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Booms and Busts in Latin America: The Role of External Factors

by

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Abstract: Focusing on the average behavior of the seven largest countries in Latin America (LAC7), we analyze the relevance of external factors in explaining the behavior of quarterly GDP growth for the period 1990-2006. Modeling the relationship between LAC7 GDP and G7 industrial production, terms of trade, US high yield bond spreads, and US T-bond rates as a restricted vector error correction model (VECM), we find that external factors account for a significant share of the variance of LAC7 GDP growth, and that external shocks exert significant responses in LAC7 GDP growth. We use the empirical model to assess recent growth performance in Latin America and evaluate the impact of deterioration in external financial conditions of the kind the region experienced often in the past. Finally, and perhaps most importantly, we stress the relevance of our findings for policy evaluation analysis. Growth performance, the strength or weakness of macroeconomic fundamentals and the impact of domestic macro and micro policies on growth, can only be properly appraised by first filtering out the effects of external factors. Failing to do so can lead to highly misleading conclusions.

JEL Classification: F31, F32, F34, F41

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I. Introduction and Motivation

Back in the early 1990s external capital flows started to flow back to Latin America after the drought that followed the debt crisis of the 1980s. In most countries this renewal of capital inflows was associated with booming asset markets, real exchange appreciation, booming investment and strong growth performance. This phenomenon was largely attributed, both by the international community and policy makers alike, to the wave of fundamental reforms the region was undertaking, namely, trade liberalization, privatization, deregulation of domestic markets and the restructuring of external debt.

In the midst of the euphoria of the early 1990s along came the seminal paper by Calvo, Leiderman and Reinhart (1993) who called attention to the fact that although the region was engaging in a substantial reform process, capital was flowing to most Latin American countries despite wide differences in macroeconomic policies and economic performance across countries in the region. Their main argument was that domestic reforms alone could not possibly explain the renewal of capital inflows to the region, suggesting that external factors, a common shock to the whole region, were also playing a large role. At the time, they argued that falling US interest rates, a continuing recession and balance of payments developments in the US encouraged investors to seek better investment opportunities abroad and that "the present episode may well represent an additional case of financial shocks in the center affecting the periphery, an idea stressed by Diaz-Alejandro (1983, 1984)."

Using a sample of ten Latin American countries, the empirical estimates of Calvo, Leiderman and Reinhart (1993) concluded that external factors accounted for a sizable fraction of the behavior of capital inflows to the region in the early 1990s, to the tune of 50 percent.[1] A key concern in that study was that external factors could deteriorate just as easily as they had improved during the bonanza, with potentially dire consequences for the region.

A lot of water has gone under the bridge since that seminal paper was written. The roller coaster ride that followed is illustrated in Figure 1, which depicts capital flows to Latin America and the associated growth cycles. The Tequila crisis in 1995, and most importantly for Latin America, the Russian crisis of 1998 and the resulting collapse in capital inflows to the region with dire economic consequences—vividly reported in Calvo and Talvi (2006)—support the premonitory concerns raised by Calvo, Leiderman and Reinhart (1993). The drought in capital inflows to the region following the Russian crisis lasted until the end of 2002. Since then, external capital has returned to the region with a vengeance due to abundant international liquidity and a dramatic rise in commodity prices. The emergence of Asia and particularly China as a global player has dramatically changed the landscape for commodity and financial markets, in the latter case through the export of financial savings, in the former through a sharp increase in the demand for primary products. Not surprisingly, Latin American economies have since then been experiencing a new phase of booming asset prices, appreciating real exchange rates, booming investment and strong growth performance. Déjà vu all over again?

Fourteen years later it is time for a fresh look at Calvo, Leiderman and Reinhart's (1993) work.[2] The first aim of this paper is to expand their work in several directions, but also to answer new questions that emerge from our own analysis and the availability of a wealth of new

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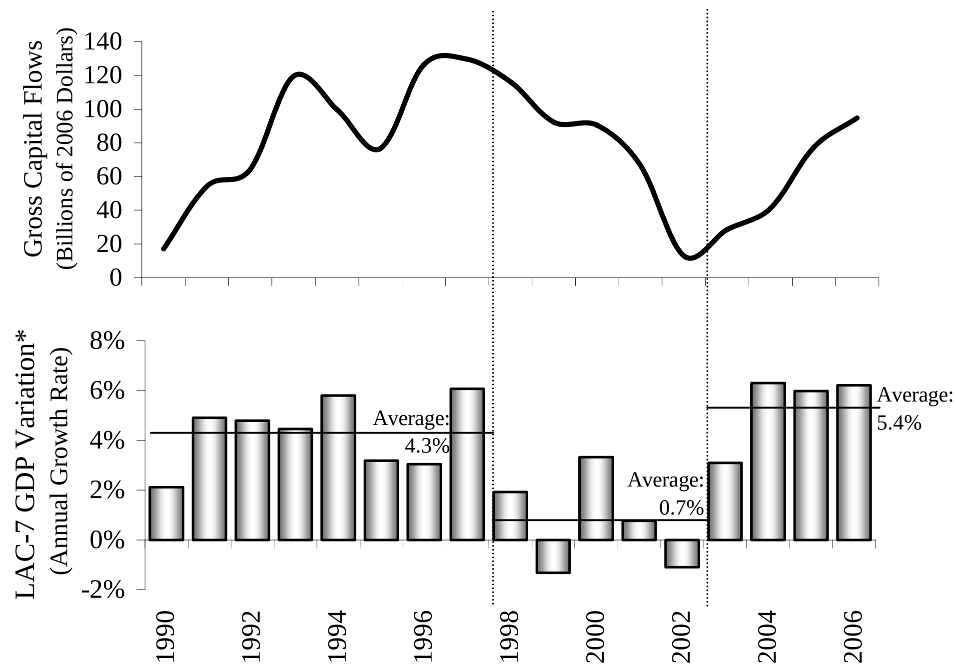
[1] External factors also accounted for approximately 50 percent of the behavior of the real exchange rate in the early 1990s.

[2] Of course, the literature has focused on the effects of external variables on growth (see for example, Calvo and Reinhart (2000), Canova (2005)), although few attempts have been made to tackle jointly the impact of external financial conditions, terms-of-trade shocks, and G7 industrial production growth, except for Österholm and Zettelmeyer (2007).

information. First, and most obviously, we expand on the sample period, now extending from 1991 to 2006. Second, rather than attempting to account for the role of external factors on the behavior of capital inflows, we analyze the relevance of external factors directly on the behavior of output performance, which is the ultimate variable of interest.

Figure 1. Gross Capital Flows and Economic Performance in Latin America



* LAC-7 includes Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which account for 93% of Latin America's GDP

Third, we extend the menu of external factors to incorporate new developments in financial and commodity markets. To begin with, we incorporate the vast development of a large international emerging bond market since the early 1990s into our analysis. Emerging market bond spreads (commonly referred to as EMBI spreads)[3] allow us to directly observe

[3] The Emerging Market Bond Index (EMBI) is compiled by JP Morgan.

variations in the market price of risky assets, which was not possible when most of the lending to Latin America was channeled through commercial banks. In fact, risky assets can move independently of movements in US Treasury rates. There are many recent examples of sharp changes in emerging market bond spreads (the Russian crisis being the most salient one) that occurred in the absence of major movements in US rates. As a matter of fact, the correlation between emerging market bond spreads and the US T-bond rate was 0.7 by end-1994 but then fell to –0.4 by end-2000.

Another important difference with respect to the early 1990s has been the sharp movements in terms of trade. As suggested by Calvo, Reinhart and Leiderman (1993), terms of trade in Latin America did not play major role in the early 1990s. This contrasts considerably with the 10 percent drop in terms of trade following the 1997 Asian crisis and the current surge between the first quarter of 2002 and the third quarter of 2006, when terms of trade increased by almost 50 percent. This led us to include terms of trade in our menu of external factors.

From a modeling perspective, this paper differs for Calvo, Leiderman and Reinhart (1993) in the empirical methodology. Rather that estimating a VAR for each individual country, we estimated a restricted Vector Error Correction Model (VECM) for an index that captures the behavior of output for the typical Latin American country.

Our analysis and new approach let us tackle issues that were not raised previously by Calvo, Leiderman and Reinhart (1993), and that are clearly reflected in our second goal, which is to use the empirical findings of this paper, that clearly suggest that the region is still heavily exposed to external factors, to bring to the forefront the relevance of incorporating external factors in policy evaluation analysis of Latin America, namely, in assessing the region's growth performance, the strength or weakness of its economic fundamentals and the impact of macro and structural reforms on growth. In particular, our empirical framework lets us perform counterfactual exercises highlighting the fact that output dynamics could have been much different from observed outcomes, both at the time of the bust originated by the Russian crisis of 1998, as well as during the current boom, had external conditions remained within the dynamics implied by the empirical model.

The rest of the paper is organized as follows. In section II we present the empirical model, estimation results and impulse-response functions. Our results confirm that external factors play a key role in explaining business fluctuations in Latin America and that changes in the external environment can lead to large changes in economic performance. In Section III we put the model to work to assess the recent performance of Latin America, including the collapse of 1998-2002 and the current strong expansion, 2003-2006. We also use our empirical model to assess the risks to the region posed by the possibility of an episode of global financial turmoil resulting in a large re-pricing of risk. Finally, Section IV concludes with the implications of our findings for policy evaluation analysis.

II. The Empirical Model

A. Estimation Strategy and Methods

In order to assess the role of external factors on Latin American growth we depart from a vector error-correction specification linking average Latin American GDP growth (henceforth LAC7 GDP growth) to a set of external variables. We use a GDP index that is a simple average of indices corresponding to the seven biggest Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) that comprise 93 percent of Latin American GDP. We decided on a simple average instead of a weighted average to avoid overrepresentation of bigger countries, given that our goal is to assess performance for the average country in Latin America.

The set of external variables includes proxies for changes in external demand, terms of trade, and international financial conditions as follows:

$$\Delta y_t = c + \alpha\beta' y_{t-1} + \Gamma\Delta y_{t-1} + ... + \Gamma_{p-1}\Delta y_{t-p+1} + \varepsilon_t \quad (1)$$

$$y_t = (\ gdp\_lat_t \quad ip\_x_t \quad tot\_lat_t \quad financ\_x_t \quad risk_t\ )' ,$$

where *gdp_lat* represents (the log of) LAC7 GDP, *ip_x* is (the log of) an index of average industrial production in G7 countries, *tot_lat* is (the log of) an index of regional terms of trade, *finance_x* is the return on 10-year US T-bonds, and *risk* is the spread on high yield bonds over US T-bonds—a variable that is tightly linked to emerging market bond spreads (EMBI) but that is definitely more likely to be exogenous to Latin American GDP than EMBI. In this specification, matrix α contains error-correction-adjustment coefficients, matrix $\beta' y_{t-1}$ contains error correction terms, matrices Γ_j contain short-run-dynamics coefficients, and ε_t is a vector of reduced-form shocks. Definitions of variables and information sources are described in detail in the Data Appendix.

We include the latter two measures of financial conditions because evidence suggests that, although behavior of US T-bond returns may have been key in explaining capital flow behavior in the early 1990s, emerging market bond spreads acquired “a life of their own” when they skyrocketed during the Russian crisis of 1998, signaling a change in risk perceptions by investors towards emerging markets that were not triggered by changes in US T-bond rates or rates in other central economies.

In such a setting, changes in each of the variables in y_t depend on previous changes on *all* variables in the model, as well as on previous-period deviations from any cointegrating relation there may exist. This specification allows for the inclusion of non-stationary I(1) variables, that under cointegration, will render model (1) stationary, as there will exist linear combinations of y_{t-1} that are stationary—and changes in I(1) variables are stationary by definition.

However, as it stands, this specification allows for potential endogeneity between LAC7 GDP and external variables, something that should be ruled out given that it is highly unlikely that LAC7 GDP will have an impact on external variables such as US interest rates. Therefore, estimation will involve imposing restrictions on the parameters of the model along two dimensions: 1) lagged changes in LAC7 GDP are not allowed to affect external variables—although lagged changes in LAC7 GDP can affect current changes in GDP; 2) error correction terms are absorbed only by LAC7 GDP. The latter restriction is imposed to rule out cases in which GDP deviations from its long-run relationship with external variables ends up having an impact on external variables. This is equivalent to restricting matrices α and Γ_j to be of the form:[4]

$$\alpha^* = \begin{pmatrix} \alpha_1 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}, \ \Gamma_j^* = \begin{pmatrix} \Gamma_{j,1,1} & \Gamma_{j,1,2} & \Gamma_{j,1,3} & \Gamma_{j,1,4} & \Gamma_{j,1,5} \\ 0 & \Gamma_{j,2,2} & \Gamma_{j,2,3} & \Gamma_{j,2,4} & \Gamma_{j,2,5} \\ 0 & \Gamma_{j,3,2} & \Gamma_{j,3,3} & \Gamma_{j,3,4} & \Gamma_{j,3,5} \\ 0 & \Gamma_{j,4,2} & \Gamma_{j,4,3} & \Gamma_{j,4,4} & \Gamma_{j,4,5} \\ 0 & \Gamma_{j,5,2} & \Gamma_{j,5,3} & \Gamma_{j,5,4} & \Gamma_{j,5,5} \end{pmatrix} \quad (2)$$

so that the model to be estimated becomes:

$$\Delta y_t = c + \alpha^* \beta' y_{t-1} + \Gamma^* \Delta y_{t-1} + ... + \Gamma^*_{p-1} \Delta y_{t-p+1} + \varepsilon_t \quad (3)$$

[4] This example corresponds to the particular case in which there exists only one cointegrating vector, but it could be readily extended to a more general case.

In practice, three issues need to be addressed before we can estimate model (3), namely, exploring the level of integration of the series, selecting the appropriate lag length for the VAR(p) process behind the model, as well as determining the existence (and quantity) of cointegrating relations.

We start by running unit root tests for each of the variables described in (1), both in levels and first differences. Results of augmented Dickey-Fuller (ADF) tests and Phillips-Perron (PP) tests are shown in Appendix Table 1, under different specifications regarding the inclusion of a constant and trend. The hypothesis of a unit root for each of the variables cannot be rejected at the 5 percent level for the sample at hand, whereas the hypotheses of a unit root in first differences is rejected at the same confidence level, rendering first differences stationary.

In terms of lag selection, we use standard optimal lag length tests, shown in Appendix Table 2, departing from a VAR in levels with five lags.[5] Most criteria, including those of Akaike, Hannan-Quin, as well as a likelihood ratio test suggest an optimal length of two lags. This implies the inclusion of one lag in the model in differences.

We use Johansen's full information maximum likelihood (FIML) method to test for the number of cointegrating relations between the five variables in the model. We report trace and maximum eigenvalue statistics in Appendix Table 3.[6] Both tests reject the hypothesis of no

[5] We choose this initial lag length given that our data is quarterly and we want to obtain a parsimonious representation.

[6] These tests assume that all variables have deterministic linear trends, and that the cointegrating relation has a constant but no trend. The specification of the model to be estimated below is consistent with these assumptions. Alternative assumptions including a trend in the cointegrating relation, or both quadratic trends in all variables and a trend in the cointegrating relation yield similar results for the maximum eigenvalue test. Results differ for the trace statistic. However, given the sharper alternative hypothesis of the maximum eigenvalue test, we keep results of this test for selection of the number of cointegrating relations.

cointegration, but do not reject the existence of one cointegrating relation at the 5 percent level. Given these results, estimation of model (3) is carried out assuming one cointegrating relation.

For computational simplicity reasons, given the difficulties involved in efficient estimation with restrictions in both loading coefficients and short-term parameters, we follow Lütkepohl (2004) in that we estimate cointegrating vector β in a first stage (including restrictions in α as indicated by α^*), and then proceed with estimation of system (3) in a second stage by feasible generalized least squares, imposing both exclusion restrictions as indicated by α^*, Γ^*_j and values for β obtained in the first stage.[7] Treating the first stage estimator of β as fixed in a second stage estimation can be justified on the grounds that convergence of cointegrating parameters is faster than that of short-term parameters.

B. Estimation Results

We estimate system (3) with information ranging from 1991:I to 2006:III. Given the optimal lag structure determined previously, estimates are obtained for the period ranging from 1991:III to 2006:III. We first describe results obtained in the first stage for the cointegrating vector, shown in Appendix Table 4. All coefficients display expected signs, indicating that increases in T-bond rates and in high yield spreads (a proxy for EMBI spreads) are associated with long-run falls in LAC7 GDP, while increases in terms of trade or in G7 output levels are associated with long-run increases in LAC7 GDP. All coefficients are significant at the 1 percent level (and high-yield spreads are significant at the 5 percent level). Second stage estimation results are displayed in Appendix Table 5. The loading factor accompanying changes in LAC7 GDP is negative and significant at the 1 percent level, indicating system stability, as

[7] First stage estimation of β is carried out via FIML.

LAC7 GDP deviations from its long-run relation with cointegrating companions are self-correcting. It is worth mentioning that this parsimonious representation including external factors and lagged growth explains 54% of the variance of LAC7 GDP growth in Latin America.

C. Impulse-Response Functions

In order to assess the performance of the model, we conduct impulse-response analysis to explore LAC7 GDP behavior to shocks in external variables. In order to identify structural shocks by Choleski decomposition of the variance-covariance matrix we need to specify a particular ordering of variables. A first ordering assuming that external real variables are largely predetermined relative to external financial variables leads to the following external ordering: G7 industrial production, terms of trade, US T-bond rates and High Yield spreads. This ordering is quite similar to that used in the literature for the identification of monetary policy reaction functions.[8] We also assume that LAC7 GDP can react contemporaneously to external variables. However, for robustness reasons, additional specifications described below test for other orderings, including scenarios in which LAC7 GDP does not react to external financial variables.

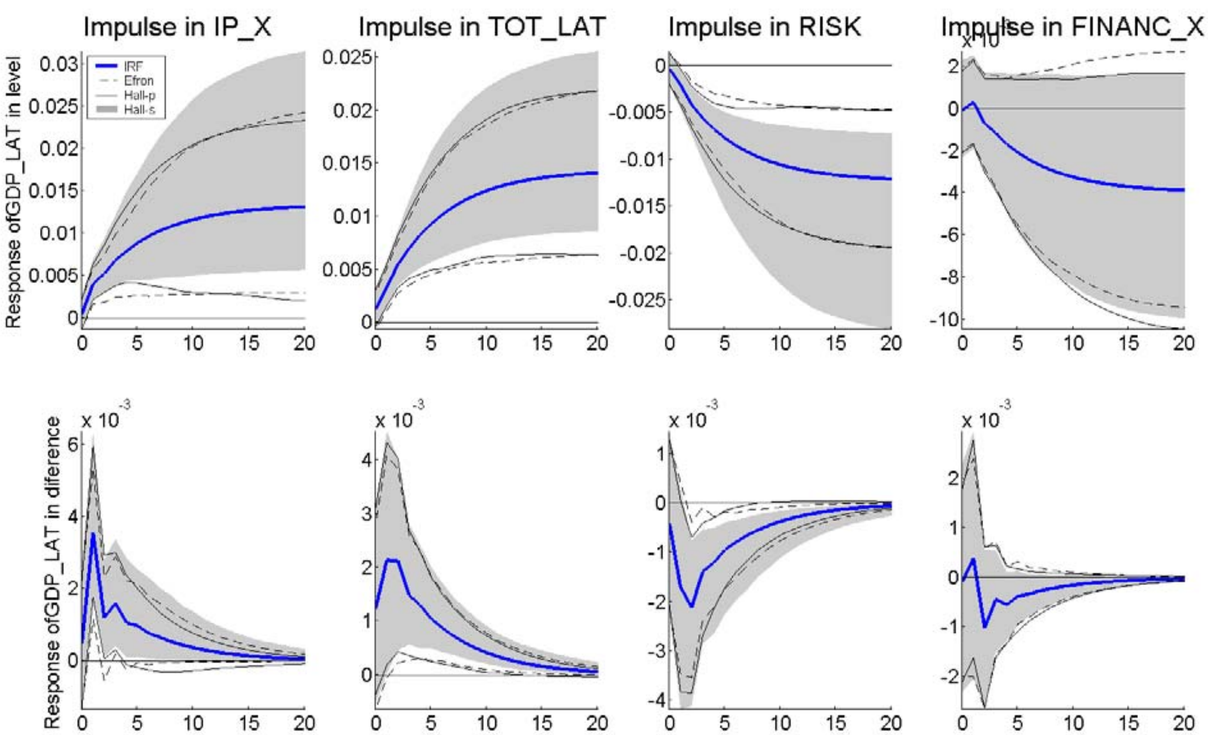
Given the high non-linearity of VEC impulse-response functions, and the fact that in small samples inference using asymptotic variances may not be very reliable, we opt for residual-based bootstrapping methods instead.[9] These methods basically consist of sampling centered residuals coming from the original estimation, which are used to compute bootstrap time series that, in turn, are employed to produce new estimates of model parameters. Iteration of this procedure (1000 replications for the standard case) produces a distribution of model parameters and their associated impulse-response functions that can be used to obtain confidence

[8] See, for example, Christiano et al (1999).
[9] See, for example, Kilian (1998).

intervals at any desired level of coverage. We display three measures for confidence intervals: the standard percentile (or Efron's) method, Hall's percentile method, and Hall's percentile-t method.[10] All measures are computed at the 5 percent confidence level.

Responses of LAC7 GDP to one standard deviation impulses in external variables are shown in Figure 2 both for levels (in logs) and LAC7 GDP growth rates (log changes). An element worth highlighting is the stability of the system, which converges in levels to particular values, while growth rates converge to zero. For this particular ordering, all responses are significant at the 5 percent level (irrespective of the confidence interval type chosen), except for responses to T-bond rates, which are significant at the 15% level when using studentized confidence intervals.

Figure 2- LAC7 GDP Responses to One-standard-deviation Shocks



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10 Hall's percentile-t method involves additional computation of the bootstrap variance of impulse responses; for this exercise, we make 100 additional replications within each bootstrap replication, bringing total replications to 100,000. See Hall (1992), and Lütkepohl (2004) for a description of these procedures.

Note: Responses in levels correspond to GDP logs. Responses in differences are quarterly and are not annualized.

As expected, positive shocks to G7 industrial production generate a positive response from LAC7 GDP. A one standard deviation shock to G7 industrial production (equivalent to an increase of about 0.6 percent on impact) leads to a short-run response in quarterly LAC7 GDP growth as high as 0.36 percent in the first quarter after the shock (i.e., for every 1 percent increase in G7 industrial production, there is a response in LAC7 GDP growth as high as 0.6 percent).[11] Notice that for all variables, convergence to steady state occurs roughly after twenty periods. For this reason, we also report differences between current GDP and the value this variable would have attained in the absence of a shock twenty periods after the original disturbance. For the case of an initial positive shock of one standard deviation in G7 industrial production, the difference between current LAC7 GDP and no-shock LAC7 GDP is close to 1.3 points of GDP after twenty quarters.

Similarly, a positive terms-of-trade shock of one standard deviation (an increase of almost 2 percentage points) generates an increase in quarterly LAC7 GDP growth as high as 0.21 percent in the second quarter following the shock (i.e., for every one-percent increase in terms of trade, there is an increase in quarterly LAC7 GDP growth as high as 0.11 percent).[12] Following a two-percent increase in terms of trade, the difference between current LAC7 GDP and no-shock LAC7 GDP is about 1.4 percentage points after twenty periods.

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[11] Growth rates are not annualized. For comparison purposes, quarterly steady state growth is roughly 0.8 percent.

[12] As described in the Data Appendix, we use a first-principal-component weighted average of (the logs of) terms of trade of LAC7 countries. Principal components are a weighted average of standardized series. In this case, series used to obtain the first principal component are the logs of each country's terms of trade. However, the resulting principal component is difficult to interpret in terms of percentage changes in terms of trade. For this reason, we perform appropriate re-weighting so that (excluding the impact of means used for standardization in the value of the principal component) the resulting series still has unit covariance with the original principal component, but can now be interpreted as a weighted average of the logs of each country's terms of trade, and, therefore, changes in this series can be interpreted as changes in (weighted) average terms of trade.

Likewise, a one-standard-deviation shock in high-yield spreads (61 basis points) leads to a change in short-run quarterly LAC7 GDP growth as low as -0.21 percent in the second quarter after the shock (i.e., for every 100 basis points in high-yield spreads there is a response in short-run quarterly LAC7 GDP growth as low as -0.36 percent). The difference between current LAC7 GDP and no-shock LAC GDP after twenty periods is of about –1.2 percentage points.

Finally, an increase in US T-bond rates of one standard deviation (36 basis points) causes a fall in quarterly LAC7 GDP growth of about 0.1 percent in the second quarter after the shock (or equivalently, for every 100bps increase in US T-bond rates there is a fall in quarterly LAC7 GDP growth of about 0.33 percent). This one-standard-deviation shock eventually builds into a difference of -0.4 percent between current LAC7 GDP and no-shock LAC7 GDP after twenty periods (however, as indicated earlier, this response is significant only at the 15 percent level).

Robustness exercises indicate that impulse-response results vary only slightly for different orderings of external variables. They are shown in Appendix Figures 1, 2, and 3. For these other orderings, practically all responses are significant at the 5 percent level, whether confidence intervals are computed by the percentile method, Hall’s percentile method, or the studentized method. Results for impulse responses to T-bond rates are now significant at the 5 percent level for orderings shown in Appendix Figures 1 and 2.

We also address the issue that average LAC7 GDP may display a lag in reacting to financial variables by changing the ordering of LAC7 GDP so that it stands in between real and financial variables. However, for this particular case we also need to restrict the variance-covariance matrix so that shocks to LAC7 GDP do not affect contemporaneously any of the financial variables. Results are shown in Appendix Figure 4, and they indicate that responses are not very different from those described previously.

III. Putting the Model to Work: Growth Performance and Global Financial Risks

Given the pivotal role played by external factors in accounting for business fluctuations in Latin America, we now use the model estimated in the previous section to raise relevant issues in the current policy debate in Latin America: the assessment of recent growth performance and the possible impact of global financial turmoil that results from a large re-pricing of risk.

A. Assessing Recent Performance in LAC: 1998-2006

Latin America has been experiencing exceptional rates of growth in the past 5 years, a record that can only be traced back to the early 1970s. Yet, there is a lot of speculation regarding the cause of this excellent performance. Typically, governments interpret this bonanza as an indication of the success of current policies. However, it could also be conjectured that the recent growth spurt may largely reflect the impact of very favorable external conditions. We use our estimated model to tackle this issue by comparing in-sample forecasted GDP levels with observed GDP levels for the period 2003-2006.

We pick this particular period because it reflects the external bonanza depicted by skyrocketing terms of trade (that increased by around 50 percent) and a dramatic fall in high yield spreads (330 basis points). We take as a benchmark a passive scenario where the dynamics of external variables for the period 2003-2006 are the forecasts implied by the model from the perspective of end-2002. These forecasts would have anticipated an improvement in external conditions, with higher terms of trade, lower spreads and US interest rates, albeit of a much smaller magnitude than the actual improvements in external conditions that took place during this interval.[13] Panel A of Figure 3 shows observed (log) LAC7 GDP levels (full line), along with the conditional forecast for GDP (dashed line) starting in the first quarter of 2003, together with its 90 percent confidence interval.[14] It can clearly be seen that observed LAC7 GDP performance stands above and outside the forecast interval, even though the forecast interval already relies on quite favorable external conditions. As a matter of fact, average observed LAC7 GDP growth between the fourth quarter of 2002 and the third quarter of 2006 stands at 5.6 percent per year, whereas average forecasted LAC7 GDP growth for the same period is 3.8 percent—a difference of almost 2 percentage points.[15] These results also suggest that the growth rate gap would have been even higher had external conditions remained closer to those prevailing at end-2002

Panel A of Figure 3 also includes the forecast for LAC7 GDP conditional on the *observed* values of external variables (the dotted line), together with a 90 percent confidence interval. This is useful in two dimensions. First, it shows that the model has relatively good predictive power in that actual LAC7 GDP always lies within the forecast interval. Second, it shows that shocks to LAC7 GDP cannot account for the difference in GDP forecasts that results from the alternative paths for external variables previously described. These results point to the very favorable draw in external conditions that the region was exposed to, and thus the higher than normal growth rates in LAC7 GDP that were observed as a result.

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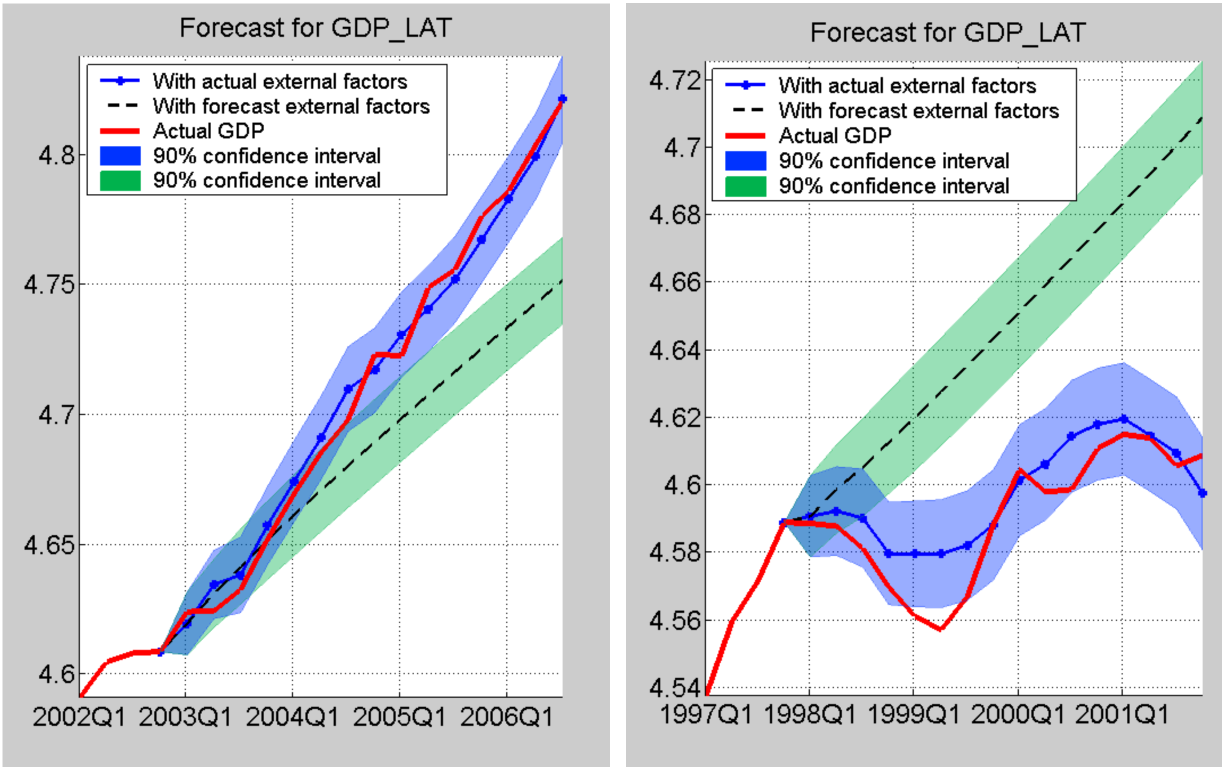
[13] Given that we used a principal-component-weighted average for the terms of trade, this implies an increase in this weighted variable of 8.5 percent between 2002:4 and 2006:3, a fall in high yield spreads of 109 basis points between the same dates, a decrease in US T-bond rates of 50 basis points, and average growth of G7 industrial production of 2.1 percent. This contrasts with observed increases of 24.5 percent in principal-component-weighted terms of trade, a fall of 446 basis points in high yield spreads, an increase of 89 basis points in US T-bond rates, and average growth of G7 industrial production of 2.4 percent.

14 That is, we forecast the path for GDP conditional on the paths of external variables, allowing for uncertainty in GDP.

[15] Even if we were to take the most optimistic GDP forecast for end-2006, corresponding to the upper bound of its confidence interval, LAC7 GDP growth for the period would be 4.2 percent, still 1.4 percentage points below observed LAC7 GDP growth.

Figure 3 – GDP Forecasts Conditional on External Variables: Bonanza vs. Crisis

Panel A **Panel B**



Note: Values expressed in logs.

By the same token, one could ask what would have happened to GDP performance had the Russian crisis of 1998 and the substantial deterioration in external conditions not taken place. Panel B of Figure 3 shows the same type of exercise previously described, only that this time it is performed for the period 1998-2001. Thus, we take as a benchmark a passive scenario where the dynamics of external variables for the period 1998-2001 are the forecasts implied by the model from the perspective of end-1997. This exercise suggests that LAC7 GDP behavior would have been very different had external conditions remained within the dynamics implied by the passive scenario (shown by the dashed line in Panel B): while average LAC7 GDP growth observed between the fourth quarter of 1997 and the last quarter of 2001 was only 0.5 percent per year, the passive forecast suggests that average LAC7 GDP growth would have been almost 3 percent for the same period. Once again, uncertainty about shocks to LAC7 GDP would not be able to wash away differences in the paths of LAC7 GDP resulting from these alternative paths for external conditions.

These exercises reveal that differences in the dynamics of external factors can account for large and significant differences in growth performance. This is a key finding that we will take up in the next section on the role of external factors and policy evaluation analysis.

B. Assessing Latent Risks: Impact of Global Financial Turmoil on LAC Performance

Another relevant question revolves around the impact that financial turmoil could trigger on activity levels. The region has recently been exposed to several episodes of financial volatility, but so far these have been short-lived, recovery in financial variables has been relatively fast, and little impact has been felt on Latin America's economic activity. However, events like the Debt Crisis of the early 1980s and the Russian crisis of 1998 still linger in the region's memory. What would happen if history were to repeat itself?

Sudden Stop to Capital Flows

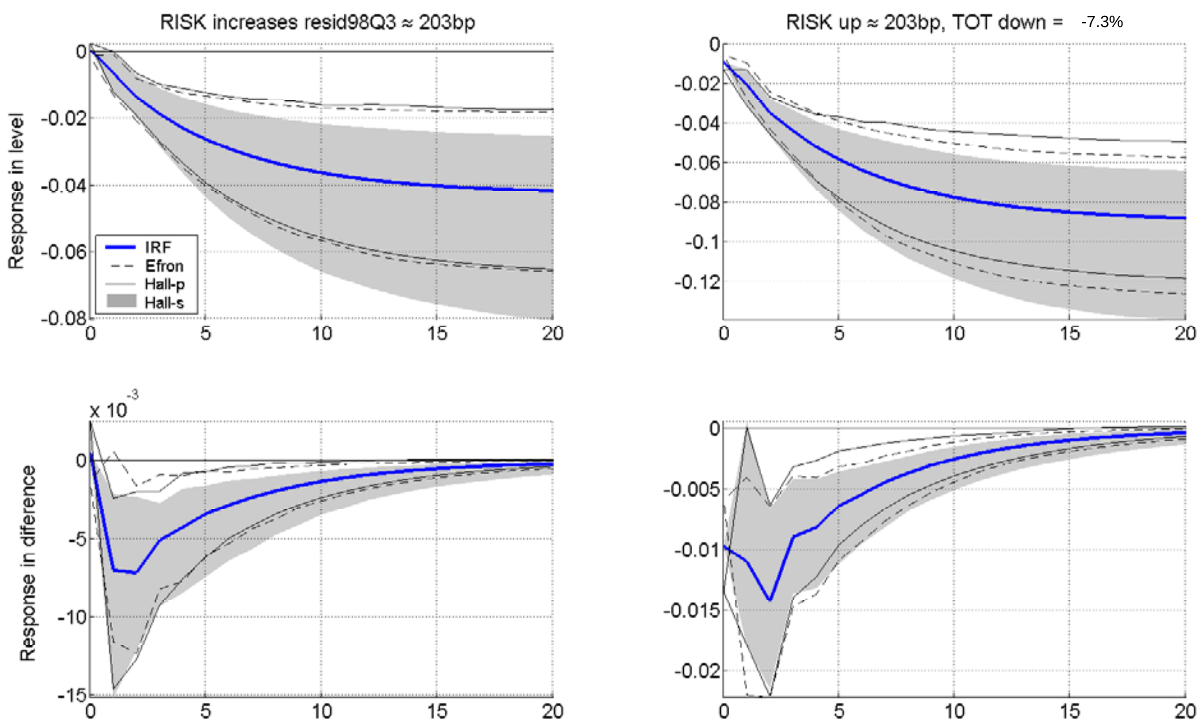
In order to assess the impact of an episode of global financial turmoil, a first exercise we perform is to consider the magnitude of reduced-form shocks to high yield spreads that occurred during the third quarter of 1998, right at the time of the Russian crisis. We select this particular point in time because it represents a very stressful period for Latin America triggered by external conditions that impacted heavily on LAC7 countries. Residuals from our reduced-form estimation indicate that the shock to high-yield spreads was roughly 200 basis points for that quarter. Interestingly, this is the largest shock in the sample—it exceeds three standard deviations—and it highlights the large and unexpected nature of the Sudden Stop episode of 1998, providing support to the conjectures made in Calvo (1998), Calvo, Izquierdo and Talvi (2003), Calvo, Izquierdo and Mejia (2004), and Calvo and Talvi (2005).

Figure 4, Panel A depicts the response in LAC7 GDP that results from a reduced-form impulse of 200 bps (3.3 standard deviations) in high yield spreads. It suggests that quarterly GDP growth could fall by as much as 0.7 percent in the second quarter following the shock, or 2.8 percent on an annualized basis. After twenty quarters, the gap between current GDP and no-shock GDP amounts to 4.2 percentage points. If instead of using the reduced form residual one were to interpret the observed increase in high-yield spreads around the time of the Russian crisis as the size of the shock—roughly 300bps—this time quarterly growth could fall as much as 1.1 percent on a quarterly basis, or 4.3 percent on an annualized basis.

Figure 4 – GDP Responses to Alternative Shock Scenarios

Panel A

Panel B



Note: Responses in levels correspond to GDP logs. Responses in differences are quarterly and are not annualized.

Sudden Stop to Capital Flows Cum Terms of Trade Deterioration

So far we have only focused on financial shocks. Yet, to the extent that terms-of-trade performance has been unusually favorable for the region in recent years—recall cumulative growth of 50 percent between 2002 and 2006—there could be room for substantial correction. Perhaps because of fears that an episode of global financial turmoil could have an impact on global demand (something that did not happen at the time of the Russian crisis), recent episodes of financial turmoil have been associated with falls in commodity prices (a 100bps increase in high yield spreads has been roughly associated with a fall in terms of trade of 3.6 percent). If this relationship were to hold during a large financial meltdown, then a shock to high-yield spreads of 203 basis points (i.e., 3.3 standard deviations) could materialize together with a shock in terms-of-trade representing a quarterly fall of roughly 7.3 percent (or 3.6 standard deviations).[16] The size of the shock in terms of trade may sound large, but it should be balanced against the dramatic increase in the terms of trade recorded in recent times. Panel B of Figure 4 shows the impact of this combined shock. It yields a fall in quarterly LAC7 GDP growth as large as 1.4 percent, or an annualized rate of 5.6 percent.

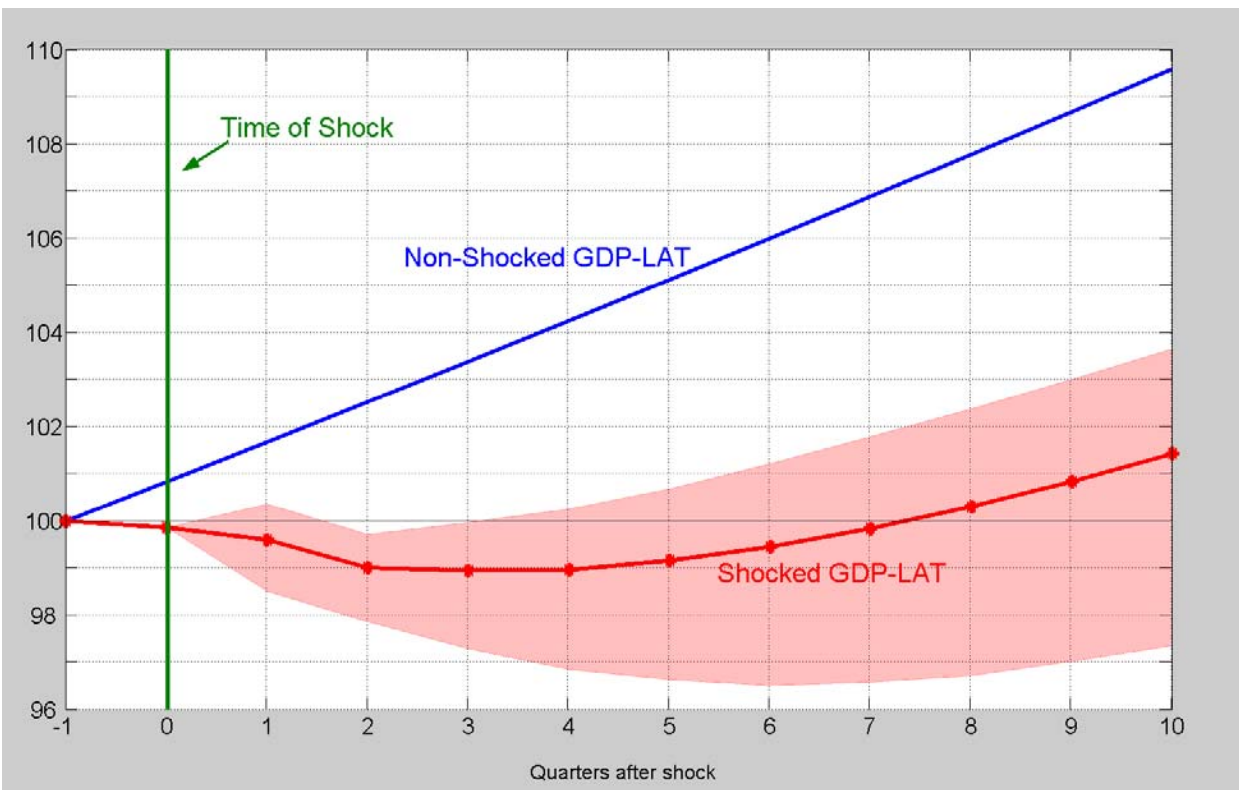
The effects of such a slowdown could be really substantial. To illustrate this point, consider the evolution of LAC7 GDP that would be consistent with impulse responses displayed in Panel B of Figure 4. Assuming that prior to the shock, LAC7 GDP was growing at its steady state rate (around 0.8 percent per quarter), the impact of the combined shock would lead to LAC7 GDP dynamics as those displayed in Figure 5 (the dotted line). According to the response of the model, LAC7 GDP would enter a recessionary phase, with a recovery to pre-crisis levels in about 8 quarters. However, given the size of confidence intervals, this recessionary period could vary widely. What is clear is that in any case there would be a significant separation from the path followed by LAC7 GDP in the absence of the combined shock (full line).

Given the predicted pattern of adjustment to large adverse external financial shocks—with terms of trade spillovers—by our empirical model, it is interesting to highlight is that this response of GDP is very much in line with two recent contributions to the analysis of output behavior in times of external financial crises. First, as noted by Calvo, Izquierdo and Talvi (2006), bounce-backs to pre-crisis output levels following a systemic Sudden Stop could be

[16] The rationale here would be that the correlation between shocks to high-yield spreads and terms of trade would be different in a future crisis from that observed in the data, given that financial turmoil within the sample period was not associated with substantial impact on aggregate demand in industrial countries.

quite fast (on average, about 8 quarters for the emerging-market episodes in their sample). However, recovery to pre-crisis trend is highly unlikely or may take a very long time, a key feature highlighted by Cerra and Saxena (2005). A possible explanation for this behavior has been suggested by Calvo, Izquierdo and Talvi (2006), and it lies in the nature of the changes in the sources of financing in times of external financial crisis. As the authors document, when external credit becomes very expensive or unavailable, much of the financing in economies that bounce-back from large output contractions comes from the postponement of investment projects, thus reducing future output capacity.

Figure 5 - Evolution of GDP Level Consistent with Impulse-Response in Panel B (Sudden Stop cum Terms of Trade Shock)



The fact of the matter is that this exercise is also highly relevant for policy evaluation analysis. Fluctuations in external fundamentals can dramatically change the path of output.

Thus, evaluating the strength of macroeconomic fundamentals, such as fiscal policy and public debt that does not account for cycles in external conditions can lead to highly misleading conclusions. We take up this topic in the next section.

IV. Concluding Remarks: the Role of External Factors and Policy Evaluation

Extending in various directions the seminal work of Calvo, Leiderman and Reinhart (1993), we have established that external factors play a key role in accounting for economic fluctuations in Latin America. We also put our estimated vector error correction model to work to perform two useful exercises: first, to assess recent growth performance in Latin America during the bust (1998-2002) and boom (2003-2006) cycles, and, second, to assess the impact of and adverse change in the currently extremely favorable financial conditions for emerging economies. These two exercises stress the relevance of our findings for policy evaluation analysis. Growth performance, the strength or weakness of macroeconomic fundamentals, and the impact of domestic macro and micro policies on growth, can only be properly appraised by first filtering out the effects of external factors. Failing to do so can lead to highly misleading conclusions.

The first of our two exercises revealed that differences in the dynamics of external factors can account for large and significant differences in growth performance. Without neglecting the possibility of diverse domestic policy responses to external shocks, it is clear that care should be exercised when passing judgment on the stagnation and crisis period, 1998-2002, and the current exceptional expansion period, 2003-2007. It may just happen that during the latter Latin America had an exceptionally good draw on external variables relative to past experience, while during the former, the draws on external variables were exceptionally bad. This means the region might be currently surfing on a wave of unjustified euphoria, both on the part of multilaterals and policy makers alike.

As a corollary of this exercise it follows that a great deal of care should be taken when evaluating the success or failure of domestic macro policies and reforms. A period of stagnation and even crisis, such as the one that followed the Debt Crisis of the 1980s and the Russian crisis of 1998, may not necessarily be a reflection of bad policy, but a consequence of very adverse external conditions. Conversely, a sustained period of high growth may not be the consequence of good policies, but the result of a string of good luck. In sum, given the large incidence of external conditions in Latin America's business cycles, the judgment of the success—or failure—of economic policies and performance should not be made in a vacuum, but rather, by factoring in external conditions before signaling thumbs up—or down.

Our second exercise revealed that a reversal in external financial conditions of a magnitude observed in the past will have a large impact on Latin America's GDP. Thus, to properly evaluate the strength of macroeconomic fundamentals such as the fiscal stance, it is key to incorporate the dynamics of external factors and their impact on Latin America's GDP. For example, an unusually favorable external environment will be associated with high commodity prices, low interest rates spreads, strong growth performance, improvement in the fiscal position and declining public debt levels. In such a scenario, the actual levels of fiscal balances and public debt could be completely misleading as indicators of the fiscal stance. A proper assessment of the strength of the fiscal position and the burden of public debt should account for cycles in external factors. Thus, computing structural fiscal balances and structural levels of public debt on which to base fiscal policy decision-making should become first order of business for policy makers in the region.[17] To the best of our knowledge, only Chile has an explicit fiscal rule that uses a structural fiscal balance measure as a target of fiscal policy.[18]

Finally, although this is not an exercise reported in the paper, it is crucial to distinguish between transitions that are a by-product of level effects and sustained growth. The nature of the estimated model in this paper suggests that one time increases in commodity prices or reductions in interest rates spreads generate level effects on output, that may translate into relatively prolonged above-average growth phases given frictions implicitly captured by the error correction term. However, these should not be confused with sustained growth. The current bonanza may yield above-average growth for some time, but its effects may eventually dissipate as frictions are corrected, even if external factors remain as favorable as they are today.

In summary, given the importance of external factors in Latin America's business cycle fluctuations, policy evaluation should be conducted keeping these factors in mind, or otherwise there may be substantial room for misjudgment. It is particularly important that the economics profession make an effort to incorporate these issues into the public debate and into our performance indicators. If not, it may be very easy to praise those lucky enough to ride the bonanza, and punish the unlucky, irrespective of their abilities.

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[17] See for example Izquierdo, Ottonello, and Talvi (forthcoming) for a recent contribution. The paper reports that in recent years, due to the exceptional growth performance, Latin America's actual fiscal position has improved significantly (from an aggregate deficit of 2.6 percent of GDP in 2002 to a surplus position of 1.1 of GDP in 2006) and public debt has been reduced by 13 percentage points of GDP in the same period. However, when they compute structural fiscal balances –using Chile's methodology-- and structural levels of public debt rather than actual levels, the picture that emerges is completely the opposite. During the current expansion the aggregate structural fiscal balance of the region has deteriorated due to strong increases in public spending. Analogously, structural debt levels have been rising, not falling.

[18] See for example Marcel et al (2003).

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Data Appendix

We used quarterly data ranging from 1991Q1 through 2006Q3. Countries included in the definition of Latin America are: Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela, which account for 93 percent of Latin America's GDP and to which we refer to as LAC7. Variables were constructed as follows:

GDP_LAT: Measure of seasonally adjusted real GDP of LAC7 countries, and it is computed as (the log of) the simple average of seasonally adjusted real GDP indices of each of the LAC7 countries. GDP data in levels is obtained from national sources.

TOT_LAT: First-principal-component weighted average of (the logs of) terms of trade of LAC7 countries. Principal components are a weighted average of standardized series. In this case, series used to obtain the first principal component are the logs of each country's terms of trade. However, the resulting principal component is difficult to interpret in terms of percentage changes in terms of trade. For this reason, we perform appropriate re-weighting so that (excluding the impact of means used for standardization in the value of the principal component) the resulting series still has unit covariance with the original principal component, but can now be interpreted as a weighted average of the logs of each country's terms of trade, and, therefore, changes in this series can be interpreted as changes in (weighted) average terms of trade. Terms of trade data in levels are obtained from national sources (except for Venezuela, for which terms of trade are computed based on export price data from the International Financial Statistics database, International Monetary Fund IFS, and own estimations of import prices).

IP_X: (the log of) the weighted average of industrial production indices of G7 countries, weighted by PPP-adjusted GDP. Industrial production indices are obtained from the International Financial Statistics database, International Monetary Fund.

FINANC_X: yield on 10-year US Treasury bonds. Source: US Federal Reserve.

RISK: Spread of US high yield bonds over US Treasuries. Source: Bloomberg.

Appendix Table 1 - Unit Root Tests

	ADF Tests			Philip-Perron Tests		
	No constant	Constant	Constant and trend	No constant	Constant	Constant and trend
GDP_LAT	6.3669	-0.6712	-2.2692	5.2978	-0.6865	-2.1272
	1.0000	0.8461	0.4441	1.0000	0.8424	0.5209
IP_X	2.0837	-0.6424	-2.3481	3.0162	-0.2226	-1.8830
	0.9906	0.8530	0.4026	0.9992	0.9295	0.6517
TOT_LAT	1.2066	0.1871	-1.2530	1.4671	1.2281	-0.6168
	0.9402	0.9696	0.8899	0.9635	0.9980	0.9744
RISK	-1.8847	-2.6004	-2.5843	-1.7774	-2.7069	-2.6791
	0.0572	0.0983	0.2887	0.0718	0.0785	0.2487
FINANC_X	-1.6182	-2.1175	-4.5627	-1.5130	-2.1725	-3.1937
	0.0991	0.2386	0.0026	0.1212	0.2182	0.0949
∆GDP_LAT	-2.4522	-4.3787	-4.3484	-5.4818	-8.1054	-8.0577
	0.0148	0.0008	0.0050	0.0000	0.0000	0.0000
∆IP_X	-3.2731	-3.9597	-3.9068	-3.2029	-3.9597	-3.9068
	0.0014	0.0029	0.0173	0.0018	0.0029	0.0173
∆TOT_LAT	-5.3817	-5.5343	-5.8119	-5.3817	-5.5466	-5.8086
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
∆RISK	-7.1032	-7.1520	-7.1682	-7.1104	-7.1556	-7.1693
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
∆FINANC_X	-5.2492	-5.4383	-5.4680	-6.3588	-6.3865	-6.3849
	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000

Note: For each variable, two values are shown. The first one is the test statistic and second one is its p-value.

Appendix Table 2 - VAR (in Levels) Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	671.110	NA	1.07e-16	-22.57999	-22.40393	-22.51126
1	1046.690	674.7710	7.44e-22	-34.46406	**-33.40768***	-34.05169
2	1082.714	**58.61631***	**5.22e-22***	**-34.83778***	-32.90109	**-34.08177***
3	1099.178	23.99776	7.31e-22	-34.54841	-31.73141	-33.44876
4	1122.460	29.99107	8.50e-22	-34.49019	-30.79287	-33.04690

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Appendix Table 3 - Johansen Cointegration Test

Trend assumption: Linear deterministic trend
Series: GDP_LAT IP_X TOT_LAT RISK FINANC_X
Lags interval (in first differences): 1 to 1

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5% Critical Value	Prob.**
None *	0.518087	89.81496	69.81889	0.0006
At most 1	0.317251	45.28551	47.85613	0.0855
At most 2	0.227842	22.00624	29.79707	0.2981
At most 3	0.084809	6.233684	15.49471	0.6679
At most 4	0.013477	0.827704	3.841466	0.3629

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5% Critical Value	Prob.**
None *	0.518087	44.52945	33.87687	0.0019
At most 1	0.317251	23.27927	27.58434	0.1619
At most 2	0.227842	15.77256	21.13162	0.2384
At most 3	0.084809	5.405980	14.26460	0.6899
At most 4	0.013477	0.827704	3.841466	0.3629

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Appendix Table 4

Vector Error Correction Estimates with Restrictions on Loading Factors

Sample (adjusted): 1991Q3 2006Q3

Cointegrating Eq:	CointEq1
GDP_LAT(-1)	1.000000
IP_X(-1)	-0.595445
	(0.09736)
	[-6.11567]
TOT_LAT(-1)	-0.718617
	(0.10668)
	[-6.73645]
RISK(-1)	1.029924
	(0.37706)
	[2.73149]
FINANC_X(-1)	2.752342
	(0.61745)
	[4.45759]
Constant	1.388440

Appendix Table 5

VEC Representation (Two-stage procedure)

Sample range: 1991 Q3, 2006 Q3, T = 61

Lagged endogenous term:

	d(GDP_LAT7)	d(IP_X)	d(TOT_LAT7)	d(RISK)	d(FINANC_X)
d(GDP_LAT7_ADJ)(t-1)	-0.326	---	---	---	---
	(0.093)	( )	( )	( )	( )
	{0.000}	{ }	{ }	{ }	{ }
	[-3.508]	[ ]	[ ]	[ ]	[ ]
d(IP_X) (t-1)	0.386	0.578	0.569	0.052	0.024
	(0.145)	(0.116)	(0.387)	(0.119)	(0.069)
	{0.008}	{0.000}	{0.141}	{0.662}	{0.728}
	[2.669]	[4.971]	[1.471]	[0.438]	[0.347]
d(TOT_LAT7) (t-1)	-0.035	0.022	0.106	0.000	0.022
	(0.055)	(0.041)	(0.136)	(0.042)	(0.024)
	{0.530}	{0.589}	{0.435}	{0.995}	{0.367}
	[-0.629]	[0.540]	[0.780]	[0.006]	[0.901]
d(RISK) (t-1)	-0.080	-0.267	-0.572	0.262	-0.206
	(0.157)	(0.116)	(0.386)	(0.119)	(0.069)
	{0.611}	{0.022}	{0.138}	{0.028}	{0.003}
	[-0.509]	[-2.298]	[-1.484]	[2.195]	[-2.987]
d(FINANC_X) (t-1)	0.597	0.159	1.312	0.460	0.022
	(0.315)	(0.243)	(0.809)	(0.250)	(0.145)
	{0.058}	{0.514}	{0.105}	{0.065}	{0.879}
	[1.894]	[0.653]	[1.622]	[1.842]	[0.153]

Deterministic term:

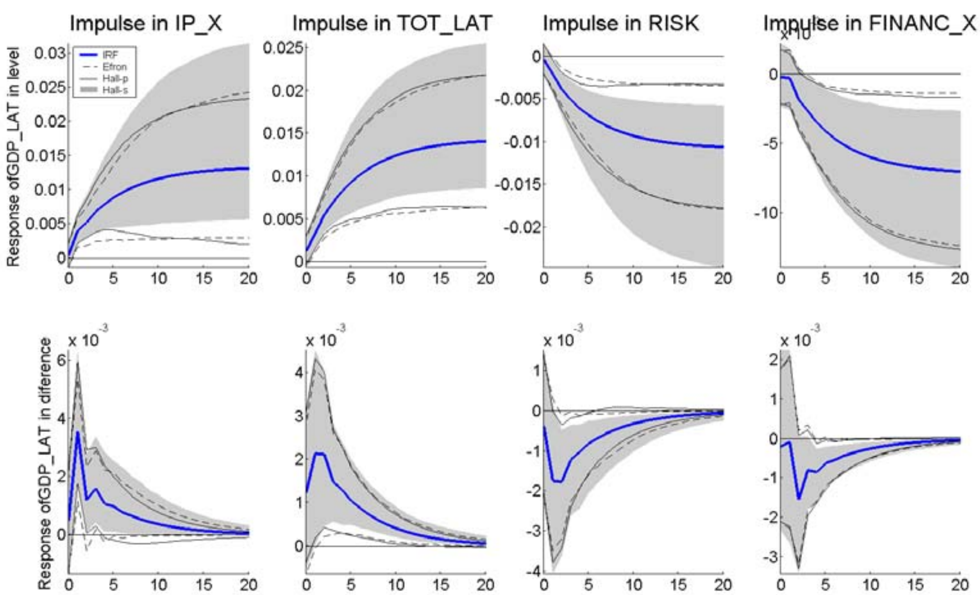
	d(GDP_LAT7)	d(IP_X)	d(TOT_LAT7)	d(RISK)	d(FINANC_X)
CONST	0.0095	0.002	0.002	0.000	-0.001
	(0.002)	(0.001)	(0.003)	(0.001)	(0.001)
	{0.000}	{0.050}	{0.593}	{0.754}	{0.118}
	[-5.989]	[1.962]	[0.534]	[-0.314]	[-1.561]

Loading coefficients:

	d(GDP_LAT7)	d(IP_X)	d(TOT_LAT7)	d(RISK)	d(FINANC_X)
ec1(t-1)	-0.241	---	---	---	---
	(0.039)	( )	( )	( )	( )
	{0.000}	{ }	{ }	{ }	{ }
	[-6.107]	[ ]	[ ]	[ ]	[ ]

Appendix Figure 1 – LAC7 GDP Responses to One-standard-deviation Shocks

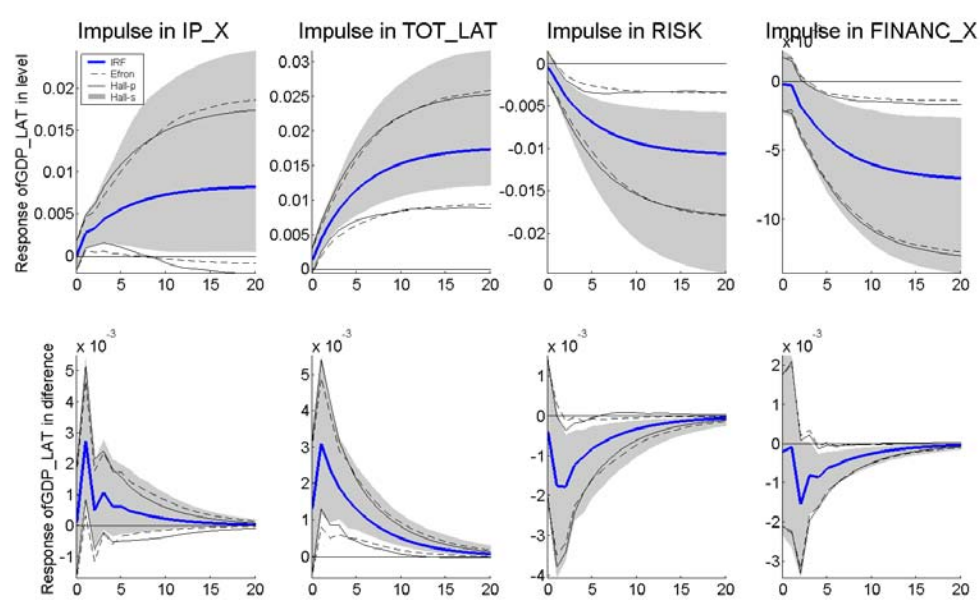
(Ordering of variables: IP_X, TOT_LAT, Risk, Financ_X, LAC7 GDP)



Note: Responses in levels correspond to GDP logs. Responses in differences are quarterly and are not annualized.

Appendix Figure 2 – LAC7 GDP Responses to One-standard-deviation Shocks

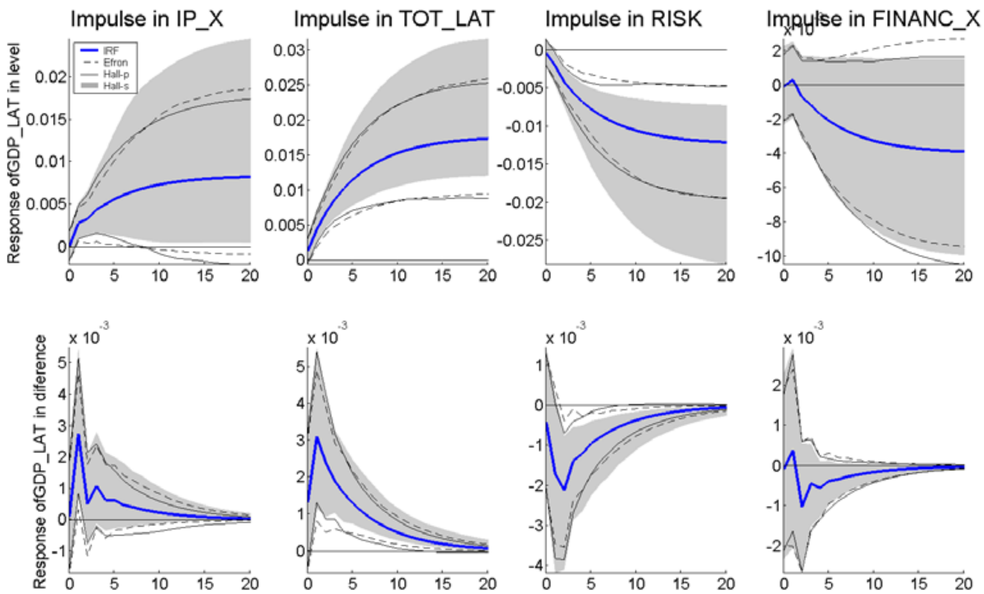
(Ordering of variables: TOT_LAT, IP_X, Risk, Financ_X, LAC7 GDP)



Note: Responses in levels correspond to GDP logs. Responses in differences are quarterly and are not annualized.

Appendix Figure 3 – LAC7 GDP Responses to One-standard-deviation Shocks

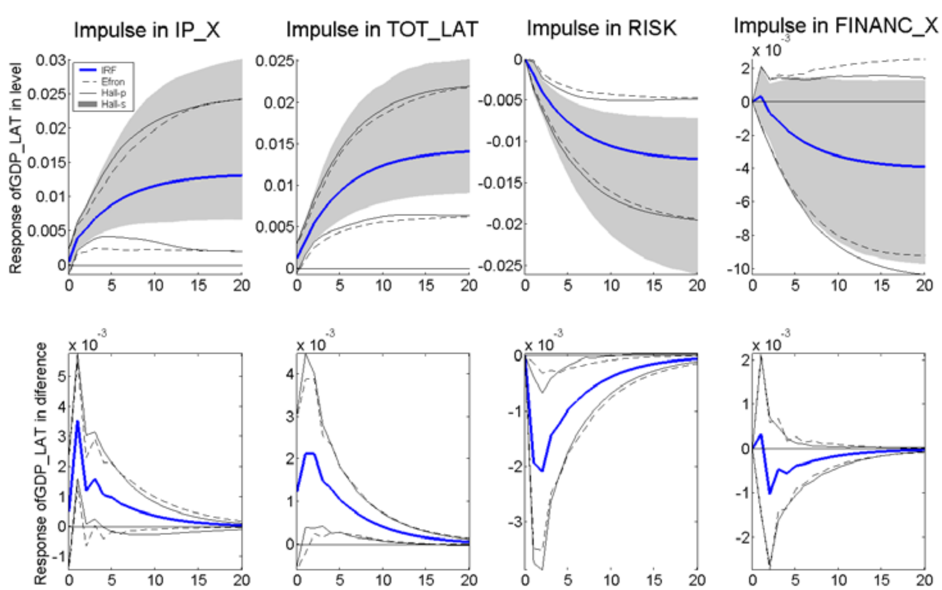
(Ordering of variables: TOT_LAT, IP_X, Financ_X, Risk, LAC7 GDP)



Note: Responses in levels correspond to GDP logs. Responses in differences are quarterly and are not annualized.

Appendix Figure 4 – LAC7 GDP Responses to One-standard-deviation Shocks

(Ordering of variables: IP_X, TOT_LAT, LAC7 GDP, Financ_X, Risk - Covariance Matrix is restricted to rule out contemporaneous impact of GDP on external variables))



Note: Responses in levels correspond to GDP logs. Responses in differences are quarterly and are not annualized.