	3% - 2006	Yes, from 4-5% in mid-1980s	
Peru	10% - 2006	Yes, from 10-20% in 2001-04	
Venezuela		Yes, during 2005-06 FX reserves↑, oil prices↑; lower ER volatility	
Czech Republic	0-40%	Yes	Inflation targeting, ER flexibility
Hungary		Yes	Widening of ER band, inflation targeting
Poland	12% - 2006	Yes, from 24% in 2002	Inflation targeting, ER float
Israel	23% - 1999-2004	Yes, from 33% in 1991-98	Declined in inflation; ER stabilization
Turkey	42% - Since 2001	Yes, from 63% before the float	
South Africa	7.8%	Not clear that PT declined	

Note: (1) Percentage increase in the CPI following a 10% depreciation of the exchange rate (individual country definitions may differ slightly). Source: BIS (2008)

regression of CPI on the nominal effective exchange rate (NEER), the HP-filtered output gap, and the lagged dependent variable, all in log changes, for our country sample.<sup>25</sup> The results emerging from our exercise are consistent with those of the Mihaljek et al. (2008) and in Ghosh (2013)—pass-through in LAC (and in other countries alike) has declined significantly in the last decade and lies now at very low levels.<sup>26</sup>

The above suggests that LAC has indeed freed itself from conditions that amplified shocks and generated the boom-bust patterns of the past. This has in turn allowed many LAC countries to move towards more robust monetary policy frameworks that feature flexible exchange rate regimes and credible inflation targets. The improved credibility and institutional capacity of central banks, which has contributed to the steady lowering of inflation and its volatility, has further consolidated the reduction in currency mismatches in the government and private sector's balance sheets, thus creating a virtuous cycle that has strengthened the region's macro-financial immune system.

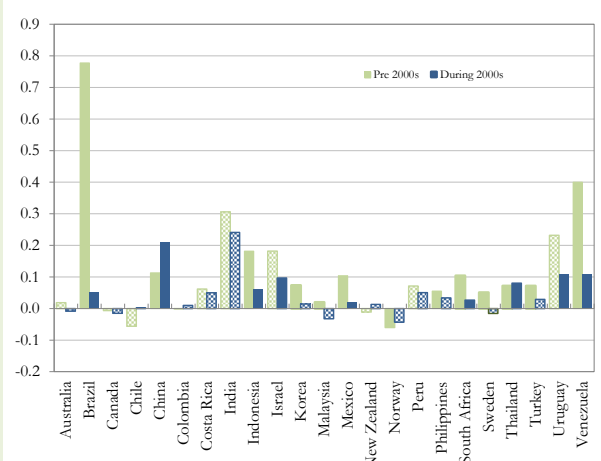
### *Can the Exchange Rate Buffer External Shocks?*

Even if, as we argued above, there seems to be plenty of room for the exchange rate to depreciate, hence move counter-cyclically, during a downturn, there remains the question of how and to what extent it can play its expected buffering role. More precisely, in the event of a capital account reversal (due to reduced global liquidity) coupled with a current account deterioration (due to weaker terms of trade and external demand from China), how does a more depreciated exchange rate facilitate a balance of payment adjustment?

<sup>25</sup> The figure emphasizes cases where the coefficient for NEER was not significant. We also try versions of this model to test for asymmetry (distinguishing depreciations and appreciations) and non linearities (large exchange rate changes), and for the inclusion of relative multilateral inflation. The key finding, namely, that the pass-through declined in the 2000s to generally very low levels, remained unaltered.

<sup>26</sup> Ghosh (2013) reports pass-through estimates based on for 1970 – 2010 quarterly data for a panel of 9 Latin American countries with visible declines in the 2000s. The author runs a regression of inflation controlling for the bilateral exchange rate and the nominal effective exchange rates (NEER), output growth, foreign prices and lagged inflation, showing that, in both cases, inflation pass-through was lower in the 2000s than in previous decades.

**FIGURE 2.3. Pass-Through Estimates Across Countries Revisited**



Notes: Pass-through coefficients were derived from a country regression of annual inflation as dependent variable and lagged inflation, annual change in the nominal effective exchange rate and the output gap. Darker columns (without pattern lines) correspond to coefficients that were statistically significant at 95%. Sources: Bloomberg, Haver and The World Bank.

The question is not trivial. The traditional small open economy argument would indicate an improvement of the trade balance (through larger exports and fewer imports) that is simultaneously accompanied by the expansion of production for the domestic market (through an expansion in import substituting and non-tradable activities) as a result of a gain in price competitiveness. Reality, however, is far more nuanced: exports—particularly commodities—tend to be largely inelastic in the short run, and the decline in imports—through both substitution and income effects—may drag down overall economic activity given that domestic production typically relies on non-substitutable imports of intermediate and capital goods—as the 2009 adjustment to trade collapse painfully showed.

Moreover, while currency appreciation owed as much to trade as it did to capital inflows, the unwinding of the global bonanza may not unleash as much capital outflows as expected. In effect, a depreciation of the currency, by lowering local asset prices (real and financial) and raising the upside on investment may limit portfolio outflows and induce FDI inflows that otherwise would move out as real interest rates go back to normal.

For all the discussion about the benefits of a flexible exchange rate to cope with a volatile globalized world, there is remarkably little empirical work on the channels through which the former helps to cope with the cycle. Now that, for the first time in ages, several countries in the region are ready to rely on the exchange rate to mitigate the costs of a down cycle, the relevance of this empirical question raises dramatically.

## Floating to Stabilize the Trade Balance

How responsive is the trade balance to changes in the real exchange rate? What is the adjustment margin: exports, import substitution or income effects (a weaker domestic demand associated with poor growth, the least desirable adjustment channel)?

The trade literature provides some detailed estimated elasticities. For example, Kee et al. (2008) estimate elasticities for 5000 imported goods, which embed not only import substitution but also substitution *across* imports as well as an income effects, so that the weighted average elasticities reported in the paper would overstate total import elasticity. Imbs and Mejean (2010) propose a fix to this aggregation problem and calculate, for a group of advanced and developing economies, export and import elasticities that range from 0.5 to 2.57, and from 0.9 to 2.25, respectively. Unfortunately, the only Latin American country in their sample is Venezuela.

Tocarick (2012), in turn, calculates non-econometric price elasticities, incorporating the general equilibrium effects arising from the prices changes in other trade goods (for example, the imported component of exported goods). Based on these estimated elasticities, he proceeds to compute the exchange rate elasticity of the trade balance. A basic log linearization of the trade balance provides the starting point to address the question:

$$\Delta \log(\text{Imports}) = \alpha + \beta \Delta \log(\text{REER}) + \gamma \Delta \log(Y) + \varepsilon \Delta \log(\text{PI})$$

$$\Delta \log(\text{Exports}) = \theta + \mu \Delta \log(\text{REER}) + \pi \Delta \log(Y^*) + \rho \Delta \log(\text{PX})$$

$$\Delta \log(\text{Trade Balance}) = (\theta - \alpha) + (\mu - \beta) \Delta \log(\text{REER}) + \pi \Delta \log(Y^*) + \rho \Delta \log(\text{PX}) - \gamma \Delta \log(Y) - \varepsilon \Delta \log(\text{PI})$$

where  $PI, PX$  are dollar unit prices of imports and exports, respectively (proxied by the implicit price index), and  $Y$  and  $Y^*$  are the domestic and world demand (proxied by local and global output). The total effect of a real depreciation will depend on a combination of parameters for which, a priori, we expect, in particular, that  $\mu > 0$  and  $\beta < 0$  so that, in the event of a real depreciation, exports go up and imports go down.<sup>27</sup>

Following Tocarick's approach, **Table 2.2** shows the calculated elasticities of exports, imports and the trade balance (TB) with respect to the real exchange rate.<sup>28</sup> As can be seen, most of the action comes from imports, perhaps reflecting the fact that many of these countries export mostly commodities with relatively inelastic domestic supplies (this argument would not in principle apply to manufactures exporter Mexico). But, as noted, translating these elasticities to the aggregate trade balance and, more critically, controlling for income effects, is a nontrivial task, so these results should be taken with caution.

Alternatively, the empirical macroeconomic literature offers mixed results on the connection between the real exchange rate and the trade balance. Indeed, the scarcity of positive results has its

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<sup>27</sup> We also expect that  $\gamma$  and  $\pi > 0$ , and  $\varepsilon$  and  $\rho < 0$ .

<sup>28</sup> The exercise assumes a "small economy" (inelastic export demand and import supply from the rest of the world), uses the import demand elasticities from Kee et al. (2008) and uses Tocarick's own estimates of export supply elasticities.

**TABLE 2.2. Non-econometric Calculation of the Trade Balance to a REER Depreciation  
(Measured by a Decrease in the REER)**

	Elasticity of Exports	Elasticity of Imports	Elasticity of TB	Weight of Imports
Argentina	-0.12	0.31	-0.43	72%
Bolivia	-0.2	0.4	-0.6	67%
Brazil	-0.11	0.3	-0.41	73%
Chile	-0.27	0.42	-0.69	60%
Colombia	-0.14	0.28	-0.42	67%
Costa Rica	-0.27	0.46	-0.73	63%
Mexico	-0.12	0.48	-0.6	80%
Peru	-0.19	0.36	-0.55	65%
Paraguay	-0.36	0.54	-0.9	60%
Uruguay	-0.2	0.43	-0.63	68%
Venezuela, RB	-0.02	0.28	-0.3	93%

*Notes: A negative elasticity of exports implies an increase of exports when the REER falls (depreciates) and a positive elasticity of imports implies a decrease of imports when the REER falls (depreciates). Sources: Author's Calculation from Tocarick.*

own term in the economic jargon: “exchange rate pessimism”, popularized in the post-war period to refer to the low exchange rate elasticities of trade typically found in the literature (Obstfeld, 2002).

In recent work, Colacelli et al. (2006), using a bilateral gravity model, find very small elasticities of exports (less than 5 percent) in developing countries. By contrast, Freund and Pierola (2008) document that exchange rate devaluations that result in significant under-valuation of developing-country currencies are associated with export surges in developing countries. However, as Lederman (2011) points out, these results might be driven to some extent by the research approach: the authors identify episodes of manufactured exports surges and then correlate the magnitude of the export growth rate with the exchange rate, but they did not test whether and how the *probability* of an export surge depends on the real exchange rate.

In turn, Hausmann, Pritchett and Rodrik (2005) find that the probability of sustained growth episodes is correlated with real devaluations and attribute that to the ebbing effect of an undervalued currency on trade. Yet Levy-Yeyati et al. (2012) find that a more depreciated currency is associated with higher growth but not larger exports or domestic substitution of imports but rather through higher savings and capital accumulation. Indeed, the argument in Rodrick (2008) in support of the trade channel consists in documenting a positive correlation between undervaluation and industry, and a negative one with agriculture, implicitly assuming that the former is more tradable than the latter –an assumption at odds with the Latin American pattern.

However, recent work by Eichengreen and Gupta (2012) finds, for a panel of 66 countries, a positive effect of a real depreciation on exports (particularly for “modern” services). We can revisit these finding using a standard reduced-form econometric model: a regression of the log change in exports as a function of the change in external demand (global growth) and the log change of the REER, as well as the log REER to control for the role of REER under and overvaluation. Because we are particularly interested in cross-country differences within LAC, we run a LAC panel but let the coefficient for the change (and the level) of the REER to vary by country. In addition, we run a similar model for imports, using the log change of imports, replacing global for domestic demand



(proxied by domestic growth). Import elasticities may depend on the composition of imports: one would expect consumption goods to be more price sensitive than less easily substitutable intermediate or capital goods.<sup>29</sup> We test for this by running the model for consumption and non-consumption goods separately.

The results are reported in **Table 2.3**. Bearing in mind the many potential caveats of this estimation (a relatively short period of time, substantial changes in the composition of trade and trade partners in LAC, the incidence of the typically inelastic intra-industry trade under negotiated agreements like autos within Mercosur), the exercise provides a number of indicative findings. First, export elasticities are small: 11 percent (7 percent if the level of the REER is also included) and close to those levels (or not significant) when estimated country by country. Second, imports elasticities are twice as large, particularly (as expected) for consumption goods.

How can we interpret these results? Taking, for example, the case of Brazil: a 10 percent real depreciation would add 1.6 percent to the volume of exports and would reduce imports by 2.5 percent. Starting from 2012 export and import volumes at USD174bn and USD251bn (and keeping dollar prices constant), it would narrow the trade deficit in close to USD9.1bn.

Naturally, this is a stylized result: there are many other things happening at the same time, including most notably a weaker domestic demand. Indeed, using for simplicity the average income elasticity of imports, 2.5 percent, a 10 percent depreciation of the real would have the same effect on the trade balance than a 1.4 percent decline in the growth rate. Moreover, the scope for the exchange rate to induce a benign import substitution would depend on the size of the country and on the diversification and versatility of its producers. Similarly, we should expect a higher export response to depreciation from manufactures exporter Mexico or tourism-intensive Caribbean countries than in undiversified, natural resource-intensive Peru or Bolivia.<sup>30</sup>

But the preliminary evidence reported above indicate, overall, that an exchange rate realignment could go a long way to avoid the income adjustment otherwise needed to offset the balance of payments effect of the global wind turnaround.

## *Exchange Rates and the Financial Account*

Perhaps the most elusive (and under researched) topic of the many associated with the role of the exchange rate as a countercyclical tool is its effect on the capital account. The basic argument is intuitive: a depreciation makes local assets (both real and financial) look cheaper and therefore should attract new international investors or, at the very least, reduce the flight to quality of existing ones.

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<sup>29</sup> The same applies to the composition of exports. For example, one would expect manufactures to be more sensitive to the exchange rate than commodities, or exports of services to be more price elastic than merchandise exports (as argued by Eichengreen and Gupta (2012)).

<sup>30</sup> Note that, while this substitution to local goods and services could in principle add to the inflationary pressures associated with depreciation, in most cases it will occur at a time in which the adverse real shock is cooling off domestic demand and dragging economic activity, creating unused capacity. In other words, import substitution during the contractionary phase of the cycle would only partially offset the slowdown of economic activity, with little if any demand pull on inflation.

**TABLE 2.3. Exports and Imports Elasticity to the Real Effective Exchange Rate**

VARIABLES	Exports					Imports			
	(1) Goods & Services	(2) Goods & Services	(3) Goods & Services	(4) Merchandise	(5) Merchandise Excl. Commodities	(6) Goods & Services	(7) Consumption Goods	(8) Rest	(9) Goods & Services
Delta Log GDP						2.56*** (0.00)	2.92*** (0.00)	2.68*** (0.00)	2.55*** (0.00)
Delta Log GDP_World	-0.15 (0.77)	-0.34 (0.59)	-0.00 (1.00)	2.80** (0.01)	30.69*** (0.00)				
Delta Log REER_Argentina		-0.03 (0.30)	-0.00 (0.92)	-0.13*** (0.00)	-0.11*** (0.00)				0.60*** (0.00)
Delta Log REER_Bolivia		-0.49*** (0.00)	-0.55*** (0.00)	-0.73*** (0.00)	-0.16 (0.38)				0.17* (0.06)
Delta Log REER_Brazil		-0.16*** (0.00)	-0.09 (0.16)	-0.10 (0.25)	0.20 (0.36)				0.25*** (0.00)
Delta Log REER_Chile		-0.24** (0.05)	-0.12 (0.25)	-0.05 (0.86)	0.31 (0.30)				-0.23** (0.02)
Delta Log REER_Colombia		-0.28*** (0.00)	-0.24*** (0.00)	-0.50*** (0.00)	-0.65*** (0.00)				0.23*** (0.00)
Delta Log REER_CostaRica		-0.18* (0.08)	-0.25* (0.06)	-0.14 (0.67)	0.43 (0.64)				0.38** (0.04)
Delta Log REER_Mexico		-0.09** (0.04)	0.03 (0.64)	-0.02 (0.76)	-0.13 (0.12)				0.06 (0.52)
Delta Log REER_Peru		0.05 (0.70)	0.22 (0.36)	0.34 (0.43)	0.72 (0.34)				0.52*** (0.00)
Delta Log REER_Uruguay		0.18*** (0.00)	0.20*** (0.00)	-0.16*** (0.00)	-0.13 (0.33)				-0.02 (0.81)
Delta Log REER_Venezuela		-0.14*** (0.00)	-0.13*** (0.00)	-0.49*** (0.00)	-0.11*** (0.00)				0.23*** (0.00)
Delta Log REER	-0.07** (0.04)					0.26*** (0.00)	0.59*** (0.00)	0.12 (0.23)	
Log REER	-0.10*** (0.00)		-0.17* (0.09)	-0.23** (0.04)	-0.35* (0.06)				
Constant	0.56*** (0.00)	0.08*** (0.00)	0.23 (0.11)	0.06 (0.78)	0.87 (0.15)	0.03 (0.28)	0.09*** (0.00)	0.03 (0.29)	0.04* (0.08)
Observations	210	210	210	210	210	211	211	211	211
Number of id	10	10	10	10	10	10	10	10	10
R-sq Within	0.39	0.39	0.44	0.36	0.34	0.81	0.59	0.69	0.83
Root mean squared error	0,057	0,059	0,058	0,094	0,19	0,067	0,15	0,10	0,066

Notes: Estimated based on a panel specification using country and time effects. \* statistics in parentheses using clustered standard errors at the country level. The asterisks indicate statistical significance, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Delta Log GDP stands for the change of the natural logarithm (Log) of GDP in constant US dollars. Delta Log GDP\_World stands for the change in the Log GDP of the World aggregate in constant US dollars. Delta Log REER is the change in the Log of the real effective exchange rate (Delta Log REER\_country, change at the country level). An increase in the REER implies real appreciation. In specifications (3) to (5), Log REER corresponds to the median of the coefficient of each country's Log of the real effective exchange rate. Exports (goods & services, merchandise, and merchandise excl. commodities) and Imports (goods & services, consumption goods, and rest) are in constant US dollars. Merchandise data are from customs reports of goods moving into or out of an economy or from reports of financial transactions related to merchandise trade recorded in the balance of payments. The commodities excluded in (5) are defined according to Lall (2000). In (9) the rest of imports comprise intermediate and capital goods. Source: Authors calculation using data from WDI and UN COMTRADE.

Empirically, however, the point is hard to make because none of the previous capital outflows episodes in the emerging world resemble the current one. Take, for example, the Mexican crisis of 1994, which followed a stream of interest rate hikes in the U.S. that fuelled capital outflows through arbitrage—a mechanism not so different from what we expect to see as QE and the interest rate cycle reach an end. While the trigger may have been the change in the U.S. monetary stance, it was compounded by two crucial aspects of the domestic Mexican debt: its very short tenor, and the misguided decision to dollarize it (i.e., to replace it by dollar-linked Tesobonos). As a result, the devaluation, rather than stabilizing capital flows, unleashed a debt crisis, in the context of which credit risk was magnified by currency mismatches and dwarfed currency risk, rendering exchange rate flexibility useless as a tool to stabilize the external financial account.

The same could be said of the typical emerging market crisis of the late 90s and early 2000s, fueled by the credit risk associated with currency imbalances, although in Asia there was also a rise in new investment in the aftermath of the crisis as international capital came looking for bargains—hence, the “fire-sale” story that attempts to explain why inflows of FDI tended to rise even amid currency crises (see Blonigen, 1997, and Krugman, 2000).<sup>31</sup>

One problem with these “fire-sale” arguments is that, empirically, they typically rely on large unilateral devaluations as a result of a currency crisis. In other words, they reflect episodes of exchange rate overshooting (and local wage and service cost undershooting), rather than a gradual exchange rate correction as we would expect under the current flexible regimes in the event of a negative shock. Would it still be the case that FDI would increase in the event of a gradual exchange rate correction in less stressful times? Would FDI and portfolio flows change direction once the prices of domestic assets decline to more appealing levels so as to stimulate FDI of the “bargain hunting” type? And, if the exchange rate correction were swift, how much capital would flow out of the country in the first place?

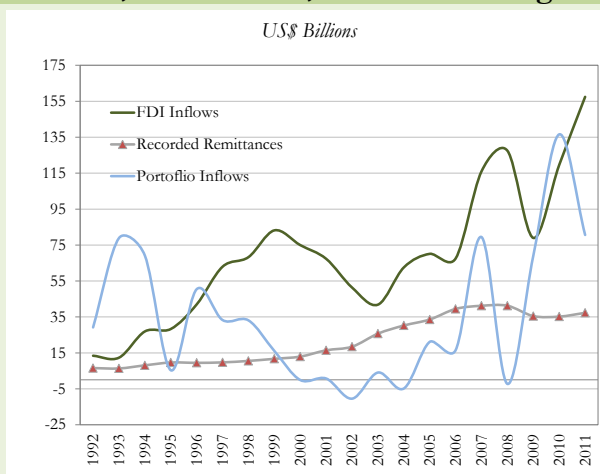
An obvious shortcoming of any casual analysis of the relationship between FDI and the real exchange rate in normal times lies in the fact that flows and exchange rates are jointly determined. As in the case of exchange rates and intervention, a first look at the evidence would show a positive correlation between the strength of the currency and FDI flows. The same correlation would be apparent for remittances and, even more so given their higher frequency, for gross portfolio flows. That was, for example, the case in 2009, when FDI flows retrenched at a time when LAC currencies reached their more depreciated levels in years (**Figure 2.4**). As a result, we are left with little more than speculation and anecdotal evidence,<sup>32</sup> and a topic that deserves a more dedicated research agenda.

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<sup>31</sup> Aguiar and Gopinath (2005) find that mergers and acquisitions increased *during* the liquidity crises (and devaluations) in East Asia, particularly in the tradable sector. Based on this premise, Calderón and Didier (2009) speculated that FDI should go up in the aftermath of the 2008-09 crisis. In turn, Lederman (2011) finds indicative evidence that in the aftermath of the large (real effective exchange rate) devaluations of the 1990s and 2000s there was generally an increase in FDI inflows (followed by a surge in exports), also in line with the “fire-sale” view.

<sup>32</sup> See, e.g., <http://www.bloomberg.com/news/2013-09-10/cannondale-bikes-show-real-drop-helps-industry-corporate-brazil.html>

**FIGURE 2.4. Financial Account, Remittances, and the Exchange Rate**



Sources: IFS and WDI, World Bank.

## Final Remarks

As we noted in our previous report, LAC has failed to generate productivity gains to durably cope with appreciating currencies and deteriorating terms of trade. But, now that many observers are quick to write emerging markets off based on the few discouraging results for a few large countries, it is key to set the record straight, at least for the region. Not all the economic, financial and social progress in LAC was the reflection of a short-lived bonanza. It also reflected a fundamental improvement in LAC's macro-financial immune system. As a result, the region is no doubt exposed to the cyclical impacts of a change in the global winds, particularly those stemming from U.S. monetary policy normalization and China's growth slowdown, but is much less vulnerable the amplification effects that tended to lead to financial collapses in the 1990s.

In particular, the exchange rate is in several of the larger LAC countries no longer a shock amplifier but rather a shock absorber. In this light, the depreciation of LAC currencies that will likely accompany the ongoing changes in the external environment should be interpreted as a good thing, for it would help (rather than hurt) the region by enabling a countercyclical response that should dampen the economic slowdown. Moreover, for the LAC inflation-targeting countries, the slowdown will likely look more like a garden-variety business cycle downturn of the type typically observed in developed economies, rather than a financial crisis of the type that tended to haunt the region in the past.

The adjustment pain will be much more intense, however, for the LAC countries in Central America and the Caribbean that, due to their small size and tight fiscal constraints, are unable to exercise sufficient monetary policy independence or to benefit from the substitution benefits of a more depreciated currency, as well as for some of the countries in South America that have not yet developed the institutional matrix to support an inflation-targeting-cum-exchange-rate-flexibility regime.

In Chapter 1 we documented the underpinnings of this new reality: de-dollarization, deleveraging and a deepening of local credit markets that do not represent a source of systemic concern. And we argued that the external shocks will be mainly transmitted through three channels: financing costs (as we documented, not only in U.S. dollars), commodity prices (although with differences: more base metals and less so grains), and the exchange rate.

But the exchange rate front catches the region in much better shape than in the 90s. Mostly flexible exchange rates with valuations that look rich but were contained by exchange rate-smoothing policies that, in the current context, proved to have been a useful addition to the macro toolkit. As we argued in detail in Chapter 2, for all the debate around exchange rate intervention as a costly and ineffective, often mercantilist policy, they have been generally successful, less costly than usually assumed, and ex post justified. Indeed, recent episodes prove that countercyclical intervention has been a prudent (and in most cases, efficient) response to globalization.

What about now? Should governments resist the exchange rate depreciation pressure? Can the exchange rate mitigate the exposure of the real economy in the short run?

As we argue in Chapter 2, there are critical differences with 2009: the world is not collapsing and the shock is milder, and this may allow for a more reasonable speed of adjustment. In addition, there are two key structural differences relative to the “fear of floating” (or, more, accurately, fear of depreciation) years: no balance sheet effects and low pass-through due to low inflation.

Indeed, the 2009 global crisis already offered a good example of a non-traumatic exchange rate adjustment in many de-dollarized, deleveraged LAC economies. However, it was not a natural example of the smoothing role that we advocate for the exchange rate in the near future. For many reasons, including the role of panicked investors flying to quality and thereby rationing countries and firms out of the capital markets with little attention to fundamental relative values, and the global nature of the shock that precluded any export enhancing effect of a depreciated currency, 2009 was far from a Mundellian world in which open economies can partially export the economic adjustment to the rest of the world.

Because of that, the next few years may offer a critical test of the graduation of Latin America (and most emerging economies) on the macro financial front, as the exchange rate is, for the first time in many decades, ready to play its Mundellian role, trading the excruciating pain of a financial collapse into the more bearable fatigue of a business down-cycle. While countries in the region focus, somewhat belatedly, on structural deficits in infrastructure or education, the exchange rate may provide the short-run cushion to plan for the long run. Let it do the job.





**PART 2: POLICY FOCUS**  
**EXPLORING ISSUES IN EXCHANGE RATE INTERVENTION**





## Chapter 3:

# *Exchange Rate-Smoothing Intervention Policies*

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Few macroeconomic policy topics have been as hotly debated as the exchange rate policy of emerging economies. From the varieties of pegs of the 70s and 80s to the bipolar (float or fix) view of the 90s, from the floating with inflation targeting paradigm of the early 2000s to the “leaning against the wind” intervention of recent years, exchange rate policy have tended to follow perceived lessons from crisis and respond to the ongoing macroeconomic juncture; hence, its apparent mercurial nature.<sup>33</sup> Nowhere has this debate been so predominant as in Latin America, a laboratory for all sorts of creative solutions to the classic exchange rate dilemma, namely, how to reconcile flexibility, on the one hand, and external competitiveness and financial and macroeconomic stability, on the other.

There are in principle two main reasons behind exchange rate intervention: the perception that the exchange rate is moving away from a given target and the perception that it is moving away from its equilibrium (or too fast towards a potentially new equilibrium). The difference between the two cases should be obvious. The first one implies a degree of explicit (or implicit) rigidity in the exchange rate that the intervention is intended to preserve. In the second, by contrast, intervention is “corrective”: it attempts to smooth out deviations from equilibrium or volatility deemed to be potentially damaging (possibly in both direction although not necessarily in a symmetric way), relative to an exchange rate “comfort” zone that reflects the behavior of a set of moving fundamentals.

In other words, whereas in the first case the exchange rate is a predetermined target (to work as a nominal anchor or as a tool to enhance international competitiveness and import protection), in the second it is a flexible relative price that, to the extent that it is prone to cyclical deviations and misalignments (as well as sudden changes and overshooting), needs to be contained by active policy. Given that an important set of Latin American countries (and nearly all economies in our broader sample) run a flexible exchange rate regime and could be grouped under the latter case, in what follows we focus on countercyclical intervention of the second kind.<sup>34</sup>

After so many ups and downs in the global financial cycle (the not-always-correlated swings in global liquidity and risk appetite), the role of exchange rate policy as a standard countercyclical tool has become increasingly apparent. While exchange rate flexibility helps mitigate real (terms of trade) shocks in the textbook Mundell-Flemming framework, the questions remains, at least from a policy making perspective, whether full flexibility should be allowed vis-à-vis more transient financial shocks in a financially integrated emerging world: appreciating with the rallies of risky assets during the risk-on phase of the global financial cycle and depreciating with the sharp selloffs that come in the risk-off reversal. The “leaning against the wind” nature of most exchange rate policy in the

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<sup>33</sup> See Sarno and Taylor (2001) for an early survey with a focus on advanced countries, and Levy Yeyati and Sturzenegger (2010) for a recent one with a focus on developing economies.

<sup>34</sup> As argued in Chapter 1, while the set of countries running flexible exchange-rate regimes represents only for 25 percent of the countries in LAC, they account for a very large share of the region’s GDP and population (about 80 percent, respectively).

emerging world (and in many advanced economies) reveals the policy view that the latter type of flexibility can be more harmful than beneficial. Indeed, there is empirical support to the idea that “excessive” exchange rate volatility can distort investment decisions and affect long-term growth, especially in countries with low levels of financial development (see Servén (2003) and Aghion et al. (2009), respectively).

The debate at the mainstream has typically downplayed the exchange rate-smoothing nature of intervention, attributing international reserve accumulation/depletion to precautionary or prudential motives, or grouping the direct sales and purchases of foreign exchange with other related measures such as taxes or restrictions on capital mobility or differential reserve requirements.<sup>35</sup> However, there is plenty of evidence, both anecdotal and hard, indicating that intervention in LAC is shifting its focus towards the objective of limiting what policy makers tend to see as unwarranted (and possibly harmful) deviations from equilibrium levels: intervention correlates negatively with exchange rate pressure and is often complemented with capital restrictions and taxes that could only make any precautionary reserve build-up more costly.<sup>36 37</sup>

This contrasts with the longer debate in the academic literature, which has concentrated in intervention strategies to postpone or limit a devaluation or, on the other extreme, to preserve depreciated real exchange rates to foster growth and prevent “Dutch disease” effects.<sup>38</sup>

However, a case can be made (as we attempt to do here) that most, if not all, exchange rate intervention should be regarded as a countercyclical macroeconomic policy aimed at smoothing out short-run currency swings and to limit volatility. Fears of deviations in either direction could be reconciled with a broader fear of exchange rate instability due to transient or cyclical (at any rate, reversible) factors—a fear that, in turn, relates to the potential impact of exchange rate misalignments on economic growth and financial stability (Levy Yeyati and Struzenegger (2010)).

Here we explore, with a Latin American focus, three essential aspects of this policy that we believe are critical to evaluate the convenience, mix and intensity of an active exchange rate policy: its moving target, the menu of alternative vehicles, and its cost-effectiveness. To do so, we first revisit the nature and source of exchange rate pressures. We propose a metric to identify an equilibrium level (or, more realistically, in view of the wide dispersion of definitions and approaches, an equilibrium “zone”) as a function of standard fundamentals, and analyze deviations from this level arising from two sources: cyclical movements of these fundamentals and the influence of non-

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<sup>35</sup> For a discussion of the precautionary and prudential motives see Aizenmann and Lee (2007) or Obstfeld et al. (2010). The taxes and capital mobility explanations of the sales and purchases of foreign currency are discussed in a recent IMF External Sector Report (see <http://www.imf.org/external/np/pp/eng/2013/062013.pdf>, pp 17 to 20).

<sup>36</sup> See, i.a., Levy Yeyati (2010) and Adler and Tovar (2011).

<sup>37</sup> The steady increase in international reserves observed in EMs in the 2000s is also consistent, for instance, with a prudential motive. However, as we argue above, the strong correlation between the growth rate of reserves and exchange rate misalignments is suggestive of a shift in the policy focus towards exchange-rate smoothing.

<sup>38</sup> The postponement of depreciations is discussed in Haussman et al. (2000) and in Calvo and Reinhart (2002). The growth motive of keeping a depreciated currency is discussed in Rodrick (2008), Haussman et al. (2005), and Johnson, Ostry and Subramanian (2006), or Levy Yeyati et al. (2012). For “Dutch disease” type concerns and evidence see Rajan and Subramanian (2011) or Cárdenas and Levy Yeyati (2011) for the case of LAC.

fundamental variables (such as interest rate differentials or domestic policy choices), with the view to characterizing the main drivers of exchange market pressure (for example, whether it comes from the current account, from portfolio or FDI flows, or as a result of local misalignments) and the consequences of such pressures, if unaddressed, on macroeconomic performance and economic development. Next, we introduce a taxonomy of the alternative vehicles of intervention (both directly in the foreign exchange market and indirectly through taxes and barriers affecting the source of market pressure), and discuss their relative efficacy and fiscal cost.

### *Real Exchange Rates: What Equilibrium?*

In order to know whether the exchange rate has gone too far away from equilibrium (to identify a deviation) we need to define an equilibrium (or “normal”) level. This is, of course, a nontrivial task given that some of the natural drivers of the real effective exchange rate (REER), including many of the fundamental ones, tend to display volatile cyclical patterns, making any simple estimate of the equilibrium zone a moving target.

A recent paper by the IMF (2013) illustrates both the complexity and the drawbacks of any exercise geared to pin down an equilibrium REER. The paper lists three types of arguments behind the REER:

- Traditional fundamentals: productivity, population growth, commodity terms of trade, trade openness, share of administered prices to CPI;
- Short-term (financial and cyclical) factors: VIX, interest rate differentials (which the IMF groups under the “policy” group), financial home bias, expected GDP growth;
- Policy variables: capital controls, FX intervention, health expenditure to GDP, private credit to GDP (a proxy for macro prudential policies).<sup>39</sup>

The estimation of a panel of REER against this set of variables opens the question on the level of the policy variables that should be considered in order to evaluate the equilibrium level of the REER. The IMF addresses this question by specifying a policy benchmark for each of these variables, according to what “the country desks suggest would be desirable for the future”—which adds a degree of subjectivity and entails some normative judgment. Similarly, there is the question about the extent to which cyclical and short-term financial variables should be reflected in the estimated equilibrium REER, rather than as explanatory factors behind its deviation from its fundamental level.

Note, however, that a more traditional approach (as the one taken, e.g., in IMF (2006) or Bello et al. (2010)) that restricts attention to traditional fundamentals and leave non fundamental and policy aspects aside faces a problem that is the flipside of the previous one: if policies (or, to a lesser extent, financial variables) drive the REER *persistently* away from the equilibrium, ignoring those variables in the estimation may bias the results. For example, we may see equilibrium exchange rates more

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<sup>39</sup> The net foreign asset position (a fundamental), the output gap (cyclical) and the fiscal balance (a policy variable) all fail to deliver significant results.

undervalued than they actually are if they have been systematically influenced by central bank foreign exchange purchases uncontrolled for in the model.<sup>40</sup>

At any rate, given that there seems to be no uncontroversial way to approach the problem, here we opt for the one that calls for the smaller set of normative assumptions regarding policy. Thus, we estimate the long-run REER as a function of standard fundamentals (productivity, terms of trade, net foreign assets, trade openness and government consumption to GDP) using a dynamic OLS on quarterly data (interpolated when only annual frequencies are available).<sup>41</sup> The results of this first stage, the equilibrium exchange-rate estimation, are reported in **Table 3.1**. In a second stage, we estimate an error correction equation that aims at capturing the speed of adjustment towards the long-run equilibrium and includes the short-run movements of fundamentals plus two financial determinants: the interest rate differential and risk appetite, proxied by the VIX. The results of this second stage will be presented later in this chapter in **Table 3.4**. In both exercises we use a balanced sample of emerging and advanced economies.<sup>42</sup>

The results of the long-run REER, reported in **Table 3.1**, are mostly significant and consistent with the priors. The equilibrium level of the real exchange rate increases (appreciates) with productivity, terms of trade (TOT), net foreign assets (NFA), and government consumption (G); and decreases (depreciate) with trade openness (OPEN).

In turn, using the coefficients from the model reported in the table, we can construct two “versions” of the equilibrium REER: one associated with the values of fundamentals at any given point in time (the fitted values of the regression), which we label as “REER based on current fundamentals”, and another one based on the medium-term values of the same variables, which we estimate as the HP-filtered trend and label “REER based on trend fundamentals”.

**Figures 3.1.A** and **3.1.B** report both measures, together with the realized (observed) REER and its HP-filtered series, for the five LAC economies included in the estimation as well as averages for each of the groups represented in the table. presumption that the deviation (and, as a result, the predicted equilibrium exchange rate) should revert to the trend in the future?

A few aspects stand out from our estimates of equilibrium real exchange rates. First, real exchange rates in EM display a larger volatility than in advanced economies (particularly, in LAC). Second, *despite the presence of heavy intervention*, the boom and bust cycle around the 2008 financial collapse was associated with important deviations from the predicted equilibrium values, based either on realized

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<sup>40</sup> The bias should be smaller, however, if the omitted variables are not correlated with the rest of the fundamentals (or tend to cancel each other over time).

<sup>41</sup> The real effective exchange rate (REER) comes from the BIS and Datastream; net foreign assets (NFA) over GDP from the update of Lane and Milesi Ferretti (2007)’s wealth of nations dataset; commodity terms of trade (CTOT) from “The history of booms and busts” dataset; productivity (PROD), proxied by ratio of GDP per capita to the US in PPP terms, from the Penn World tables; and government consumption over GDP (GC) and openness (OPEN), computed as exports plus imports over GDP, are from the IMF’s IFS. GC, PROD and OPEN are computed relative to the country’s trade partners.

<sup>42</sup> We prefer to estimate the model using the realized values of the variables (rather than their trends as in Bello et al. (2010)) to capture the elasticities of the REER more precisely.

or trend fundamentals—a finding that a priori justifies the leaning against the wind policy displayed by many countries in the region. Third, fundamental values of the REER may differ significantly depending on whether they are estimated based on *current* or *trend* (that is, medium run) fundamentals, which may motivate intervention to offset, for example, capital flows or a commodity bonanza that are perceived to be temporary.

The difference between equilibrium REER based on current fundamentals and the actually observed values of the REER can be attributed to exogenous factors such as the global financial cycle (interest rates, risk appetite, the dollar) as well as to policy choices such as the ones highlighted in IMF (2013) (such as capital controls, FX intervention, and others) and simple mean-reverting noise that results from the overreaction of the foreign exchange market to some of these variables.

Finally, for all the relevance of the precautionary motives, reserve accumulation seems to have been partly oriented to counteract perceived exchange rate misalignments, as shown by the large correlation between changes in reserves and deviations from the equilibrium REER (**Figure 3.2**).

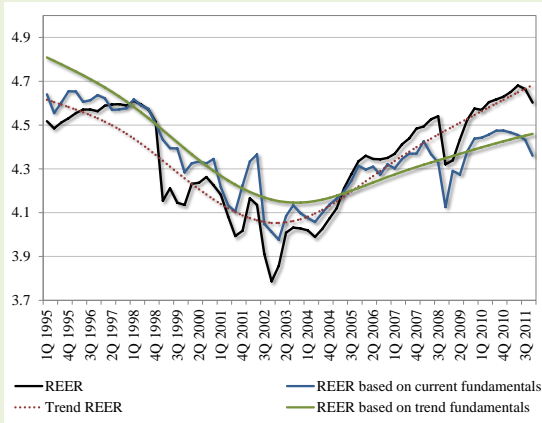
**TABLE 3.1. Equilibrium REER as a Function of Fundamentals**

Variables	(1) LAC	(2) ASIA	(3) EMEA	(4) Emerging	(5) Advanced	(6) All
NFA	0.514** (4.39)	-0.109 (-0.71)	-0.834*** (-4.91)	-0.166 (-1.66)	-0.0882* (-1.95)	-0.119** (-2.59)
Log Open	-0.791** (-2.86)	-0.439*** (-4.95)	-0.671*** (-6.19)	-0.526*** (-6.65)	-0.679*** (-10.14)	-0.539*** (-6.69)
Log Commodity TOT	2.507* (2.20)	-0.392 (-0.48)	0.295 (0.93)	-0.209 (-0.50)	-0.0196 (-0.07)	0.156 (0.52)
Log (G/GDP)	0.885*** (10.25)	0.465** (3.41)	0.448** (3.70)	0.387*** (3.22)	-0.0418 (-0.27)	0.194 (1.49)
Log Productivity	0.758* (2.59)	0.776*** (8.28)	0.153 (0.86)	0.739*** (6.12)	0.344 (1.11)	0.719*** (6.92)
N	325	390	455	1170	715	1885
Countries	5	6	7	18	11	29
R-sq Within	0.6915	0.7321	0.7536	0.6226	0.6445	0.5889

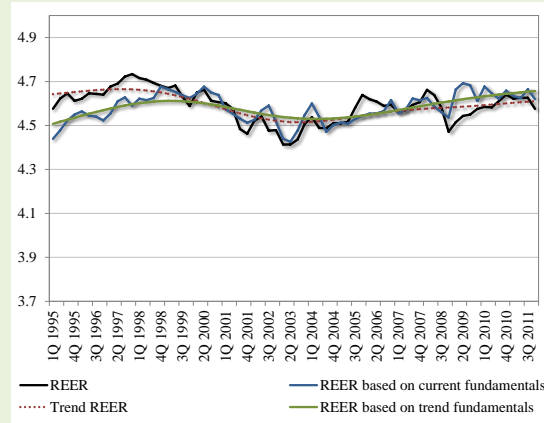
Notes: LAC includes Brazil, Chile, Colombia, Mexico, and Peru; Asia includes India, Indonesia, South Korea, Malaysia, Philippines, and Thailand; EMEA includes Czech Republic, Hungary, Poland, Rumania, Russia, South Africa and Turkey; Advanced includes Australia, Canada, Israel, Japan, New Zealand, Norway, Singapore, Sweden, Switzerland, and UK. Estimated based on a dynamic OLS specification. *t* statistics in parentheses using clustered standard errors at the country level. The asterisks indicate statistical significance, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Source: Daude et al. (2013).

**FIGURE 3.1.A. Equilibrium Exchange Rates in LAC**

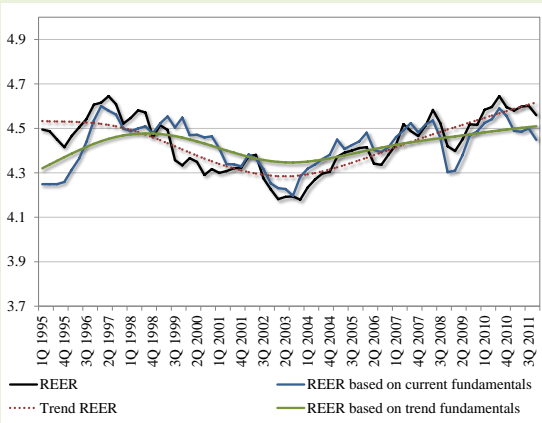
**PANEL A. Brazil**



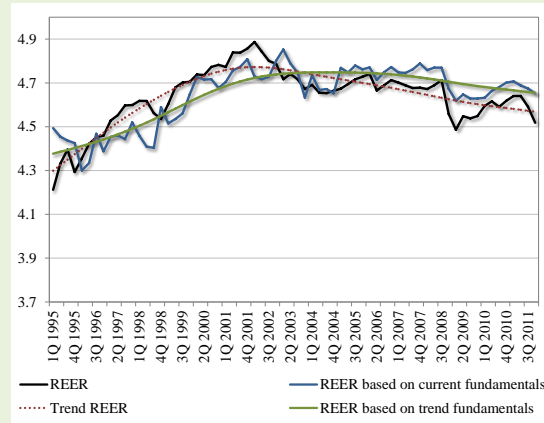
**PANEL B. Chile**



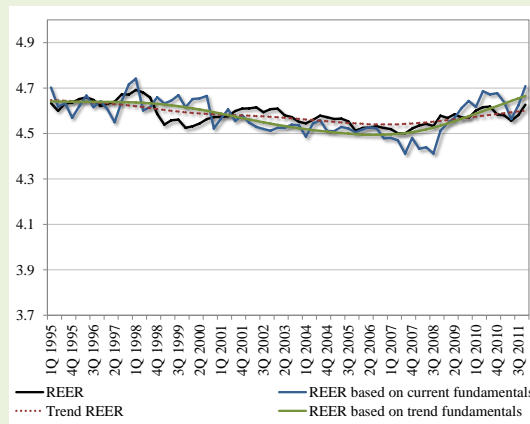
**PANEL C. Colombia**



**PANEL D. Mexico**



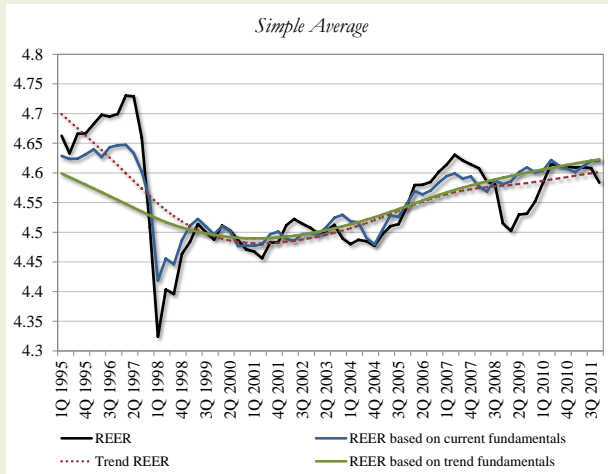
**PANEL E. Peru**



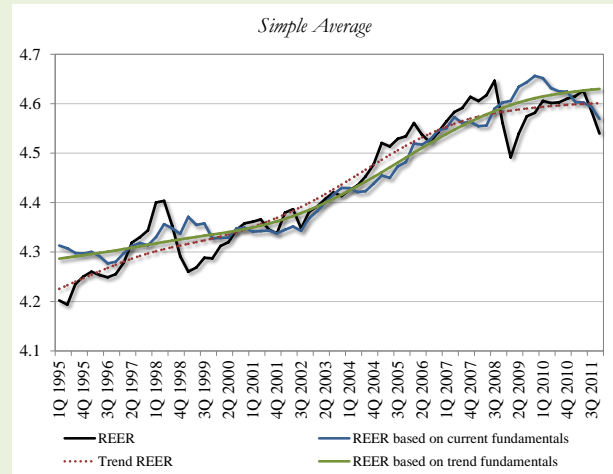
Notes: In Panels A-E an increase represents an appreciation of the real effective exchange rate and a decrease is associated with a depreciation. REER stands for the natural logarithm (Log) of the real effective exchange rate, Trend REER stands for the Log of the HP-filtered series for the real effective exchange rate, REER based on current fundamentals stands for the predicted values from the regression results presented in the specification (1) of Table 3.1, and REER based on trend fundamentals stands for the value of the predicted real effective exchange rate using the coefficients from specification (1) of Table 3.1, and the HP-filtered trend of the regressors. Sources: Authors calculation from Daude et al. (2013).

**FIGURE 3.1.B. Equilibrium Exchange Rates in Selected Regions**

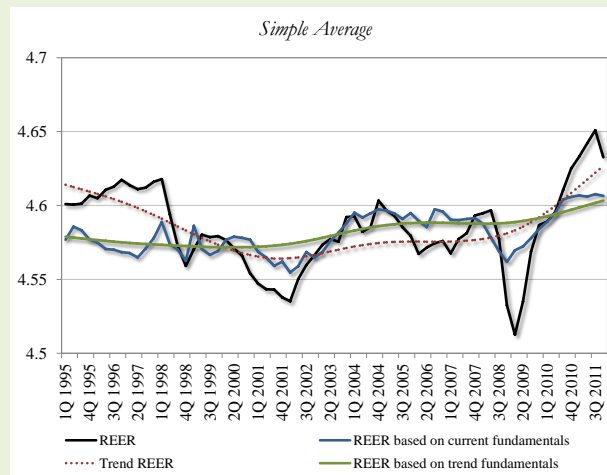
**PANEL A. Asia**



**PANEL B. Europe Middle East and Africa**



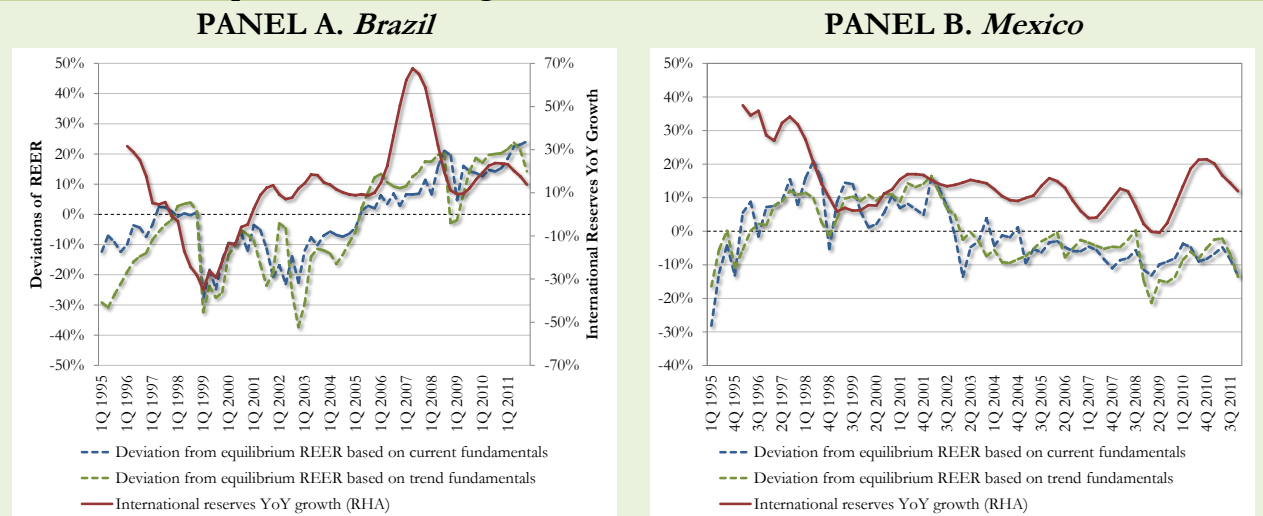
**PANEL C Advanced Economies**



Note: Asia includes India, Indonesia, Rep. of Korea, Malaysia, Philippines, and Thailand; EMEA includes Czech Republic, Hungary, Poland, Rumania, Russia, South Africa and Turkey; Advanced Economies includes Australia, Canada, Israel, Japan, New Zealand, Norway, Singapore, Sweden, Switzerland, and UK. In Panels A-C an increase represents an appreciation of the real effective exchange rate and a decrease is associated with a depreciation. REER stands for the natural logarithm (Log) of the real effective exchange rate, Trend REER stands for the Log of the HP-filtered series for the real effective exchange rate, REER based on current fundamentals stands for the predicted values from the regression results presented in Table 3.1 for each region, and REER based on trend fundamentals stands for the value of the predicted real effective exchange rate using the coefficients of Table 3.1 for each region, and the HP-filtered trend of the regressors. Estimated based on a dynamic OLS specification. *t* statistics in parentheses using clustered standard errors at the country level. Source: Authors calculation from Daude et al. (2013).

Simplifying, one can compare the realized values of the REER with those driven by current and medium term fundamentals. The difference between the latter comes from the fact that fundamentals change over time: for the particular case of the Latin American commodity exporters represented in the sample, this bears a natural question: should exchange rate policy react to the appreciation that is due to cyclical, reversible increases in commodity prices? In other words, should policy be oriented by the equilibrium consistent with today's prices (for example, if we believe the latter follow a random walk and move independently from past history) or should it be based on the

**FIGURE 3.2. Equilibrium Exchange Rates and International Reserves**



Notes: Deviation from equilibrium REER based on current fundamentals stands for the difference between the Log of the real effective exchange rate and the predicted values from the regression results presented in specification (1) of Table 2.1; Deviation from equilibrium REER based on trend fundamentals stands for the difference between the Log of the real effective exchange rate and the predicted values using the coefficients in specification (1) of Table 2.1, and the HP-filtered trend of the regressors. Positive (negative) deviations imply a REER more appreciated (depreciated) than the level predicted by fundamentals. International Reserves are seasonally-adjusted using a moving average with uniform weights. Source: Authors calculation from Daude et al. (2013), and IFS.

### Exchange Rate Intervention: A Taxonomy

Despite the increasingly populated menu of alternative measures, for the purposes of the analytical debate, exchange rate–smoothing (countercyclical) policies as a response of capital flows could be usefully grouped into two broad categories generally associated with *trading the flows* and *taxing the flows*.

The first group covers traditional intervention policies in the foreign exchange market that take the shape of purchasing foreign currency in times of inflows and selling in times of outflows or, more precisely, in taking the other side of the private investor’s exchange rate transaction. Thus, if a private (portfolio or direct) investment entails trading foreign currency for local currency-denominated assets (financial or real), the government offsets it by purchasing dollars in exchange of local currency assets. In other words, whenever the private sector lengthens or shortens the currency composition of its holdings, the government does the opposite. More generally, this type of intervention changes the foreign asset position of the consolidated public sector, including the central bank as well as the Treasury and public (quasi sovereign) entities.

The second group of policies consists in raising the costs (adding *sand in the wheel*) of cross-currency transactions, includes through Tobin-like taxes, differential reserve requirements or quantitative restrictions on capital mobility in and out of the domestic economy.

In the first case, the public sector takes the buy (sell) side of the foreign exchange market to meet sales (purchases) of foreign currency by private investors and stabilize the clearing price, usually (although not necessarily) at a fiscal cost (i.e., the cost of sterilization, if any). In the second one, it



discourages the cross market flows by raising transaction costs at the expense of profits, thereby fending off inflows (rather than absorbing them as in the first case) or hindering outflows.

As noted, there are a variety of forms within each group. For example, **traditional intervention** by the Central Bank often takes the form of sterilized dollar purchases in the spot market (whereby the Central Bank “issues” local currency paper in exchange for dollars, changing supply and demand in the foreign exchange market, meeting the demand for local currency assets without altering the money supply)<sup>43</sup> or intervention in the forward market (which has no immediate monetary effect and therefore needs no sterilizing open market operations).

But the Central Bank does not need to be alone in this effort: a similar effect could be achieved by the Treasury through public credit management, that is, balance sheet operations that change the currency composition of the consolidated public debt. Examples of these operations are the investment of external surpluses (as in the Chilean Copper Fund) or fiscal surpluses (as in sovereign wealth funds) in foreign assets, issuing local currency debt to cancel foreign currency debt, changing the local-external mix of financing sources, issuing local currency debt to fund a sovereign wealth fund abroad, or covering future external obligations in the swaps market. The same is valid, of course, for quasi sovereign entities. Yet another version of intervention entails the portfolio composition of institutional investors, for example, by relaxing or tightening limits on foreign asset position (although pension funds in LAC tend to cover much of currency exposure in local derivative markets) or by modifying the benchmark against which pension fund performance is measured to include foreign currency assets (which should bias the typical pension fund portfolio towards a larger dollar exposure).

In the other corner, **sand-in-the-wheel measures** include capital controls—the already-discussed Chilean-type Tobin tax or the equivalent unremunerated reserve requirements on selected foreign inflows,<sup>44</sup> as well as Asian-type quantitative caps on cross-border flows and foreign ownership. In addition, within this category we can count micro prudential measures, such as limits to banks’ foreign exchange positions and restrictions on dollar lending to non-dollar earners, red tape options like reporting requirements of foreign exchange transactions, and the lifting of capital restrictions on outflows (as in the relaxation of foreign asset limits to local institutional investors).

Perhaps more controversially, we can also group under the “tax” umbrella the use of traditional reserve requirements to widen the wedge between the borrowing interest rate that determines the currency carry trade profit, and the lending rate that governs the transmission of monetary policy, as was recently done in Turkey (or in Peru prior to the September 2008 crisis). Though in principle this combination of lower interest rates and higher reserve requirements could be seen as business-as-usual monetary policy, from the perspective of the foreign exchange market, the lower carry trade profit is the flipside of a tax, in this case on financial intermediaries (banks), that reduces the speculative returns of the carry trade much in the same way as a Tobin tax. **Table 3.2** summarizes this taxonomy, describes the players and the costs involved, and lists selected recent examples in the emerging world.

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<sup>43</sup> Because in practice the Central Bank seldom issues its own paper but rather sterilizes dollar purchases by reducing its stock of Treasury securities, the latter may impose a limit to the amount of dollars than can be acquired in this way.

<sup>44</sup> Naturally, this is a particular case of the differential reserve requirements widely used in LAC in the past to discourage dollar intermediation.

**TABLE 3.2. Taxonomy of Interventions**

Taxonomy	What?	How?	How costly?	Who?
<b>Direct intervention (buying inflows)</b>	Unsterilized central bank purchases and sales	Auction or discretionary purchases	Inflation	<b>LAC7:</b> Argentina. <b>Asia:</b> Infrequently. <b>Elsewhere:</b> Turkey, Russia, Romania.
	Sterilized central bank purchases and sales	Auction or discretionary purchases; sterilization through bill sales or repos; sale of peso paper settled in foreign exchange	Quasi fiscal costs: interest rate differential plus valuations change	<b>LAC7:</b> Brazil, Colombia, Argentina, Chile, Peru, Uruguay. <b>Asia:</b> Singapore, Korea, Taiwan, China, Philippines and Thailand <b>Elsewhere:</b> SA, Israel, Egypt, Poland, Hungary.
	Government's and quasi sovereigns' purchases and sales (stabilization and sovereign wealth funds; debt currency profile)	Through state or private sector banks	Fiscal costs (under market arbitrage, comparable to quasi fiscal costs)	<b>LAC:</b> Chile, Brazil. (Argentina and Peru in the recent past.) <b>Asia:</b> None. <b>Elsewhere:</b> Poland, Israel (matching dollar debt)
<b>Sand in the wheel (taxing inflows)</b>	Tobin tax on cross-border transactions; withholding tax on non-resident incomes or capital gains	Law or decree.	Lower market liquidity	<b>LAC:</b> Brazil 6% IOF (currently at 0%), Chile 4% withholding tax, Colombia 33% maximum withholding tax. , Peru (5% WHT on up to 60d NDFs) <b>Asia:</b> Philippines (20% withholding tax), Thailand (15% withholding tax), Korea (14% withholding tax), India (20% maximum withholding tax). <b>Elsewhere:</b> Egypt (20% withholding tax)
	Unremunerated reserve requirements on foreign inflows	Law or decree.	Higher foreign currency borrowing costs	<b>LAC:</b> Argentina (30% of foreign inflows, albeit with multiple exceptions), Brazil (60% RR on banks' short spot USD positions), Peru (60% RR on short-term bank borrowing). <b>Asia:</b> Indonesia (increase RR on IDR and FX deposits), China hiked RRR 6 times by 300bp since Dec 2009 <b>Elsewhere:</b> Israel (10% on local bank foreign exchange derivative transactions with non residents).
	Limits on foreign access to local markets	Financial market regulation	Lower market liquidity	<b>LAC:</b> Argentina, Colombia, Brazil, Peru. <b>Asia:</b> Taiwan (restricting FINI from buying bonds), India (outright FII level limits), Indonesia (SBI min holding period) and Sri Lanka (proportional limit for offshore holding). <b>Elsewhere:</b> None.
	Reserve requirements as a substitute for interest rate hikes	Monetary policy decisions	Wider local currency interest rate margins	<b>LatAm:</b> Peru. <b>EM Asia:</b> Rarely. In many cases, rate gradualism reflects fear of appreciation. <b>EMEA:</b> Turkey.

## Costs and Benefits

Ever since the *Jurgensen Report* (Jurgensen 1983), conventional wisdom favors the view that sterilized intervention is costly and affects exchange rates in the short run but much less so in the long run.<sup>45</sup> But questions about its **effectiveness** (how much does intervention influence exchange rate movements) and **efficiency** (at what cost) remain open, possibly because they depend both on country characteristics (market depth, overall consistency of intervention with monetary and fiscal policies) and on the **source** of exchange market pressure (from cyclical swings of global liquidity and international interest rates to commodity booms).

Sterilized interventions, conventional wisdom says, are costly. The typical scenario that comes to mind in relation with this statement is intervention against depreciation: a country that issues costly local debt in exchange of short-term, risk-free reserve dollar assets, bears the negative interest rate differential and, ultimately, if appreciation finally materializes, has to absorb a significant valuation loss on its reserve stock. However, ever since Milton Friedman's (1953) case against intervention, one may rather argue that a successful attempt to stabilize exchange rate volatility, without fighting against fundamentals, should make a profit (rather than a loss) at the expense of speculators.<sup>46</sup>

More generally, one can think of intervention as the negative (more precisely, the other side) of a carry trade. In the latter, the investor anticipating an appreciation of the local currency takes a long position on a (usually high yielding) local currency asset funded by a short position in a (usually low-yielding) foreign currency, and receives the interest rate differential (the *carry*) and valuation changes (an appreciation of the local currency that would add to the final profit of the trade).<sup>47</sup> At any rate, a sterilized intervention by the central bank against appreciation is similar to the opposite trade: taking a long foreign currency position funded in the local currency; therefore, the carry paid by the central bank should be proportional to the one perceived by the investor, net of transaction costs (including, as we will see below, Tobin taxes on capital flows).<sup>48</sup>

The conventional view, which suggests that carry traders win at the expense of the central banks, seems to overstate the costs. As Friedman suggested, if you purchase dollars when the exchange rate is overvalued and sell them when it is undervalued, valuation changes may offset and even outweigh any interest rate differential. For the conventional wisdom to apply, central bank intervention would

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<sup>45</sup> More specifically, the report suggested that the influence of intervention on exchange rates through the portfolio-balance channel was relatively minor (Jurgensen, 1983). In our report, we focus on sterilized intervention unless explicitly noted as it has become the norm in the past two decades. Conventional view accepts that non-sterilized (and, ideally, multilaterally coordinated) intervention tends to be more powerful in the long run; however, because they subordinate monetary policy to exchange rate policy, they are increasingly unpopular and infrequent.

<sup>46</sup> Friedman's case was based on the presumption that intervention is often unsuccessful. Interestingly, this is also the basis to relate the effectiveness of intervention on its profitability, an aspect to which come back below.

<sup>47</sup> While a depreciation of the local currency that offsets the carry is to be expected under uncovered interest rate parity, it is often the case that high-yielding currencies appreciate, at least in the short run because uncertainty about fundamentals, the response of other market players or the response of the government (that is, because of intervention policies).

<sup>48</sup> The early literature on the cost of intervention in emerging economies typically assumed that reserves were purchased with the issuance of foreign currency debt and computed the cost of reserves as a function of the sovereign spread (see, e.g., Jeanne and Ranciere (2011) and Levy Yeyati (2008)). However, in the absence of uncovered interest rate parity (which would equate the costs of local and foreign currency domestic debt), this analogy does not seem to describe the practice of sterilized intervention in the 2000s. See Cárdenas and Levy Yeyati (2010) and references therein.

have to systematically be geared at defending an ultimately indefensible exchange rate level. If intervention is rather geared at smoothing volatility while not fighting against the fundamentals-driven equilibrium level of the exchange rate, then the Friedman-type reasoning would be more applicable.

How did emerging economies fare in this regard? To estimate the *realized costs* of central bank intervention in the spot exchange rate market we conduct a simple exercise. We calculate cumulative purchases and sales of international reserves simply as the change in the reserve stock—where the latter is corrected for valuation changes (assuming a currency composition similar to that reported for emerging economies by the IMF’s COFER) as well as for interest accrual (assuming a continuous income flow associated with an annualized return equal to the yield on 2-year Treasury notes).<sup>49</sup> We start the exercise from the beginning of 2005, far enough from the effects of currency crises in the 90s that undervalued emerging currencies and at early stages of the appreciation trend that characterized most of the 2000s.<sup>50</sup>

We computed profits and losses of this central bank position as the sum of the local to foreign currency interest rate differential (the carry, typically positive and therefore a flow cost from the perspective of the holder of international reserves) and valuation changes (for the central bank, a loss whenever the local currency appreciates and a gain when it depreciates).

The exercise is, naturally, only an illustration of the different ingredients involved in the calculation, as the selected countries presented in **Figure 3.3** show. In particular, it shows that the cost is larger for “carry currencies” with large interest rate differentials (Brazil, Turkey) than for those with a lower local interest rates (Mexico, South Korea) and for currencies that go through persistent appreciation processes (Colombia, China) rather than trendless cyclical volatility (Mexico, Turkey, South Korea and, to a lesser extent, Brazil).

As a result of different combinations of carry and exchange rate trends, the cost of central bank intervention differs widely (**Table 3.3**). As can be seen, central banks generally run important carrying costs of holding reserves over the recent exchange rate cycle but, overall, with the exception of currencies with high carry or permanently appreciation (1.6 percent of GDP in Brazil, 3.3 percent in Peru), the final bill was in many cases quite modest, with gains in a few cases (0.6 percent in South Africa, 1 percent in India).<sup>51</sup>

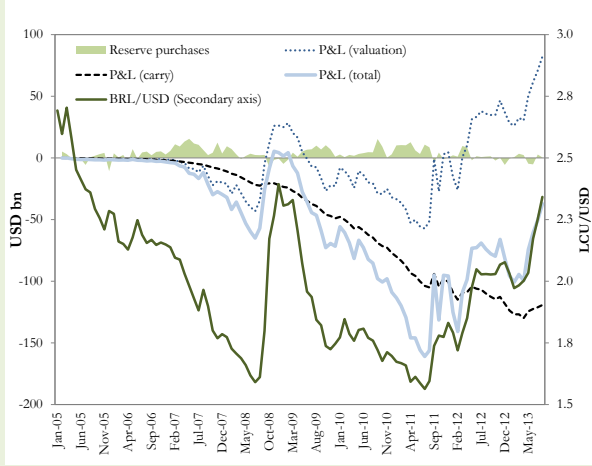
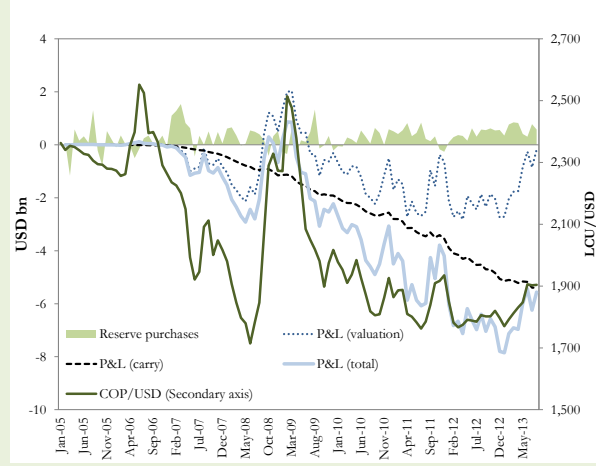
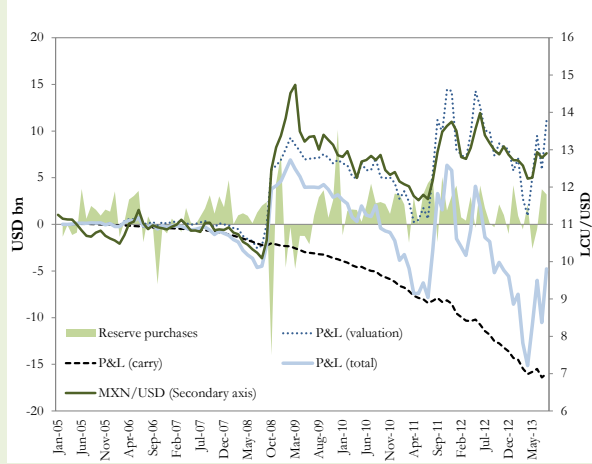
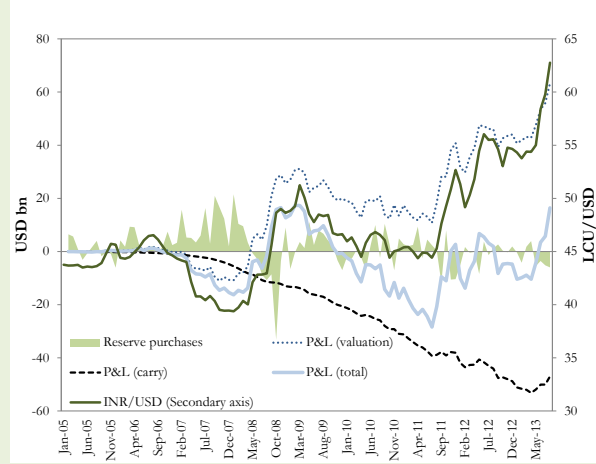
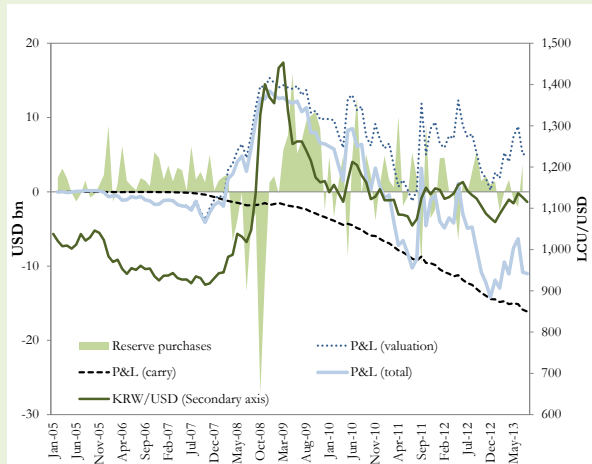
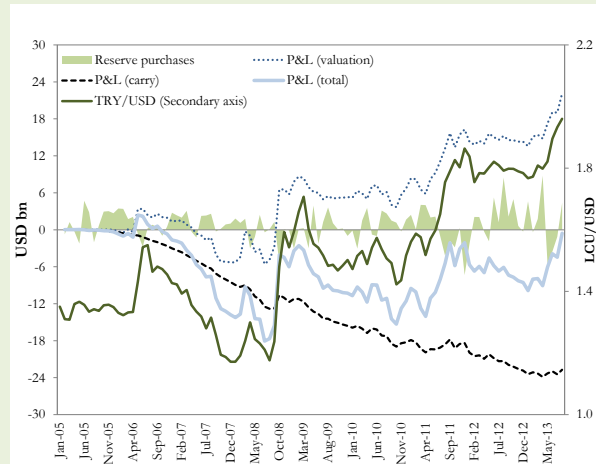
More specifically, while it is true that interest rate differentials have played in recent years against intervening central banks, the cyclical nature of exchange rates imply that valuation changes have mostly turned a profit, which may widen in the future should the eventual reversal of the interest rate cycle in the U.S. prop up the dollar globally. The same should be true, of course, of intervention

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<sup>49</sup> This is, naturally, an imperfect approximation to actual intervention, for which there is publicly available data only for a few central banks and limited periods. But, as Adler and Tovar (2012) indicate, the difference between reserve changes and actual intervention is relatively minor over monthly frequencies.

<sup>50</sup> The starting point is arbitrary: starting before a crises (e.g., mid-2008) would overstate the valuation gains of intervention; doing it right after a large exchange rate correction (e.g., March 2009) would do the opposite.

<sup>51</sup> The same picture emerges if we compute the cost as a function of cumulative reserve accumulation.

**FIGURE 3.3. Realized Costs of Central Bank Spot Intervention**
**PANEL A. Brazil**

**PANEL B. Colombia**

**PANEL C. Mexico**

**PANEL D. India**

**PANEL E. South Korea**

**PANEL F. Turkey**


Notes: P&L carry is the monthly sum of interest rate differential (2yr country rate – 2yr Treasury rate) times the reserve stock, P&L valuation is the difference between the stock of reserves and the monthly currency purchases, while P&L total is the sum of P&L carry and P&L valuation. Sources: Bloomberg, IFS, GEM and The World Bank.

out temporary exchange rate swings (which it is often but not always the case), the cost of central bank intervention in foreign exchange markets appears to be relatively minor. through derivative markets that, under covered interest rate parity, simply replicates the interest rate differentials used in the previous exercise. Thus, to the extent that intervention is geared to smooth

Indeed, the marginal cost of intervention could be even lower than recorded. On the one hand, the exercise above does not take into account the effect of reserve building on financial (roll over) costs that affect both public and private debt stocks. On the other, as we mentioned above, although it is widely recognized in policy circles that central bank intervention in spot foreign exchange markets is driven by the desire to smooth out exchange rate fluctuations (as a recent survey by the BIS makes clear: see **Box 2**), it may be the case that at least part of the reserve variation is due to precautionary motives; in that case, only a share of the P&L computed in **Table 3.3** should be attributed to intervention.

Moreover, inasmuch as reserves do not need to be held in short, low-yielding liquid assets, the carrying cost could be further reduced. Hence, the cost of central bank intervention, while nontrivial, has been less steep than conventional wisdom usually suggests. In turn, this is consistent with the view that exchange rate intervention in many EMs, particularly in LAC, has been preponderantly geared at smoothing volatility around the equilibrium real exchange rate, more than at targeting a pre-determined level of the exchange rate.

**TABLE 3.3. Cost of Central Bank Intervention for Selected Emerging Economies**

*Total 2005-2012, Percent of 2012 GDP*

Country	P&L/GDP	P&L	
		Carry/GDP	Valuation/GDP
Argentina	-0.4%	-2.9%	2.5%
Brazil	-1.6%	-5.3%	3.6%
Chile	-1.2%	-1.6%	0.3%
Colombia	-1.5%	-1.5%	0.0%
Mexico	-0.4%	-1.4%	1.0%
Peru	-3.3%	-3.0%	-0.3%
<b>LAC</b>	<b>-1.6%</b>	<b>-2.5%</b>	<b>0.9%</b>
Indonesia	-0.3%	-1.8%	1.5%
South Korea	-1.0%	-1.4%	0.5%
Malaysia	-1.1%	-2.3%	1.2%
Philippines	-3.7%	-3.3%	-0.4%
Thailand	-5.6%	-3.6%	-2.0%
<b>SEA</b>	<b>-2.3%</b>	<b>-2.5%</b>	<b>0.1%</b>
India	1.0%	-2.7%	3.7%
Israel	-3.0%	-1.9%	-1.1%
Russia	-2.1%	-6.7%	4.5%
South Africa	0.6%	-2.1%	2.7%
Turkey	-0.1%	-2.9%	2.8%
<b>Others</b>	<b>-0.7%</b>	<b>-3.3%</b>	<b>2.5%</b>

Source: Authors' estimates based on Bloomberg, IFS, GEM and The World Bank.

Also, since traditional intervention can be conducted not only by central banks but also by the Treasury or by decentralized public entities, even using derivative markets, a relevant policy question is how do intervention costs compare across alternative intervention vehicles.

Imagine, for example, a sovereign debt de-dollarization (a change in its currency composition, assuming for simplicity full roll over and a similar duration of issuances across currencies): the government issues local currency debt and uses the proceeds to purchase the dollars needed to reduce dollar debts.<sup>52</sup> What would be the cost of doing this relative to the benchmark case: rolling over the debt in the same currency?

The computation is similar to the exercise documented in **Table 3.3**, except that now the interest rate differential would be given by the yield on the foreign currency-denominated sovereign debt that the government would issue in the benchmark case, minus the interest rate it pays on the newly issued local currency debt. Given that the sovereign debt is typically longer and issued at a spread over the U.S. Treasury, the interest rate differential local currency-denominated and foreign currency-denominated debt of the same sovereign would tend to be smaller.<sup>53</sup>

Some studies have proposed to use the ‘profit test’ to assess whether interventions have exerted a stabilizing influence on the exchange rate, with the rationale being that if central bank intervention has been profitable, it must have ‘bought low and sold high’ (Becker and Sinclair, 2004). Naturally, the effectiveness of intervention cannot be entirely based on costs: profitability is not the same as effectiveness. More generally, the fact that intervention costs are not an overriding concern for policy makers does not imply that intervention is always convenient: at the very least, we need to show that it has the desired influence on the exchange rate.

A normative assessment of the optimal degree of intervention exceeds the scope of this report. But a positive question about its effectiveness is a good starting point: Can intervention depress the value of the currency? There is surprisingly little consensus about the capacity of intervention to fend off appreciation pressures; on the other hand, policymakers seem to prefer intervention to benign neglect, despite the skepticism often voiced in academic and policy circles.

Quantifying this effect is not simple, because it entails not only a good account of other factors that may be pressing on both the exchange rate and the level of reserves but also an accurate measure of intervention itself. Intervention data is scarce and often substituted for reserve changes, which may occur for reasons arguably unrelated to central bank intervention, including the accrual of interest, the liquidation of foreign currency receipt by public companies, or the rebuilding or reduction of the reserve buffer driven by prudential considerations.<sup>54</sup> And many alternative or complementary

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<sup>52</sup> The same would be the case for a debt swap (issuing local currency debt to buy back foreign currency obligations of the same tenor) and for cross-currency swaps (exchanging a cash flow in a foreign currency for a cash flow in the local currency), although in both case the Treasury may face budgetary limits.

<sup>53</sup> Note that, in the case of central bank intervention, the differential conflates currency risk as well as credit risk (reserves are by definition less risky than the sterilization bonds), whereas in the case of sovereign debt credit risk is the same for both currencies and only currency risk remains. The cost associated with other combinations would depend on the tenor of the debt instrument involved: for example, the cost of issuing local currency debt to purchase foreign currency assets for a sovereign wealth fund would be equal to the interest rate differential born by the central bank, albeit for longer maturities.

<sup>54</sup> Adler and Tovar (2011) highlight this point, but document that differences between changes in reserves and actual intervention at lower-than-weekly frequencies tend to be minor at uncorrelated with exchange rate changes. In turn,

vehicles of intervention described above (changes in the currency composition of government debt or in the local interest rate, or intervention in futures markets) are difficult to trace systematically and often left aside in empirical tests.

Moreover, interventions usually take place when the exchange rate is moving or expected to move in the opposite direction to the expected effect of the intervention. This ‘endogeneity’ problem usually results in intervention showing with the *wrong* sign in exchange rate regression equations, with purchases (sales) of dollars associated with an appreciation (depreciation) of the local currency, and no simple way to estimate the counterfactual exchange rate under no intervention. Hence, the growing use of event studies to identify the high frequency impact on intervention (see **Box 1**).

To filter out the prudential motive for intervention and minimize the endogeneity bias, Levy Yeyati and Sturzenegger (2010) proposed to use, as a “strict” proxy for intervention, the change in the reserves-to-M2 ratio (where reserves are computed as the central bank’s net foreign asset position excluding gold). In turn, a natural approach would be to model the variation of the REER, controlled for deviations from its long-run fundamental value and for short-run drivers as we did in the exercise presented in **Table 3.1**, augmented with a proxy of central bank intervention as defined above.<sup>55</sup> This is done by Daude et al. (2013) for a group of selected emerging and advanced economies. They start from a long-run function of the REER on the same set of fundamentals used in **Table 3.1** above to compute the deviation of the REER from its equilibrium level, which in turn they use along with changes in fundamentals in an error correction equation that also includes intervention. Finally, to correct for the endogeneity bias (the fact that intervention may respond to changes in the exchange rate as much as the other way around), the authors instrument intervention with the change in the M2-to-GDP ratio. Their results are replicated in **Table 3.4**: intervention is significant and has the expected sign: dollar purchases are positively correlated with exchange rate depreciations, and vice versa. Instrumenting intervention strengthens the link, as expected.<sup>56</sup>

What about the effectiveness of “sand-in-the-wheel” options? The one that best fits the macro prudential mandate—and the only one endorsed by mainstream economists and the IMF—is the tax-based control on capital inflows of the type introduced in several Latin America countries in the mid-1990s. This modality usually takes the form of an unremunerated reserves requirement (URR) on capital inflows, and is virtually identical to a Tobin tax—so much so that back in the 1990s, the Chilean and Colombian authorities offered the option of an upfront payment tax in lieu of the URR to those investors with a stronger preference for liquidity.

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Obstfeld, Shambaugh and Taylor (2010) argue that prudential reserves tend to move together (ultimately, to cover) broad money aggregates such as M2 to avoid double bank and currency runs. Note that an appreciation can cause the central bank to build reserves if the latter are held for precautionary motives, as a stronger currency “deteriorates” the reserve-to-money coverage ratio because of valuation changes. The change in the reserve-to-M2 ratio used as a proxy for intervention below mitigates this potential bias.

<sup>55</sup> As noted, the specification is leaving aside other policy measures that may affect the exchange rate: while some of them (changes in reserve requirements, capital controls) have a low frequency that is unlikely to alter significantly the results of the test, the omission of intervention in derivative markets or through interest rates may bias somewhat the results.

<sup>56</sup> Because the equilibrium exchange rate is difficult to pin down and is often a moving target, leaning against the wind intervention is usually aimed at slowing down the speed of exchange rate adjustment, as documented by Adler and Tovar (2011) for EM, or Newman et al. (2011) for Australia.



**TABLE 3.4. Effectiveness of Central Bank Intervention**

Variables	(1) Log REER	(2) Log REER
Lagged gap wrt to equilibrium REER	-0.030 (4.02)***	-0.023 (2.94)***
Delta NFA	0.095 (0.70)	0.085 (0.61)
Delta Openness (logs)	-0.513 (6.41)***	-0.456 (6.45)***
Delta Government consumption (logs)	0.048 (2.96)***	0.038 (1.94)*
Delta Productivity (logs)	-0.193 (8.25)***	-0.193 (8.11)***
Lagged dep. variable	0.133 (3.48)***	0.151 (3.78)***
Delta VIX	-0.000 (2.81)**	-0.000 (2.51)**
Interest rate differential	-0.000 (0.72)	-0.000 (0.86)
<b>(R/M2)(t) - (R/M2)(t-1)</b>	<b>-0.073</b> <b>(2.83)**</b>	
<b>(R/M2)(t) - (R/M2)(t-1) instrumented</b>		<b>-0.387</b> <b>(2.75)**</b>
Constant	0.001 (2.92)***	0.001 (3.64)***
R-sq Within	0.22	0.25
Number of observations	1,027	1,027

*Notes: REER stands for the real effective exchange rate instrumented with the log change in the M2-to-GDP ratio. Delta stands for changes in the variables. Panel regressions, clustered standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Source: Daude et al*

### Box 1. Effectiveness of Exchange Rate Intervention

The economic literature has identified two main channels through which sterilized interventions can exert this influence: the portfolio and the signaling channel. A recent set of studies coordinated by the BIS based on very detailed, high-frequency data tries to address the specific channel through which intervention is expected to work on the determination of the exchange rate in Latin American economies. The table below summarizes their results.

TABLE B.1. Effectiveness of Central Bank Intervention in LAC: A Review

	What	How	Findings
<b>Lahura y Vega (2013)</b>	Is the effect of intervention asymmetric?	Based on confidential intraday (minute by minute) data for Peru (2009-2011). Two <i>event-style regressions</i> , they estimate purchases and sales regressions separately, where changes in the exchange rate are explained by intervention, a dummy for a 1 hour interval after intervention and an autoregressive term (alternatively, by intervention normalized by daily interbank turnover).	Intervention is more effective in reducing rather than raising the exchange rate in line with previous work.
<b>García-Verdú y Zerecero (2013)</b>	Is intervention effective in providing liquidity to the forex market?	<i>Event-style</i> approach, focused on <i>bid-ask spreads</i> as a liquidity measure. Using Mexican intraday data they regress the spread on an intervention dummy, plus a set of controls.	Intervention reduces the exchange rate <i>bid-ask spread</i> .
<b>Echavarría et al (2013)</b>	Are preannounced interventions rules more effective than <i>dirty</i> ones?	A Tobit-GARCH reaction function and daily data for Colombia (2004-2012).	Intervention rules in daily USD 20M purchases (2008-12) were more effective than dirty purchases between 2004 and 2007.
<b>Pincheira (2013)</b>	Does intervention affect inflation expectations (signaling channel)?	Inflation expectation surveys by the Bank of Chile around two preannounced interventions by the Bank of Chile (2008 and 2011).	Brief impact from the 2008 intervention; no impact from the 2011 intervention (despite significant impact on exchange rate returns).
<b>Kohlscheen (2013)</b>	Is sterilized intervention effective?	Daily dealer ask flows and exchange rate intervention data (2002-2011). Model of exchange rate variations on flows and addition macro variables, estimated for days with and without official intervention in the spot market.	The effect of dollar sales by (mainly non-financial, trade-related) end users are larger on days with no official intervention.

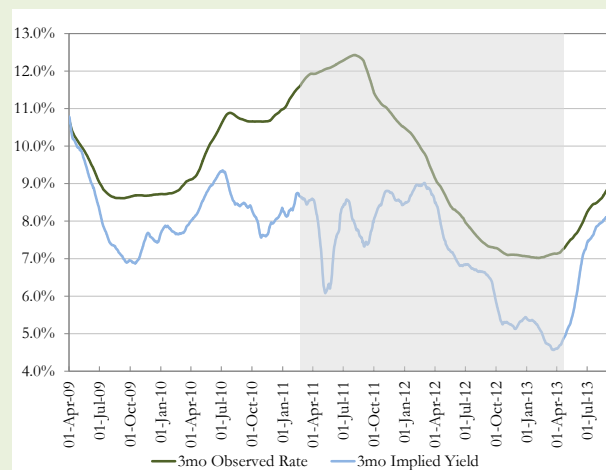
This back-of-the-envelope calculation of the impact of capital controls on the carry perceived by speculative investors can be readily replicated for the more recent case of Brazil's Tobin tax (**Figure 3.4A**). The introduction of a 3 percent IOF (subsequently widened to 6 percent), coupled with capital inflows and appreciation pressures, created a difference between the implied yield (the carry perceived by the investor) and the interest rate differential of about the same amount, which tended to narrow once the exchange rate pressure reverted (ultimately leading to the elimination of the tax).

A similar pattern can be observed in Turkey, where the "tax" adopted a different form: a higher reserve requirement that widened the difference between the deposit rate (which, under covered interest rate parity, determines the forward discount) and the lending rate that transmits monetary policy (**Figure 3.4B**). Again, the wedge between the carry and the interest rate differential widened when appreciation pressures mounted and narrowed once capital flows reversed.

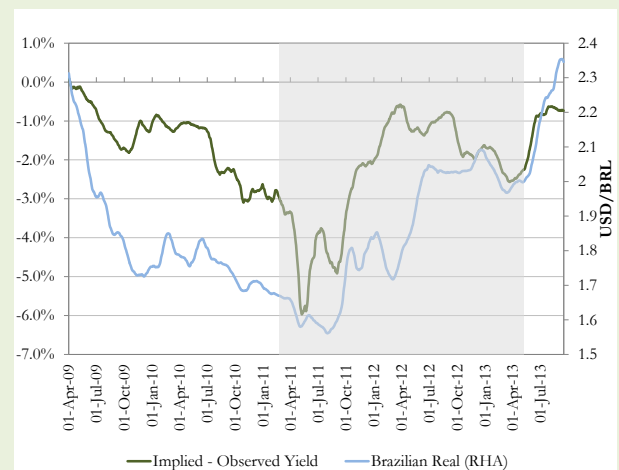
Are tax-based controls effective? To the extent that they impose a toll on traffic in and out of domestic markets, they are. But, as in the case of traditional intervention, their impact is small if they are administered in small doses. For example, a 3 percent tax should result in a cut in the value of local assets (including the local currency) of approximately 3 percent, depending on the effect of the measure on expectations of higher taxes or additional measures to come.<sup>57</sup>

**FIGURE 3.4A. Brazil: Impact of Tobin Tax on Capital Inflows**

**PANEL A. Implied vs. Observed Yield**



**PANEL B. Yields Differential and Exchange Rate**



Notes: Implied Yield is the 3month rate implied from Non-Deliverable Forwards contracts between the US dollar and the Brazilian Real. Shaded area represents the period of the Financial Transaction Tax (IOF). All variables have been smoothed with a one month moving average. Sources: Bloomberg.

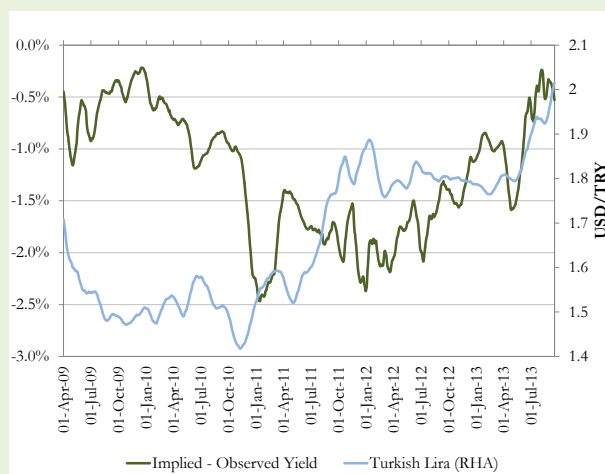
<sup>57</sup> The literature also points to the benign composition effect of tax-based controls (the lengthening of cross-border transactions). To the extent that it lowers flow volatility; this should have positive prudential implications. However, part of this lengthening may come from financial engineering making up short-term movements into longer contracts.

**FIGURE 3.4B. Turkey: Impact of an Increase in Reserve Requirements**

**PANEL A. Implied vs. Observed Yield**



**PANEL B. Yields Differential and Exchange Rate**



Notes: Implied Yield is the 3month rate implied from Non-Deliverable Forwards contracts between the US dollar and the Turkish Lira. All variables have been smoothed with a one month moving average. Sources: Bloomberg.

## Box 2. Exchange Rate Policy from the Perspective of Central Banks

Thus far the discussion in the report has stressed the point that exchange rate policy today has a “leaning against the wind” nature. That is, we argue that policy makers in developed and developing countries alike intervene in exchange rate markets in order to control for short-term fluctuations around equilibrium exchange rates rather than pursuing a specific target to gain competitiveness.

Is this view consistent with the objectives of central bankers? A series of recent surveys by the Bank of International Settlements (BIS) and another survey by the World Bank explores this question. The first BIS survey was conducted in 2005, prior to the 2008 global financial crisis, and includes a sample of 19 countries, seven of which are from LAC. The second BIS survey and the WB survey were carried in the 2012-2013 period, and between the two they include 20 countries, 8 from LAC.

A look at the responses from these three surveys provides some important insights. First, curbing excessive exchange rate speculation, the most important objective in 2005 according to the BIS survey, continues to be, and increasingly so, the most important motive for exchange rate intervention (**Table B.2.1**). The rise in the number of countries between 2005 and 2012-13 with concerns about exchange rate speculation and, as will be discussed below; its implication for exchange rate volatility is probably associated with the large swings in capital flows and the fickleness of capital markets which have characterized the post-Lehman world. Importantly, exchange rate intervention appears to be more associated with managing the adverse effects of capital inflows on the exchange rate and on monetary stability, and less to motives such as enhancing the competitiveness of the currency.

The previous conclusion is also evident when looking at the intermediate objectives of interventions. By and large countries in the sample intervene to 1) limit the volatility of the exchange rate, 2) limit pressures arising from capital inflows, and 3) smooth the trend of the exchange rate towards its new

**Table B.2.1. Motives of Intervention**

	Importance in 2005			Importance in 2012-2013		
	High	Moderate	Low	High	Moderate	Low
1. Curb excessive speculation	42%	21%	0%	60%	20%	0%
2. Maintain monetary stability	36%	11%	11%	55%	10%	10%
3. Discourage sharp capital flows	21%	16%	5%	30%	25%	5%
4. Build Reserves	36%	0%	11%	30%	10%	10%
5. Smooth the impact of commodity price movements	16%	5%	16%	20%	5%	15%
6. Maintain or enhance competitiveness	11%	11%	16%	25%	5%	15%

*Note: The results are based on two BIS surveys, one conducted in 2005 and one conducted in 2013, and one WB survey conducted in 2013. Respondents in these three surveys include: Argentina, Brazil, Chile, Colombia, Czech Republic, Hungary, Hong Kong SAR, Korea, India, Indonesia, Malaysia, Mexico, New Zealand, Peru, Philippines, Poland, Singapore, South Africa, Thailand, Turkey, Uruguay, and Venezuela.*

level (**Table B.2.2**). As was argued above, the post-Lehman period has been characterized by an increasing concern of Central Banks of the adverse effects of excessive exchange rate volatility. As a reflection of the little weight put on mercantilist objectives by countries in the survey, a very small share of countries report influencing the exchange rate level as one of their intermediate objectives.

While the evidence provided in these surveys suggests concern from central banks to dampen excess exchange rate volatility, this alone does not warrant intervention. As is argued earlier in this chapter, high costs or low effectiveness may discourage intervention by central banks.

The survey conducted by the BIS shows that central banks regard exchange rate interventions as very effective. Over 70 percent of respondents reported that intervention was successful in achieving the exchange rate objective, and 20 percent reported that they were partly successful. Interestingly, the perception of exchange rate effectiveness is very stable in the 2005-2012 period

A final question one could ask is how do central banks' balance the use of different policy instruments to achieve the exchange rate objective. The survey carried out by the BIS in 2013 and the WB in 2013 shows that market-based interventions are by and large the primary tool used by central banks to affect the exchange rate. Of this tools, most central banks (91% of the sample) report using purchases and sales of foreign currency in the spot market regularly, with the rest using

**Table B.2.2. Immediate Objectives**

	2005	2012
1. Influence the level of the exchange rate	21%	20%
2. Smooth the path of the exchange rate	36%	35%
3. Limit Volatility	57%	60%
4. Limit pressures arising from capital flows	42%	45%
5. Provide liquidity to thin exchange rate market	10%	20%

*Note: The results are based on two BIS surveys, one conducted in 2005 and one conducted in 2012, and one WB survey conducted in 2013. Respondents in these three surveys include: Argentina, Brazil, Chile, Colombia, Czech Republic, Hungary, Hong Kong SAR, Rep. of Korea, India, Indonesia, Malaysia, Mexico, New Zealand, Peru, Philippines, Poland, Singapore, South Africa, Thailand, Turkey, Uruguay, and Venezuela.*

this tool occasionally (**Table B.2.3**). Other market-based interventions, such as interventions in the forwards markets and the use of derivatives, are only used by around half of the central in the survey, perhaps as a reflection of the poor depth and sophistication of the financial markets in many countries in the sample. Finally, some central banks use additional tools to complement market-based operation, but at least in the sample, these are a small fraction of the total.

Overall, the evidence presented in these surveys show that i) the “leaning against the wind” motive for exchange rate intervention seems to be the most prevalent among EMs, and ii) exchange rate interventions are deemed as an effective tool to cope with excessive volatility.

**Table B.2.3. Intervention Tools**

	Regularly	Occasionally
<b>Market-based interventions</b>		
1. Direct or indirect intervention in spot markets	91%	9%
2. Intervention in forward markets	9%	36%
3. Use of derivatives	14%	32%
<b>Other interventions</b>		
4. Capital Controls	12%	18%

*Note: The results are based on a 2013 BIS survey and a WB survey conducted in 2013. Respondents in these three surveys include: Argentina, Brazil, Chile, Colombia, Czech Republic, Hungary, Hong Kong SAR, Rep. of Korea, India, Indonesia, Malaysia, Mexico, New Zealand, Peru, Philippines, Poland, Singapore, South Africa, Thailand, Turkey, Uruguay, and Venezuela.*

## *Final Thoughts*

Based on exchange rate policy in the emerging world in recent years the key question appears to be not so much whether the currency could be depressed as a substitute for international competitiveness (the mercantilist, developmental view) nor whether the exchange rate is currently misaligned (far from where the market would take it under a textbook float) but rather how to filter short-term fluctuations caused by the cyclical move of its fundamentals as well as temporary financial shocks and market overshootings. LAC is not the exception. The region has moved from a situation where exchange rate intervention was geared towards defending (sometimes unsustainable) pegs, to one where policy makers intervene to smooth fluctuations around fundamentals.

This is easier said than done. While it is intuitive to see that the interest rate cycle in the U.S. as a transient influence to counter, other factors (for example, Chinese growth or the evolution of the demand from biodiesels and ethanol that affects the price of a few key commodities) are more difficult to fathom. Also, the REER is a multilateral relative price: by definition, any deviation will depend on other countries’ performance –hence, the benefits of multilateral coordination. Finally, there is difficulty faced by policy makers to identify movements away from equilibrium and shift in the equilibrium relation. At any rate, in practice, exchange rate policy is bound to be cautious and exploratory, but warranted by the undeniable distortions in investment and exporting decisions, and the inherent costs for long-term growth, generated by exchange rate volatility.

With those caveats in mind, the available evidence on exchange rate smoothing policies indicate that they have been an effective tool with low quasi-fiscal costs, to the extent that they are geared towards reducing excessive volatility and mitigating the influence of fast moving, mean reverting

global factors. In short, an essential part of the macroeconomic toolkit that may prove particularly useful now that the appreciation wave inverts.





## *Appendix 1. The Response of Mutual Funds to the Flow of News from the U.S. Federal Reserve*

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Over the past 30 years, there has been a generalized process of *two-way* financial globalization, intensified during the 2000s, that has deeply changed the financial landscape around the globe. At the core of this process has been a transition from mostly bank-based financial systems to more complete and interconnected ones, where capital markets have gained space, institutional investors (such as mutual and hedge funds, etc.) have played a more central role, and the number and sophistication of participants has increased.<sup>58</sup> In other words, while in the past banks directly interacted with borrowers and lenders through “relationship lending”, there are now several institutions participating in the process of the intermediation of savings and the allocation of credit through arm’s length transactions, involving many agents, such as financial analysts, financial advisors, asset managers, rating agencies, and underwriters.

An important characteristic of these increasingly important, highly sophisticated, financial agents is that, compared to banks, they have shorter investment horizon, making them more sensitive to news flows. For instance, mutual funds, both through the injections/rejections of the underlying investors as well as the allocation decisions of fund managers, are partly responsible for the large swing in capital flows observed in global capital markets in booming periods and in times of stress.<sup>59</sup>

How have mutual (bond) funds responded to the news regarding the normalization of monetary policy in the U.S.? To answer this question we analyze the evolution of (i) the flows into these funds by underlying investors around the Quantitative Easing (QE) announcements by the U.S. Federal Reserve Bank and (ii) international mutual fund portfolio weights in different regions and countries. This allows us to understand the managers’ behavior through their changes in portfolio weights and the underlying investors’ behavior through their injections to and redemptions from mutual funds. The data collected covers global bond funds (with investments in both developed and developing countries) and regional bond funds. For the latter, we focus on LAC regional funds and look at their behavior towards individual countries in the region. In particular, we identified five relevant QE announcements related to expansionary policies (two related to QE1, one to QE2, and two to QE3) and one reflecting contractionary policies (the withdrawal of the QEs) and look at the behavior of mutual funds around those dates.

We start by analyzing the behavior of the underlying investors. After pulling out of all funds (global, global emerging, and regional funds) during the turbulent times of the summer of 2008, investors started to inject money back into all funds once the QE was announced and markets stabilized around March 2009 (**Figure A.1**). Two things stand out from the injection/redemption patterns of underlying investors. First, injections/redemptions into global funds are much more stable than those to emerging market and regional funds. Second, there appears to be a larger elasticity of fund flows to contractionary news than to expansionary news. Against this backdrop, LAC regional funds

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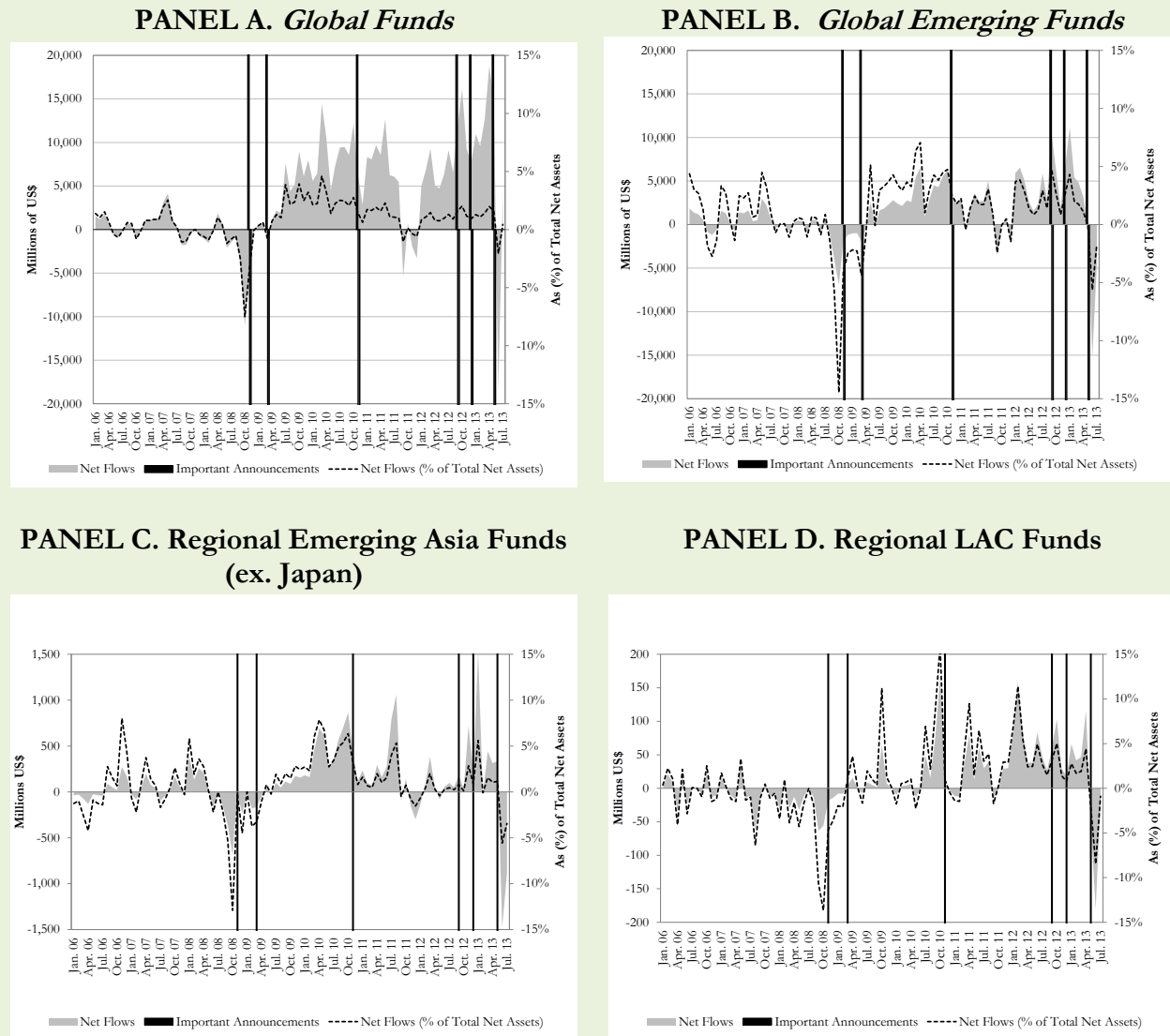
<sup>58</sup> See our 2011 Flagship Report “*Financial Development in Latin America: The Road Ahead.*”

<sup>59</sup> For instance, the April 2012 report in this series “LAC Copes with Volatility, the Dark Side of Globalization,” studies the behavior of mutual funds around the months of the Asian Crisis of 1998 and the global financial crisis of 2008.

appear to be much more sensitive to recent news flows than other funds. For instance, after Fed chairman Bernanke's tapering talk, redemptions from regional LAC regional suffered redemptions of approximately 10 percent of total net assets under administration. In contrast, global funds, global emerging funds, and regional emerging Asian funds suffered redemptions of 5 percent of total net assets or less.

Let's turn now to the analysis of the behavior of fund managers. We start by looking at the portfolio allocation decisions of fund managers in global bond funds, that is, funds that invest in advanced economies and emerging economies alike.

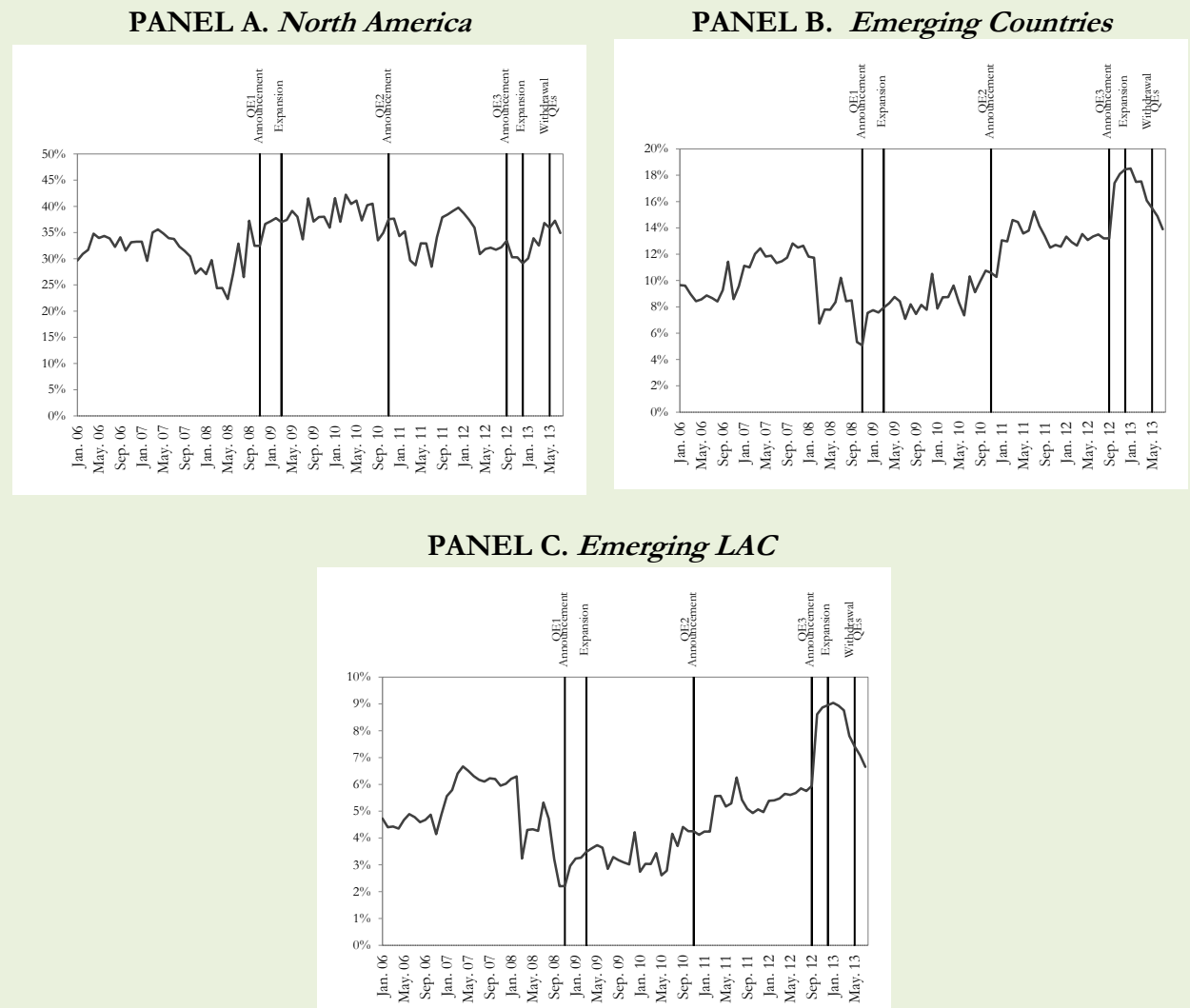
**FIGURE A.1. Investors' Injections and Redemptions in Mutual Funds**



Notes: Panels A and B show injections/redemptions towards different types of International Bond Funds for each point of time. Primary y-axis: Information presented in \$Mill. Secondary y-axis: Information presented in relative terms to the net assets in each type of fund by month (percentage points). The vertical bars indicate QE important announcements dates. In chronological order they represent: QE1 announcement (Nov. 2008), QE1 expansion (Mar. 2009), QE2 announcement (Nov. 2010), QE3 announcement (Sept. 2012), QE3 expansion (Dec. 2012), and QEs withdrawal (May. 2013). Sources: EPFR Global

The general picture emerging from this analysis is that fund managers tend to move towards emerging market bonds and pull out of the U.S. in the months around QE expansionary announcements, especially after the QE2 and QE3 announcements, while pulling out EMs and moving towards the US after contractionary announcements (**Figure A.2**). Notice, however, that managers started to move out of EMs around December 2012, a few months ahead of the actual announcement by the FOMC. Interestingly, the pattern of movements in the portfolio weights put to LAC bonds is very similar to that of other emerging markets- it increased drastically after the QE3 announcement, peaked around January 2013, and has fallen steadily since then.

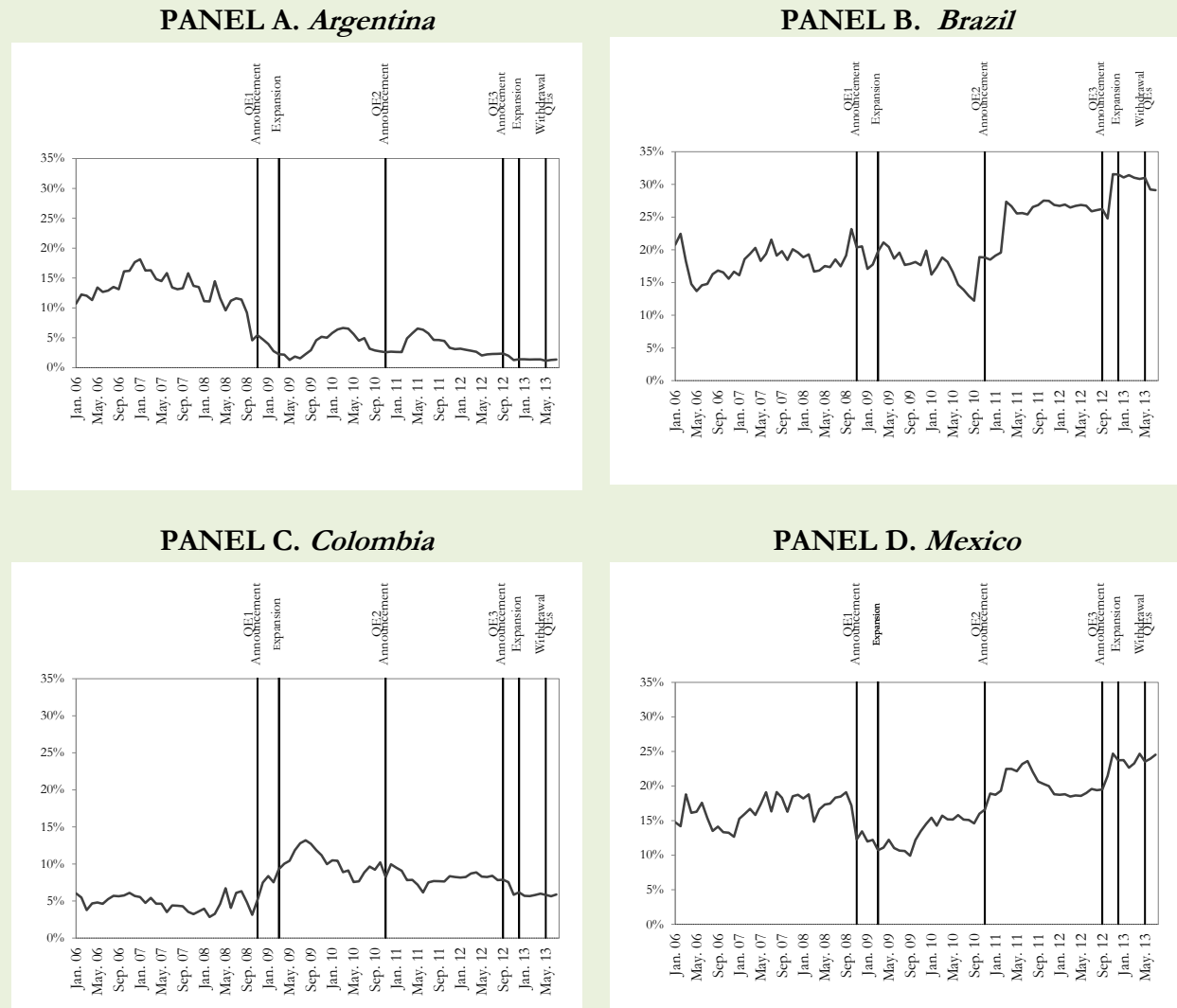
**FIGURE A.2. Average Portfolio Weights across Global Bond Funds**



Notes: This figure presents the evolution of portfolio weights invested in different regions (panels A, B, and C) by Global Mutual Bond Funds from January 2006 to July 2013. Regions are aggregated according to the EPFR Global classification. The vertical bars indicate QE important announcements dates. In chronological order they represent: QE1 announcement (Nov. 2008), QE1 expansion (Mar. 2009), QE2 announcement (Nov. 2010), QE3 announcement (Sept. 2012), QE3 expansion (Dec. 2012), and QEs withdrawal (May. 2013). Sources: EPFR Global

The rebalancing within LAC Regional funds suggests that Brazil and Mexico are the countries that benefitted the most from the QE expansionary announcements, while other countries like Argentina and Colombia display little sensitivity to these announcements (**Figure A.3**). To be sure, Colombia seemed to benefit around the QE1 announcement, but not around QE2 or Q3. Surprisingly, there is little rebalancing after the announcement of May 2013, with only a slight shift away from Brazilian bonds and towards Mexican bonds, a possible sign of the latter's close commercial ties with the US.

**FIGURE A.3. Average Portfolio Weights across Latin America Regional Funds**



Notes: Panels A and B show injections/redemptions towards different types of International Bond Funds for each point of time. Primary y-axis: Information presented in \$mill. Secondary y-axis: Information presented in relative terms to the net assets in each type of fund by month (percentage points). The vertical bars indicate QE important announcements dates. In chronological order they represent: QE1 announcement (Nov. 2008), QE1 expansion (Mar. 2009), QE2 announcement (Nov. 2010), QE3 announcement (Sept. 2012), QE3 expansion (Dec. 2012), and QEs withdrawal (May. 2013). Sources: EPFR Global.

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