The Burden of Debt: An Exploration of Interest Rate Behavior in Latin America[1]

Draft: Comments Welcome

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Abstract

What determines the behavior of interest rates in Latin America? Does the recent sharp reduction in rates in a number of Latin American countries reflect a convergence towards industrial country levels or just a transitory deviation from much higher long-term rates? To tackle these questions this paper raises two main hypotheses. The first is that by being a key factor explaining country risk, external debt plays a central role in the *sustainable* behavior of domestic interest rates on assets denominated both in local currency and in US dollars. The second is that country risk provides valuable information for predicting the behavior of exchange rate risk *and not the other way around*. Econometric tests applied to a sample of six Latin American countries confirm these hypothesis and lead to a straightforward conclusion: In equilibrium, highly indebted/high country-risk economies will tend to be associated with high domestic interest rates. For these countries, a reduction in interest rates would tend to be a temporary phenomenon, even if they succeed in keeping inflation down or in improving other macroeconomic fundamentals.

JEL: E43, G15, O16, O54, C22

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I. Introduction

After two decades of extremely high nominal and real interest rates, since the early 2000s interest rates have declined significantly in a number of Latin American countries (for example, Chile, Colombia, Mexico and Peru), reaching unprecedented low levels by end-2005. By contrast, in some other Latin American countries, most notably Brazil, interest rates have remained very high in international comparisons in spite of a drastic reduction of the domestic inflation rate and a significant improvement of overall macroeconomic performance.

In the context of the well-known high volatility of financial variables in Latin America, does the recent behavior of low-interest rate countries in the region reflect a new trend or just temporary deviations from much higher long-term rates? Is it possible to identify which countries are more likely to experience a reversal from the current low levels of interest rates?

Dealing with this issue involves taking a fresh look at the old debate regarding the relative importance of exchange rate risk and country risk in the determination of domestic interest rates. Central questions that need to be raised include: How important is external debt for the determination of domestic interest rates in Latin America? Does it matter whether the domestic asset is denominated in local currency or in US dollars? Can domestic interest rates be reduced on a sustainable basis by focusing on policies aimed at reducing exchange rate risk? Or if exchange rate risk and county risk are interrelated, what is the direction of causality?

These are the questions addressed in this paper. There are two main hypotheses:
H.1) Given that it is a key factor explaining country risk, external debt plays also a central role in the *sustainable* behavior of domestic interest rates on assets denominated both in local currency and in US dollars.
H.2) The second is that country risk is also at the center of predicting the behavior of exchange rate risk *and not the other way around.*

The policy implication from these claims is straightforward: Highly indebted/high country-risk economies will tend to be characterized by high domestic interest rates. For these countries, a reduction in the interest rates they face will tend to be a temporary phenomenon, even if they succeed in keeping inflation low.

These claims derive from an analysis of how the process of international securitization of debt affects Latin American domestic financial markets. Let us expand on this: Since the late 1980s, a highly liquid market for international bonds issued by emerging markets has developed and has displaced unsecuritized bank lending as a major source of portfolio flows to Latin America.[2]. In contrast to internationally active banks, there is (yet) no syndication or other widely spread concerted arrangements among bond holders to deal with collective action problems in case of sovereign default[3]. These free market/unconcerted features of the international bond market imply that any type of news affecting investors' perceptions of a country's capacity or willingness to service its debt is reflected immediately in the spread between the yield on bonds issued by that country and the yield on US Treasury bonds of corresponding maturity. If both bonds are denominated in US dollars, the spread is free of exchange rate risk and is considered a typical measure of country or default risk.[4] [5]

When investors' perceptions of risk deteriorate significantly for a given country, the yield and spread on external debt increase sharply, thus raising the country's financing cost and severely limiting the availability of external sources of finance.

The first hypothesis (H.1) implies that an increase in spreads and yields on external government debt translates into higher domestic interest rates across the spectrum of local assets. There are a number of reasons to support this claim.

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[2] This process started with the emergence of the Brady bonds. It is important to note that the process of international securitization is explicitly emphasized here rather than the more general process of financial integration. Although reference to the latter is often used to describe the depth of countries' participation in a wide variety of cross-border flows as well as structural processes (i.e., the role of foreign banks in the region), increased securitization refers to countries' growing usage of the international bond market rather than more traditional loans from international banks for their financing needs.
[3] However, the recent inclusion of collection action clauses in recent bond issues by the Mexican and other governments is a step in the right direction to alleviate this constraint.
[4] The terms "country risk" and "default risk" will be used interchangeably in this paper.
[5] Recently, Latin American countries are also issuing Euro-denominated bonds.

First, the majority of Latin American countries have liberalized their capital accounts to a great extent, allowing for financial arbitrage to take place between domestic and external debt issued by a government [6].

Second, the experience in Latin America shows that, to a large extent, private debt can be considered a contingent liability of the government because, in cases of severe difficulties in the private sector, governments have often “absorbed” private-sector liabilities into the public sector accounts. Thus, it is difficult for investors to distinguish between government risk and private-sector risk. In this context, adverse shocks increase the perceived risk of liabilities issued both by the public and private sectors[7]. This, of course, pushes interest rates up.

Third, because the entire financial system in most Latin American countries is dominated by short-term instruments, domestic interest rates at all existing maturities are affected by an adverse shock.

Finally, the transmission mechanism described above is reinforced by the very limited supply of domestic sources of finance in Latin America, which cannot offset the severe curtailment of external sources of finance that often follows a deterioration in investors’ perceptions of creditworthiness. At any point in time, a given stock of debt (both domestic and external) becomes riskier if the capacity of the country to roll over maturing debt decreases sharply. If, following a sudden adverse shock, increased perceptions of default lead to an increase in spreads and a severe reduction in market access, the country’s overall capacity to service its existing obligations decreases. Domestic interest rates increase as domestic holders of the country’s liabilities perceive the deterioration of the borrowers’ capacity to meet payments. Notice that this transmission mechanism of default risk into the domestic interest rates is valid even if the economy follows a flexible exchange rate system. The reason is that even a large depreciation of the exchange rate cannot generate external resources quickly enough to offset a sharp decrease in the availability of foreign sources of finance. This problem is, of course, exacerbated the larger the stock of debt and the shorter the maturity structure.

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[6] The implicit assumption is that there are no perceived differences in investors’ perceptions of default on domestic and external debt, so that both kinds of debt share the same country premium.

[7] The experience in Latin America, where external debt crises are accompanied by severe banking crises involving significant default on domestic liabilities lends support to this statement.

About this last point, it should also be noted that the creation and development of private pension funds does not provide a simple and straightforward solution. It is true that over the last decades a number of Latin American countries have undergone substantial pension-system reforms and that lately the new systems are accumulating significant amounts of financial resources. But this does not translate directly to unlimited availability of fresh resources for the government. There is no reason to assume that the domestic private sector will freely acquire government securities at a low interest rate if their perception of the government creditworthiness has deteriorated –more importantly when this perception is shared with external investors. Investors will prefer a better risk-return option. It is neither necessarily true that governments will be able to issue low-interest securities if pension funds' investment options are limited by local regulation. In that case, the government would crowd out the private sector, limiting its access to finance. Regardless of any efficiency consideration, credit for the private sector would be scarcer than before, pushing interest rates up[8].

The discussion above provides arguments that illustrate different mechanisms through which default risk might affect the behavior of domestic interest rates. This hypothesis will be empirically tested in the paper[9] [10].

The second hypothesis is that default risk contains valuable information to explain the behavior of exchange rate risk, but not the other way around. This is a highly controversial issue and certainly not everybody agrees with the claim in this paper. For example, Powell and Sturzenegger (2000) use an event study methodology to show that a reduction (or elimination) of exchange rate risk will have a significant impact on country risk. They also argue that this effect will be stronger in *de facto* dollarized countries.

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[8] Moreover, restraining the growth of the private sector means also restraining the growth potential of the country, a fact that will not easily go unnoticed by investors, since low growth reduces the collecting ability of the government.

[9] Using a different methodology from that used in this paper, Favero and Giavazzi (2002) confirm a similar hypothesis for the case of Brazil.

[10] As will be explained fully below, this first hypothesis can be divided in two empirically testable hypotheses related to a) the link between external debt and country risk and b) the link between country risk and domestic interest rates.

Hausmann (1999) also argues that an increase in the risk of large exchange rate depreciations leads to higher default risk. His argument is based in the so-called structural currency mismatch between assets and liabilities of the private sector in Latin America[11]. The existence of this mismatch causes extensive bankruptcies if the exchange rate depreciates significantly. As investors become aware of this effect, their perceptions of default risk increase.[12]

The argument that increased exchange rate risk *causes* an increase in default risk is often defended by supporters of dollarization. In our view, however, dollarization cannot prevent the deterioration of country risk arising from policy inconsistencies, because dollarization per se cannot generate additional resources to restore confidence in a country's capacity to service its debt.

While agreeing that default risk and exchange risk are correlated, this paper argues that the causality runs in the opposite direction from that suggested by the authors mentioned above. In our view, the problem with the arguments above is that they ignore the initial source of the problem, which rests on the presence of domestic policy inconsistencies. In a number of recent emerging market crises, large stocks of debt, sometimes inherited from previous administrations and sometimes fueled by large government deficits, raised doubts about the capacity of these countries to service their debts[13]. As perceptions of default deteriorated, countries found it more difficult to roll over maturing external debt. Large net external amortization payments followed, calling into question the sustainability of the exchange rate and thus deteriorating perceptions of exchange rate risk. The existence of a link between

[11] Latin America is a region characterized by a long history of currency instability, best exemplified by its recurrent sharp devaluations and long periods of high and hyperinflation. Without adequate hedging, both phenomena make creditors in financial contracts lose. Because of that, domestic investors are willing to lend long-term only if the contracts are denominated in US dollars. Because many long-term projects are directed to the domestic market, where transactions take place in the domestic currency, the structural currency mismatch ensues.

[12] Moreover, a dollarized economy cannot print dollars. In contrast, in some crisis episodes such as Mexico 94 and Korea 97, depreciating the exchange rate was part of the solution as improved competitiveness allowed for an increase in exports, and consequently, in needed resources. While exchange rate depreciation was essential, however, it was certainly not enough. A crucial component of crisis resolution was the availability of large financial packages made available to those countries by multilateral organizations. The immediate availability of liquidity provided assurances to external investors that debt obligations could be met on a timely basis. Perceptions of default were, therefore, contained.

[13] For a discussion and measurement of "over-indebtedness", namely, the amount of debt in excess of a "safe" debt ratio that would prevent default, see Reinhart et al (2003).

default risk and exchange risk will also be empirically tested, as well as the causality of that relation.

The rest of this paper is organized as follows: Section II presents the methodology adopted to give empirical content to the hypotheses raised in this study. Section III uses cointegration analysis to investigate whether there is a long-run relationship between domestic interest rates (denominated both in local currency and in US dollars) and the risk of default. Error correction models are utilized to determine the direction of causality between domestic interest rates and default risk. Using the same techniques, this section also explores the direction of causality between default risk and exchange rate risk. Based on panel data analysis, Section IV tests whether a measure of indebtedness is indeed a key variable in the determination of default risk. This section also sheds light on the identification of a few additional variables explaining the recent behavior of default risk. Finally, Section V concludes the paper with an assessment of the sustainability of the observed reduction of interest rates in Latin America, based on the empirical results of the previous sections. Furthermore, it advances some recommendations in terms of policy options.

II. Methodology of the Study

As discussed before, the two hypothesis advanced in Section I can be translated into three *testable* hypotheses.

A. Indebtedness –as represented by a measure of external debt- is a central variable in explaining the behavior of default risk
B. "Country" or "default" risk has a major role to play in the long-run behavior of interest rates of domestic assets denominated in either local currency or US dollars.
C. Second, movements in country risk "lead" and are a significant factor in explaining changes in exchange rate expectations.

The two first testable hypotheses (A and B) are components H.1 in the previous sections, though A has bearings on H.2 also. For presentational purposes, testable hypothesis A will be dealt with in Section IV of the paper.

Hypothesis B is formally expressed as:

$$(1+i_t)S_t / E_t(S_{t+1}) = 1 + g(i_t^{ed}) \qquad (1.a)$$

$$i_t^* = h(i_t^{ed}) \qquad (1.b)$$

for local domestic- and foreign-currency assets; where: i_t is the domestic nominal interest rate at time t on local-currency denominated assets; i_t^{ed} is the yield on external debt; S_t is the spot exchange rate at time t, defined as the price of one US dollar expressed in local currency; and $E_t(S_{t+1})$ is the expected value at time t of the t+1 spot exchange rate conditional on information available at time t. $E_t(S_{t+1})/S_t$ is the expected rate of depreciation (or appreciation) of the domestic currency.

This exact form of equations (1.a) and (1.b) is not casual. In fact, all the arguments outlined in Section I point to the existence of arbitrage between local interest rates and interest rates on external debt. Hence, it is stated here that interest rate parity is the framework within which one should naturally understand these relations. That is, domestic interest rates are closely related to the international perception of the country's creditworthiness (default or country risk), which is captured by the behavior of i_t^{ed}.[14] In fact, Equations (1.a) and (1.b) would have been interest parity conditions, were *g* and *h* to take a linear form with a coefficient equal to one (which would certainly not happen in Latin America, as explained below).

Before moving to the estimation methodology, it is necessary to explicit an assumption that lies beneath these equations: that there are no significant differences in investors' perceptions of default on domestic and external debt, so that both kinds of debt share the same country-risk premium. Notice that, since we are referring to "domestic" and "external" debt, we are also assuming that there are no significant differences in the perception of default on public and private external debt. This assumption will become evident in the empirical analysis of

[14] With the idea of using a framework similar to that the interest rate parity hypothesis, section III uses the yield rather than the spread on external debt as a proxy for default risk. This assumption will not significantly distort the results since, during the period under consideration, for every country in the sample the correlation between yields and spreads on external debt was about 0.9. Section IV, which analyzes the determinants of default risk, relaxes the assumption and uses the spreads on external debt directly as a measure of default risk.

this paper where we utilize domestic rates on local instruments issued by either the public sector or the private sector, or both, while the yield on external debt corresponds to the JP Morgan EMBI Global index, which refers exclusively to public external debt[15].

While these assumptions would have been severely restrictive in the case of industrial countries, they are much less restrictive for Latin American countries. There are two reasons for this. The first is that a large number of episodes of default on external debt in the region have been accompanied by banking crises, which in turn involved significant default on domestic liabilities. The recent crisis in Argentina clearly illustrates this point, but the same pattern also occurred in earlier crises including those of the early 1980s. Based on this experience, there is little reason to believe that investors would assume external debt to be riskier (or safer) than domestic debt. The second reason is that, in most episodes of debt default by the public sector, the private sector encountered significant difficulties and was bailed-out by the government. In other words, in Latin America the experience suggests that, to a large extent, private sector debt is a *contingent liability* of the public sector. Thus, there is no reason to believe that investors would assume that public sector debt is safer (or riskier) than private sector debt.

As stated before, it is highly unlikely that equations (1.a) and (1.b) be “exact” interest parity conditions, because the instruments considered in these equations are very different. For example, for Latin American countries it is true that assets issued in the domestic market tend to have much shorter maturities than assets issued by those same countries, but traded on the international capital markets. In Brazil, for example, the domestic term structure of interest rates extends up to two years, while external debt issued by the Brazilian government typically has a much longer maturity. This difference in maturity structure is even more dramatic in other Latin American countries, such as Peru, where one cannot find domestic *liquid* assets with maturity longer than one year.

[15] There are two reasons to prefer the EMBI Global over the EMBI+. The first is that the EMBI Global tracks returns only for US-dollar-denominated debt instruments, allowing a better correspondence with local instruments denominated in foreign currency in Latin America, which are all denominated in US dollars. The second reason is that, in contrast to the EMBI+, the EMBI Global includes Chile, a country analyzed in this study. In any event, the correlation between the EMBI+ and the EMBI Global is 0.99 both for Latin America as a group as well as for individual Latin American countries.

In view of these differences, one cannot expect that interest rates in Latin American countries, once adjusted for expectations of exchange rate changes, would equal the yield on the respective country's external debt. Instead, we argue that such variables "move together", at least in the long run; that is, that they are cointegrated, where *g* and *h* represent the functional form of the cointegration relation.

To examine hypothesis B, tests were run to determine, first, whether local assets denominated in US dollars were cointegrated with the yield on the corresponding country's external debt; and second whether local assets denominated in local currency were also cointegrated with the yield on external debt and the foreign exchange premium[16]. These tests are the subject of section III. It must be noted that tests relating US-dollar-denominated local assets and default risk where performed only on instruments from Argentina, Brazil and Chile, were liquid instruments in foreign currency exist. For tests relating local-currency assets and default risk, instruments from Colombia and Mexico were added.

Section III also provides evidence regarding the validity of hypothesis C, that is, whether the yield on external debt plays a role in explaining expectations of exchange rate changes. The evidence also stems from the results obtained in the cointegration models.

Finally, we turn to hypothesis A, namely, that a measure of external indebtedness is a significant explanatory variable for the behavior of default risk. To test it, section IV presents a number of models estimated using panel data analysis for a number of Latin American countries. Due to the greater availability of the kind of information required for this section, the samle was enlarged and includes Argentina, Brazil, Chile, Colombia, Ecuador, Mexico and Peru.

The period covered in the analysis runs from the late 1990s to the early 2000s. The exact period for each country is determined by the availability of data. For presentational purposes, this paper reports analyses for only a limited number of the available instruments. However,

[16] Khor and Rojas-Suarez (1991) use a similar methodology to test the hypothesis of a cointegrated relationship between default risk and local assets denominated in US dollars for the case of Mexico in the late 1980s.

a larger number of instruments were studied during the preparation of the paper. Figures 1A and 1B present all the instruments that were considered and the Appendix describes them.

There are two salient features of Figures 1A and 1B. The first is that, (for the countries with available information) with the exception of Chile, the term structure of interest rates was upward sloping during most of the period analyzed. This shows quite markedly in the case of Colombia.[17] The second is the drastic reduction in domestic interest rates in Chile, Colombia and Mexico. The results from the analysis in this paper will be used to assess in which countries significant reversals of the downward trend of interest rates can be expected.

III. Domestic Interest Rates and Default Risk

Consistent with the discussion in Sections I and II, this section explores the role of "default" or "country" risk in explaining interest rates on local currency and US dollar-denominated assets. As stated in Section I, this part of the paper tests the following hypotheses: First, that, given the region's relatively open financial economies with few restrictions on capital flows, domestic interest rates on US dollar-denominated assets reflect primarily the default-risk premium (Hypothesis B, for foreign-currency local assets). Second, when taking expectations about exchange rate changes into account, default risk also significantly affects the behavior of domestic interest rates on assets denominated in the local currency (Hypothesis B, for domestic-currency local assets). Third, that default risk provides information useful in the determination of exchange rate risk (Hypothesis C).

As mentioned in Section II, the maturities and some other market characteristics of US dollar-denominated domestic debt and external debt are very different for the Latin American countries that we study. Moreover, in the empirical analysis, we use a number of domestic instruments issued by the private sector (banks) while the yield on external debt corresponds to the EMBI Global index produced by JP Morgan, which only includes debt issued by the public sector[18]. In spite of these differences, however, if hypothesis B is true, one would

[17] Favero and Giavazzi (2002) make this observation for Brazil and identifies "term premium" with country risk. As will be shown later their conclusions regarding the importance of country risk in the determination of interest rates in Brazil coincide with the results of this paper.
[18] It includes both sovereign and quasi-sovereign entities.

expect that i_t^* and i_t^{ed} "move together" at least in the long run. The same kind of relationship is expected between i_t and i_t^{ed}.

To conduct the analysis, we first tested for the order of integration of i_t^*, i_t and i_t^{ed}, using the Augmented Dickey-Fuller (ADF) test. As shown in Annex I, for all countries and instruments considered, the domestic interest rates (denominated in either local currency or US dollars) and the yield on external debt are integrated processes of order one, I(1), and become stationary only in their first differences.[19] [20]

Since the original series are non-stationary, the means and variances of the series are not constant and the usual statistical properties of convergence to the population mean and variance do not apply. As is well known, cointegration analysis, rather than traditional econometric theory, provides an adequate tool for examining whether there is a meaningful, close relationship in the long run for variables that are I(1) processes.[21] In the cases where the evidence shows that the variables are cointegrated, coefficients for the lagged Error-Correction Term (ECT) in the Error Correction Model (ECM) will be used to assess the direction of the causality in the relation.

The remainder of this section (subsections III.1 and III.2) and the following section empirically assess the three testable hypotheses discussed before..

III.1 Interest Rates on Domestic US dollar-denominated debt and default risk.

Turning first to testing whether interest rates on domestic assets denominated in US dollars are cointegrated with the yield on external debt, Table 1 shows the results from testing the following cointegration equation (consistent with the hypothesis in equation (1.b))[22]:

[19] Strictly speaking, the null hypothesis of the ADF test is that the process has a unit root that renders it non stationary. When performing our tests, the null hypothesis cannot be rejected at the 5% significance level for most variables (at the 1% significance level for a few), indicating that the series are non-stationary processes.
[20] Annex I also shows that the forward premium f_t is an I(1) process. See Section III.2
[21] See, Engle and Granger (1987)
[22] Periods included in the analysis in this section do not coincide exactly with those used in the previous section because of data availability. Likewise, at occasions, the samples for this section and section III.2 differ. Similar situations explain the differences in period coverage for other countries.

$$i_t^* + \delta_1 \, i_t^{ed} + c_1 = \varepsilon_t^* \tag{2}$$

Results are presented for Argentina, Brazil and Chile, as these countries have liquid US dollar-denominated domestic assets. To make use of the information available, the frequency of data varies across countries. For example, while the analysis for Chile uses monthly data, that for Argentina is conducted on the basis of daily data.

Supporting the hypothesis in this paper, the table shows that domestic interest rates on US dollar-denominated debt and the yield on external debt are cointegrated in all the countries in the sample and that there exists a strong positive long-run relationship between these two variables.[23]

Since the series are cointegrated, an ECM exists (see Granger (1986)). In general, we assume that the error-correction models can be expressed as[24]:

$$\Delta\, i_t^* = \lambda_0 + \lambda_1 \,\mathrm{ECT}_{t-1} + \sum_{j=1}^{n} \phi_j \,\Delta\, i_{t-j}^* + \sum_{j=1}^{n} \eta_j \,\Delta\, i_{t-j}^{ed} + \mathrm{u}_t \tag{3}$$

$$\Delta\, i_t^{ed} = \lambda_2 + \lambda_3 \,\mathrm{ECT}_{t-1} + \sum_{j=1}^{n} \omega_j \,\Delta\, i_{t-j}^{ed} + \sum_{j=1}^{n} \kappa_j \,\Delta\, i_{t-j}^* + \mathrm{v}_t \tag{4}$$

where: ECT_{t-1} represents the lagged error term of the cointegration equation, and Δ indicates the first difference of a variable. Cointegration requires that at least λ_1 be significant and negative or that λ_3 be significant and positive. These coefficients also contain information regarding the direction of causality between the variables: a negative λ_1 indicates that local interest rates adjust to divergences in the long-term relationship and hence "follow" EMBI yields.

[23] Notice that Table 1 presents the cointegration vector, in which the signs of the coefficients of i_t^{ed} and the constant are inverted because all the variables are on the same side of the equation, in order to have the errors on the other side. The coefficient of the local interest rate is normalized to one by construction.

[24] We assume that most ECMs do not have a constant, since that implies a linear trend for the variables on levels.

Table 2 presents the results for the error-correction models. For all countries, in the equations explaining $\Delta\, i_t^*$, the coefficients for ECT_{t-1} are negative and significant at the 1 percent level (as indicated by the t-ratios), implying that i_t^* tends to move as to restore its long-run equilibrium with i_t^{ed}. In contrast, in the equations for $\Delta\, i_t^{ed}$, the coefficients for ECT_{t-1} are either not significant even at the 10 percent level (Argentina –CD 3 Months-, Brazil and Chile) or have a sign opposite to the one that would ensure causality (i.e., positive). Overall, the significance level of the lags of the differences give further evidence of this result, since the lags of Δi_t^* tend not to be significant in explaining Δi_t^{ed}. Taken together, these results point to a strong causality running from i_t^{ed} to i_t^* and not the other way around[25].

III. 2 Interest Rates on Domestic local-currency-denominated debt and default risk

Finding an estimable form of equation (1.a) is no easy task. Since $E_t(S_{t+1})$ is an unobservable variable, many of the empirical tests for UIP incorporate two hypotheses of expectations behavior: (a) the rational expectations hypothesis that states that $E_t(S_{t+1})$ is a mathematical conditional expectation, based on the true probability distribution underlying the behavior of the exchange rate and (b) the hypothesis that the foreign exchange market is "weakly" efficient, in that expectations about the future exchange rate incorporate all information contained in past forecast errors of the exchange rate. Testing for these hypotheses is outside the scope of this paper. In addition, even for liquid markets in developed countries, recent evidence is still against UIP (See, for instance, Chinn (2006) and the references therein), so there is no reason to assume that other would be the case in less liquid markets such as the Latin American. On the other hand, other works have consistently found evidence in favor of Covered Interest Parity (CIP) [26]..This makes it preferable to work with forward exchange rates than to device a way to work with exchange rate expectations when testing for cointegration.

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[25] we test for block exogeneity using a modified Granger setup. The results are far from convincing and are only supportive in the case of Brazil and Chile. We present them in Annex II.

[26] See, for instance, Frenkel and Levich (1975), one of the typical –though dated- references; the evidence cited by Isard (2006); and Szylagi and Batten (2006), a recent work that shows that CIP has clearly been holding since the year 2000

Thus, rather than using equation (1.a), we will empirically test the following, more general approximation, which is based on CIP and, therefore, involves the forward premium f_t

$$i_t = \text{m}\,(i_t^{ed}, f_t) \qquad (5)$$

where $f_t = (F_t\text{-}S_t)/S_t$ and F_t is the forward exchange rate at time *t*. Thus, the testable hypothesis states domestic interest rates on local currency-denominated instruments as a function "m" of the yield on external debt and the forward premium (hypothesis B). As discussed above, an additional claim in this paper is that the yield on external debt can contribute to predict the behavior of the forward premium (hypothesis C). Therefore, after testing for the existence of cointegration between i_t, i_t^{ed} and f_t, we will explore whether i_t^{ed} causes both i_t and f_t.[27]

The cointegration equation consistent with equation (5) can be expressed as:

$$i_t + \gamma_1 i_t^{ed} + \gamma_2 f_t + c_2 = \varepsilon_t \qquad (6)$$

In conducting the cointegration test, we can now add Colombia and Mexico to the sample of countries. The reason is that equation (6) involves local-currency-denominated domestic debt, which is issued in significant amounts in both countries (in contrast to US-dollar denominated domestic debt). As in the previous sub-section the frequency of the series differs across instruments.

The results from the Johansen cointegration tests are presented in Table 3. In all cases, the test supports the presence of at least one stationary long-run relationship between the variables.

The table also shows the normalized long-run equilibrium equation corresponding to (6) (where the coefficient for i_t takes the value of 1). In the cases where evidence for two cointegrating vectors was found, the results for both one- and two-vector specifications are reported. In all cases, the coefficient for i_t^{ed} has the expected sign and is highly significant[28].

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[27] Annex I shows that f_t follows an I(1) process.

[28] The only exception is the case of Mexico, where there is also evidence for two vectors. Under this latter specification, results are as expected.

Results for the coefficient of f_t are also strong. On an overall basis, in Latin America not only there is at least one long-run relationship between local-currency-denominated domestic interest rates, default risk and exchange rate risk. Also, the relationship between country risk and interest rates on local-currency denominated domestic debt is positive and significant.

The error correction models corresponding to the cointegration exercise are presented in Table 4. It should be noted that, as in the previous table, both possible specifications are shown in the cases where evidence for two cointegration equations was found, Regarding the models with only one cointegration equation, the most salient feature is that in all the equations for Δi_t the coefficients for the lagged error correction term, ECT_{t-1} are negative and, highly significant (at the 1 percent significance level for Argentina, Chile and Colombia and 5 percent for Brazil), which means that i_t follows f_t and i_t^{ed} and adjusts to any deviations from the long-term relation [29]. This is not the case for the equations corresponding to Δi_t^{ed}, where generally the coefficient for the ECT_{t-1} is not significant or has a negative sign (implying that i_t^{ed} is does not follow any of the other variables). Turning to the models for Δf_t in the cases for Argentina (CD 1 Month) and Brazil, ECT_{t-1} has a positive and significant coefficient, and therefore f_t adjusts to deviations from the long-term equation (indicating that it is caused by the other variables). In the other cases, that coefficient is not significant (implying lack of causation for f_t). However, when the models are specified with two cointegrating vectors, more evidence for Hypothesis B and C is found. In the case of Argentina (CD 1 Month) and Mexico, both Δi_t and Δf_t respond adjusting to their respective long run equilibrium, while Δi_t^{ed} does not react accordingly. Argentina (CD 3 Months) is the only exception: though the results are the same as those recently described, i_t^{ed} responds seems to adjust to deviations from its long run relation with i_t, and, thus, some sort of double causation occurs. Nevertheless, these results provide a strong indication that interest rates on local-currency denominated debt is the endogenous variable in the long-run

[29] Mexico appears to be a notable contradiction to testable hypothesis B. However, as will be seen later, a model with two cointegrating vectors provides both a better fit and a more logical result.

relationship between the three variables under consideration[30]. Moreover, there is also weak evidence that foreign currency risk is driven by the yield on external debt (there was no evidence at all that the inverse was true).[31]

In summarizing the results of this section, one conclusion stands out: default risk matters and it matters a lot. The tests performed in this section strongly indicate that default risk has a strong predictive power over the behavior of domestic interest rates on assets denominated in both local currency and US dollars. A number of economic reasons could underlie this statistical causation; that is, there are several mechanisms through which the yields in external sovereign debt can be transmitted to local interest rates. Briefly, and as explained before these reasons are:

i) Increased financial liberalization has allowed for interest rate arbitrage, making systematic deviations of interest rates on domestic debt from interest rates on external debt unlikely.

ii) The recent experience of governments bailing out the private sector during crises makes it difficult for investors to distinguish between government and private sector risk.

iii) The lack of domestic sources of finance to offset reduced access to external finance casts doubt on the government's ability to repay both its domestic and external debt. As a consequence default perceptions of both domestic and external holders of government debt deteriorate and both interest rates increase.

Also, some (weak) evidence was found regarding the direction of the causality between default risk and foreign currency risk (running from the first to the second).

These results suggest that, in Latin America, the key for achieving industrial-country levels of interest rates *on a sustainable basis* rests mainly in improving investors' international perceptions of creditworthiness. This is not to say that declining exchange rate risk will not

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[30] However, stronger conclusions about causality derived from the error correction models can only be reached after undertaking joint significance tests such as the F-test or Wald test. Those tests have not been done in this study.

[31] While we fully recognize the need to undertake further causality tests based on the error correction models – more sophisticated tests in particular-, this paper presents similar block-exogeneity tests similar to those used in section IV.1. The results are shown in Annex III and point out at some evidence for the exogeneity of the BMBI yield, with respect to the other variables (particularly, again, in the cases of Chile and Brazil). The other two variables appear to be Granger-caused by the rest of the variables in the model.

contribute to reducing domestic interest rates, but based on the results, focusing on the reduction of default risk seems to be a more efficient policy recommendation.. Otherwise, policymakers facing highly deteriorated perceptions of creditworthiness might find that reductions in domestic interest rates are only a temporary phenomenon.

IV. Debt and Default Risk

The empirical analysis of the previous sections has investigated the relationship between default risk and domestic interest rates, using the yield on sovereign external debt (rather than the spreads) as a proxy for default risk. As explained in section II this assumption was done to conduct the analysis under the interest parity framework.

However, in order to reach conclusions about the effect of external debt on domestic interest rates we need to determine whether indeed a measure of external indebtedness is a central determinant of default risk (hypothesis A). That is the purpose of this section.

The issue is not new and there already exists a large amount of literature that validates the hypothesis that debt ratios are significant explanatory variables for the behavior of default risk, measured by the spread on sovereign debt.[32] The aim of this section is to confirm that such a relationship existed for the group of countries analyzed during the time period under consideration.[33]

In accordance with conventional models of default risk, which assume risk-neutral lenders, a linear formulation for the determination of spreads can be expressed as:

$$Log\left(s_{i,t}\right) = \alpha + X_{i,t}'\beta + w_{i,t} \qquad (7)$$

[32] See, for example, Edwards (1983), Frank and Cline (1971), Kamin and von Kleist (1999), Min (1998), Xu and Ghezzi (2003), Mody and Saravia (2003).

[33] Since the empirical tests in this section are independent from the ones undertaken in the previous sections, we will now conform to the existing literature and use the spread on external debt as a measure of default risk.

Where s is the spread on sovereign external debt[34] and the $X_{i,t}$'s are the determinants of spreads..Also, $u_{i,t}$ takes the following general form (which varies depending on the specification):

$$w_{i,t} = \mu_i + \lambda_t + e_{i,t} \tag{8}$$

where μ_t and λ_t are individual- and time-specific parameters, respectively, and $e_{i,t}$ is assumed to be a disturbance with the usual properties of zero mean and constant variance.
The list of variables suggested by previous studies as determinants of spreads on sovereign external debt is quite long; they can be categorized into financial variables, macroeconomic fundamentals, structural variables, external shocks and dummy variables (see Min (1998)). However, even though the models used in those papers differed in their selection of variables, a common feature is that all included a measure of external indebtedness.

Based on the results in the literature, we considered the following variables in our empirical estimation of spreads: the ratio of overall external debt to GDP (Debt/GDP, the ratio of international reserves to monetary base (R/H), the ratio of trade in goods and services to GDP (Trade depth), the real rate of growth of exports (Exports growth), the ratio of commodity exports to total merchandise exports (Commodity dependence), the year-on-year variation in the terms of trade (DToT), real GDP growth in the United States (US_growth), the log of US Fed Funds rate (US_i) and a dummy reflecting the provision of new IMF credit (IMF_credit). In addition, two alternative fiscal variables were considered: the ratio of fiscal balance to GDP (FB/GDP) and the ratio of government revenue to GDP (GR/GDP)

A number of studies include domestic real growth in the equation, although it might be considered an endogenous variable. The approach followed in this paper is using the predicted value of a regression of growth on its lag as an instrumental variable.[35] That variable is named Growthiv.

[34] Consistent with the analysis in the previous section, the series for spreads used in this section are the JP Morgan EMBI Global spreads

[35] There is no reason to assume that the past growth should be influenced by present EMBI spreads. Still, regressions were performed without that variable and the main results hold. It is also possible that some of the other variables in the list may be influenced by sovereign spreads. One possible candidate is the fiscal balance.

The expected signs of the regression coefficients are straightforward. It is expected that the coefficients of Debt/GDP, Commodity_Dependence and US_i have a positive sign as an increase in the value of these variables would tend to increase the spreads on sovereign external debt. For the rest of the variables, a negative sign is expected.

In addition to the above variables, we introduced a variable not so commonly used in the literature: the ratio of government liabilities held by the banks to total banks' assets (GL/BA). This ratio is used as an indicator of banking sector fragility since a high ratio signals that a government's debt problem would translate into banking sector difficulties. The debt-cum-banking-crisis problem in Argentina in 2001 is the most recent example of this interconnection. Clearly, it is expected that the coefficient of GL/BA will have a positive sign since an increased fragility of the banking system simply compounds the contingent liabilities of the public sector.

An unbalanced data panel was constructed using quarterly data for the seven Latin American countries: Argentina, Brazil, Chile, Colombia, Ecuador, Peru and Mexico. The period covered varied from country to country, going, in some cases, as early as the first quarter of 1995 and as late as the third quarter of 2005. Estimation was conducted using the method of fixed effects for two reasons. First, on a theoretical level, one would like to allow each country in the sample to have a different, non-random intercept, since some systematic differences in the eyes of the investors –not captured by the regressors- are expected. Second, random-effect estimator was not deemed statistically recommendable as the Hausman test showed that the regressors were correlated with the error terms.. We also included time-specific dummies to control for any event that affected all the countries at the same time (e.g., the Russian crisis, high world-wide liquidity, etc.)

Before presenting the results of the econometric analysis, some clarifications are needed regarding the construction of the external debt variable. First, as discussed in Section II, the experience in Latin America suggests that, at time of severe difficulties, the private sector is *bailed-out* by the government. This implies that the external debt of the private sector can be considered a contingent liability of the public sector. In this context, it is reasonable to expect that investors' perceptions of a country's creditworthiness depend on the *total* stock of external debt and not just the stock of public debt. Second, while GNP rather than GDP can be considered a better denominator for the debt ratio, we were not able to obtain sufficient information on a quarterly basis. Third, most of the data for the ratio of External Debt/GDP come from national authorities' publications. However, these data do not always go back in time as needed, thus, in order to fill the gaps, we constructed quarterly series using a modified version of the methodology suggested by Lane and Milesi-Ferrerri (2001)[36].

Table 5 presents the results of the estimations. In general, two approaches are followed here. The first includes regressions in which the debt ratio and the fiscal variables are treated separately. In the second, the ratio of debt to government revenue (Debt/GR) replaces the former variables. The reason for using the two approaches is that, while the first one is the most commonly used in the literature, the second seems to be more appropriate for Latin America. Specifically, given the high volatility of capital flows faced by Latin American countries, investors' assessments of a government's capacity to service its debt need to take into account the government's ability to generate domestic sources of revenue relative to the stock of debt. That is, investors assess a government's debt relative to its payment capacity. The ratio of external debt to tax collection would, therefore, be an ideal variable. However, data for tax ratios on a quarterly basis (the frequency used in the estimations) was not available. Thus, we introduced the ratio of Debt to government revenues (Debt/GR) as a proxy.

As seen in the table, it is not possible to reject Hypothesis A since the debt ratio is very significant in either of the two approaches and across model specifications. Moreover, when the variable Debt/GR is included (estimations 9 to 12) fewer variables are needed to obtain a

[36] End of the year, annual stock data on external debt were taken from the World Bank's World Development Indicators (WDI). To obtain quarterly data, we used quarterly weights to allocate the annual changes in debt stock (from the end of the fourth quarter of one year to the next) to the quarter in between. The weights were constructed from BOP flow data from IFS. For example, the first quarter's flow of portfolio investment debt securities, other investment liabilities, use of IMF credit and loans, and exceptional financing was added together to get total first quarter flow. To get the second quarter's total flow, we added the same variables together and added that sum to the flow for the first quarter. The weight for each quarter was then found by comparing the quarter's total flow to the total annual flow (the sum of the four quarters). Finally, the weights were multiplied with the change in the annual stock to estimate how much of the annual change in stock of debt should be applied to the end of a particular quarter. This change in stock was then added to the stock at the end of the fourth quarter from the year before to get the total stock at the end of the quarter.

good fit. In column 12 of Table 5 the only variables needed, in addition to Debt/GR are: Commodity_dependence, Growthiv and GL/BA.

Interestingly, GL/BA is always very significant in all specifications, which provides positive evidence for the idea that the fragility of the banking system is at the core of default and is therefore closely watched by investors. The significance of trade-related variables (other than commodity dependence) depends on model specification and therefore their inclusion is not very robust. Typically, the final form of the regressions always includes some measure of openness and/or commodity dependence. It is also interesting to note that, when estimating with fixed effects, no measure of foreign currency liquidity appears to be significant. Finally, the measures of external conditions related to the US are not significant across specifications, probably due to the inclusion of time-specific dummies.

Other specification and estimation methods were used and the results –shown in Table 6, including Debt/GR- were somewhat similar. First, we estimated the same models using robust standard errors (columns 1 through 4). Then we allowed for the errors to have an AR(1) structure (columns 5 through 8). It is expected that these methods will improve the accuracy of the estimation. The most important result is that the significance of the ratio holds invariably, with other variables being significant depending on the specification. This gives further support to Hypothesis A.

V. Policy Implications

The analysis in this paper has established the importance of external indebtedness for the determination of interest rates on domestic assets (denominated in either the local currency or US dollars). Debt ratios are important determinants of default risk, and cointegration analysis and causality tests strongly indicate that default risk provides valuable information about the behavior of domestic interest rates. Moreover, error correction models suggest that domestic interest rates tend to converge to a long-run equilibrium determined by the yield on external debt.

An important policy implication of these results is that the recent significant decline in interest rates in a number of countries in the region (Chile, Colombia, Mexico and Peru in our sample) has a better chance of being permanent (albeit not necessarily at current levels) in some countries than in others.

The case of Chile is the most straightforward. Since the creation of the JP Morgan EMBI Global index for Chile in the second quarter of 1999, Chile has displayed consistently the lowest yield on external debt of any Latin American country. This is consistent with being one of the countries with the highest capacity to service its debt as indicated by the ratio of government revenues to GDP (Figure 3). This relatively high capacity to pay, together with a hard-gained credibility for maintaining good economic policies, has allowed Chile to enjoy the unique—in Latin America—combination of declining yields on external debt and relatively high (albeit declining) ratios of external debt to GDP (Figure 3). The analysis in this paper would therefore suggest that Chile is in a position to reach industrial country-levels of domestic interest rates on a *permanent basis*.

The significant reduction in the ratio of external debt to GDP in Mexico since the late 1990s has allowed the country to offset the pervasive effect on the country's capacity to pay signaled by its low ratio of government revenue to GDP. Indeed, with a debt to GDP ratio of less than 20 percent by end-2005, Mexico had the lowest ratio of the countries in the sample. Because of these developments, the results in this paper suggests that the observed significant decline in the yields on external debt can be considered a permanent effect (not necessarily at current levels, however) and that Mexico is ready to enjoy significantly lower interest rates (relative to the 1990s) on a *sustainable basis.*

In the period for which there are data in the sample –basically, before the official dollarization of the economy- Ecuador displays an unsustainable behavior: its collecting capacity hovers around the mean of the other countries, but its debt ratio is extremely high. The conclusion is that the low interest rates Ecuador has been facing should be expected to increase in the future.

The cases of Colombia and Peru are less clear. Both countries have ratios of government revenue to GDP similar to that of Mexico, but debt ratios twice the size of Mexico's[37].

[37] Although they have somewhat declined in the last two years.

Consistently, spreads and yields on external debt are higher in Colombia and Peru than in Mexico. However, by end 2005, domestic interest rates were at a record lows and, in the case of Colombia, at levels similar to those in Chile. Following the analysis in this paper, the current low interest rates in these countries would appear to be a transitory phenomenon.

The policy conclusion is straightforward: High-risk Latin American countries (as indicated by the spreads on external debt) that are currently experiencing a significant reduction in domestic interest rates need to improve their capacity to collect taxes, an endeavor that often takes a significant amount of time, and appropriately deal with their debt situation in order to ensure a permanent reduction in rates.

Clearly, this does not mean simply raising tax rates, since that option faces important political constraints. It actually means taking action to deal directly with the core of the issue: the tax-revenue structure and the tax-collecting capacity of Latin American countries.

As shown in Birdsall and Rojas-Suárez (2004), both the amount and composition of tax-collection vary significantly across regions. Using industrial countries as a benchmark, Latin America as a region has a very low tax-collecting capacity[38]. Among other things, this is the consequence of having a large informal sector and of having inefficient collecting entities –despite the major reforms of the early 1990s-. Therefore, governments in Latin America should focus their efforts in increasing the efficiency of these institutions and widening the tax base, not so much in raising tax rates. As shown in Birdsall and Rojas-Suárez too, the composition of government tax income is different across regions, with Latin America relying heavily on consumption taxes. An option worth considering is increasing the revenue coming from personal income tax –thus resembling more an industrial country revenue structure-, but this involves again making the tax collection system more effective, as to avoid exemptions and loopholes that make it easy for individuals to avoid paying taxes.

Unless these problems are solved, *the burden of debt* might bring domestic interest rates right back up towards a high-level long-run equilibrium.

[38] For a sample of countries, Industrial countries tax income is 39% of GDP, while that of Latin America was only 17%.

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Table 1: Johansen Cointegration Tests

Specification: $i_t^* + \delta_1 \, i_t^{ed} + c_1 = \varepsilon_t^*$

Country	Argentina		Brazil	Chile	
Instrument (data periodicity)	Certificate of Deposits USD 1 Month (daily data)	Certificate of Deposits USD 3 Months (daily data)	Treasury Notes USD 6 Months (monthly data)	Captaciones 90-365 days 3 Months (monthly data)	Captaciones 30-90 days 1 Months (monthly data)
Sample	6/19/1998 10/31/2001	6/19/1998 10/31/2001	1998:04 2002:11	1998:01 2003:04	1998:01 2003:04
Cointegration vectors 1/					
Trace statistic	1**	1**	1**	1*	1
Max. Eigenvalue statistic	1**	1**	1*	1*	1*
Lags	3	2	1	1	1
Coefficients					
Local instrument yield	1	1	1	1	1
EMBI yield	-1.1320	-0.7182	-0.3488	-1.2504	-0.8830
	[-8.20271]	[-10.6042]	[-2.58927]	[-6.48281]	[-4.30021]
Constant	0.0055	0.0033	-0.0737	0.0138	0.0018
	[3.42072]	[1.37587]		[3.77173]	[1.39511]

Notes:
1. *,** denote significance at the 5% and 1% level, respectively. T-ratios in brackets.
2. For the Brazilian instrument, we include a (significant) trend in the cointegration equation
3. The number of lags is chosen using the Schwartz Information Criterion with a maximum number of 10 lags for daily data and 5 lags for monthly data.

Table 2. Error Correction Models

Country	Argentina				Brazil		Chile			
Instrument (data periodicity)	Certificate of Deposits USD 1 Month (daily data)		Certificate of Deposits USD 3 Months (daily data)		Treasury Notes USD 6 Months (monthly data)		Captaciones 90-365 days 3 Months (monthly data)		Captaciones 30-90 days 1 Months (monthly data)	
Sample	6/19/1998 10/31/2001		6/19/1998 10/31/2001		1998:04 2002:11		1998:01 2003:04		1998:01 2003:04	
	Local instrument yield	EMBI yield	Local instrument yield	EMBI yield	Local instrument yield	EMBI yield	Local instrument yield	EMBI yield	Local instrument yield	EMBI yield
	Δi^*_t	Δi^{ed}_t	Δi^*_t	Δi^{ed}_t	Δi^*_t	Δi^{ed}_t	Δi^*_t	Δi^{ed}_t	Δi^*_t	Δi^{ed}_t
ECT_{t-1}	-0.0897	-0.0168	-0.0975	-0.0142	-0.5434	-0.1191	-0.5898	0.0410	-0.6493	0.0557
	[-5.15882]	[-2.22641]	[-6.83806]	[-1.21054]	[-5.07393]	[-1.18583]	[-4.28196]	[1.19533]	[-4.06100]	[1.64956]
Δi^*_{t-1}	0.0131	0.0019	-0.1870	0.0502	0.2559	-0.1956	0.0470	-0.0506	-0.1761	-0.0264
	[0.35555]	[0.11620]	[-5.47946]	[1.78969]	[2.37739]	[-1.93872]	[0.37033]	[-1.60124]	[-1.39621]	[-0.99298]
Δi^*_{t-2}	-0.1030	0.0180	-0.0832	0.0241	.	.	.	.	.	.
	[-2.85717]	[1.15066]	[-2.47245]	[0.87268]	.	.	.	.	.	.
Δi^*_{t-3}	-0.0966	-0.0040	.	.	.	.	.	.	.	.
	[-2.70865]	[-0.26107]			.	.	.	.	.	.
Δi^{ed}_{t-1}	0.3668	0.0690	-0.0457	0.0763	0.0273	0.3531	0.2038	0.1268	-0.0157	0.1206
	[4.24132]	[1.83673]	[-1.03386]	[2.10293]	[0.17327]	[2.38649]	[0.38847]	[0.97072]	[-0.02581]	[0.93909]
Δi^{ed}_{t-2}	0.4209	-0.0753	0.0054	-0.0737	.	.	.	.	.	.
	[4.76997]	[-1.96632]	[0.12074]	[-2.00434]	.	.	.	.	.	.
Δi^{ed}_{t-3}	-0.0097	-0.0602	.	.	.	.	.	.	.	.
	[-0.10677]	[-1.53273]	.	.	.	.	.	.	.	.
Constant	.	.	.	.	-0.0006	0.0002	.		.	.
					[-0.59140]	[0.16690]	.	.		
R-squared	0.1416	0.0185	0.1082	0.0140	0.3927	0.1863	0.3008	0.0049	0.4221	0.0044

Notes:

1. T-statistics in brackets. "." Indicate the variable was not included in the model

Table 3: Johansen Cointegration Tests

Specification: $i_t + \gamma_1 i_t^{ed} + \gamma_2 f_t + c_2 = \varepsilon_t$

Country	Argentina					
Instrument (data periodicity)	Certificate of Deposits Pesos 1 Month (daily data)			Certificate of Deposits Pesos 3 Months (daily data)		
Sample	6/19/1998 10/31/2001			6/19/1998 10/31/2001		
Cointegration vectors 1/						
Trace statistic	2**			1**		
Max. Eigenvalue statistic	2**			2*		
Lags	3			2		
Coefficients						
Local instrument yield	1	1	0	1	1	0
Foreign exchange premium	-0.3461	0	1	-0.2108	0	1
	[-14.5729]			[-5.45628]		
EMBI yield	-0.6128	-2.2499	-4.7307	-1.1580	-2.2506	-5.1839
	[-3.62065]	[-9.63941]	[-6.81304]	[-4.70583]	[-11.7176]	[-7.26145]
Constant	0.0002	0.0160	0.0457	0.0155	0.0480	0.1541
	[0.12538]	[5.94141]	[5.69088]	[2.03808]	[7.11899]	[6.15249]

Table 3: Johansen Cointegration Tests (continued)

Country	Brazil	Chile	Colombia		Mexico		
Instrument (data periodicity)	Treasury Letters Reais 6 Months (monthly data)	Captaciones 90-365 days 3 Months (monthly data)	Treasury Bonds 3 Months (daily data)	Deposits 3 Months (daily data)	Treasury Certificate 1 Month (weekly data)		
Sample	1998:01 2003:10	1998:01 2006:02	5/14/1999 3/14/2006	5/14/1999 3/14/2006	7/14/1995 3/10/2006		
Cointegration vectors 1/							
Trace statistic	1*	1**	1**	1**	2*		
Max. Eigenvalue statistic	0	1**	1**	1**	1**		
Lags	3	1	4	4	2		
Coefficients							
Local instrument yield	1	1	1	1	1	1	0
Foreign exchange premium	-0.9847	-0.7918	-0.3264	-0.2728	-1.2994	0	1
	[-4.92613]	[-5.32272]	[-2.43554]	[-1.98275]	[-16.4629]		
EMBI yield	-1.5470	-0.7766	-0.7567	-0.9138	0.4667	-3.1852	-2.8104
	[-3.69545]	[-2.40941]	[-3.05789]	[-3.60695]	[1.88254]	[-10.3477]	[-11.4044]
Constant	0.0759	0.0021	0.0030	0.0052	-0.0025	0.0116	0.0108
	[2.27141]	[0.50531]	[0.55413]	[0.94206]	[-2.13804]	[4.61220]	[5.37235]

Notes:
1. *,** denote significance at the 5% and 1% level, respectively. T-ratios in brackets.
2. The number of lags is chosen using the Schwartz Information Criterion with a maximum number of 10 lags for daily data and 5 lags for monthly data.

Table 4. Error Correction Models

Country	Argentina											
Instrument (data periodicity)	Certificate of Deposits Pesos 1 Month (daily data)						Certificate of Deposits Pesos 3 Months (daily data)					
Sample	6/19/1998 10/31/2001						6/19/1998 10/31/2001					
	Local instrument yield	Foreign exchange premium	EMBI yield	Local instrument yield	Foreign exchange premium	EMBI yield	Local instrument yield	Foreign exchange premium	EMBI yield	Local instrument yield	Foreign exchange premium	EMBI yield
	Δi^*_t	Δf_t	Δi^{ed}_t	Δi^*_t	Δf_t	Δi^{ed}_t	Δi^*_t	Δf_t	Δi^{ed}_t	Δi^*_t	Δf_t	Δi^{ed}_t
$ECT1_{t-1}$	-0.1726	0.1934	-0.0067	-0.2098	-0.0771	-0.0110	-0.1083	-0.0884	-0.0110	-0.1086	-0.0814	-0.0112
	[-7.20683]	[1.75097]	[-1.13503]	[-8.11212]	[-0.65445]	[-1.71106]	[-8.06425]	[-1.88532]	[-1.95660]	[-8.07082]	[-1.74654]	[-1.98614]
$ECT2_{t-1}$	.	.	.	0.0528	-0.1169	0.0015	.	.	.	0.0246	-0.0321	0.0036
	.	.	.	[6.26292]	[-3.04411]	[0.72929]	.	.	.	[4.79027]	[-1.80198]	[1.68602]
Δi^*_{t-1}	0.1044	-0.4016	-0.0162	0.1329	-0.1949	-0.0129	0.0790	-0.1612	-0.0085	0.0783	-0.1426	-0.0090
	[2.68794]	[-2.24130]	[-1.67901]	[3.37882]	[-1.08819]	[-1.31215]	[2.30562]	[-1.34776]	[-0.59070]	[2.28263]	[-1.19900]	[-0.62336]
Δi^*_{t-2}	-0.2604	-0.2143	0.0125	-0.2403	-0.0681	0.0148	0.0048	-0.0335	0.0023	0.0037	-0.0050	0.0015
	[-7.36938]	[-1.31421]	[1.42371]	[-6.77023]	[-0.42116]	[1.67072]	[0.14262]	[-0.28708]	[0.16115]	[0.11180]	[-0.04300]	[0.10821]
Δi^*_{t-3}	-0.0169	0.4498	0.0026	0.0057	0.6144	0.0052	.	.	.	.	.	.
	[-0.51495]	[2.96353]	[0.31362]	[0.17197]	[4.05974]	[0.62441]	.	.	.	.	.	.
Δf_{t-1}	0.0335	-0.0940	-0.0007	0.0354	-0.0802	-0.0004	0.0303	-0.1136	0.0013	0.0293	-0.0843	0.0006
	[3.02702]	[-1.83792]	[-0.24323]	[3.22018]	[-1.59875]	[-0.16320]	[2.58537]	[-2.77592]	[0.27261]	[2.44034]	[-2.02679]	[0.11535]
Δf_{t-2}	0.0293	-0.1553	-0.0057	0.0309	-0.1430	-0.0055	0.0434	-0.1344	-0.0146	0.0425	-0.1116	-0.0151
	[2.77852]	[-3.19662]	[-2.19849]	[2.95883]	[-3.00326]	[-2.12428]	[3.72933]	[-3.31114]	[-2.97840]	[3.60844]	[-2.73184]	[-3.05668]
Δf_{t-1}	0.0099	-0.0418	0.0040	0.0101	-0.0399	0.0040	.	.	.	.	.	.
	[0.98244]	[-0.90078]	[1.59556]	[1.01636]	[-0.87781]	[1.60956]	.	.	.	.	.	.
Δi^{ed}_{t-1}	0.3565	4.0213	0.0935	0.2632	3.3435	0.0827	0.4829	1.3089	0.0454	0.4882	1.1597	0.0493
	[2.13316]	[5.21647]	[2.25727]	[1.56865]	[4.37605]	[1.97575]	[5.06891]	[3.93591]	[1.13472]	[5.07786]	[3.48022]	[1.22036]
Δi^{ed}_{t-2}	0.5803	1.7482	-0.0011	0.5297	1.3805	-0.0069	-0.2084	-0.0506	-0.0189	-0.2040	-0.1744	-0.0157
	[3.33959]	[2.18063]	[-0.02493]	[3.06253]	[1.75241]	[-0.16044]	[-2.08608]	[-0.14506]	[-0.44955]	[-2.02967]	[-0.50047]	[-0.37097]
Δi^{ed}_{t-3}	-0.0084	-1.0227	-0.0878	-0.0415	-1.2632	-0.0916	.	.	.	.	.	.
	[-0.04760]	[-1.25097]	[-1.99710]	[-0.23597]	[-1.57544]	[-2.08396]	.	.	.	.	.	.
Constant												
R-squared	0.3817	0.1190	0.0387	0.3922	0.1559	0.0422	0.2304	0.0436	0.0232	0.2306	0.0575	0.0238

Notes:

1. T-statistics in brackets. "." Indicate the variable was not included in the model

Table 4. Error Correction Models (continued)

Country	Brazil			Chile			Mexico					
Instrument (data periodicity)	Treasury Letters Reais 6 Months (monthly data)			Captaciones 90-365 days 3 Months (monthly data)			Treasury Certificate 1 Month (weekly data)					
Sample	1998:01 2003:10			1998:01 2006:02			7/14/1995 3/10/2006					
	Local instrument yield	Foreign exchange premium	EMBI yield	Local instrument yield	Foreign exchange premium	EMBI yield	Local instrument yield	Foreign exchange premium	EMBI yield	Local instrument yield	Foreign exchange premium	EMBI yield
	Δi^*_t	Δf_t	Δi^{ed}_t	Δi^*_t	Δf_t	Δi^{ed}_t	Δi^*_t	Δf_t	Δi^{ed}_t	Δi^*_t	Δf_t	Δi^{ed}_t
$ECT1_{t-1}$	-0.1623	0.1537	0.0463	-0.4782	-0.1165	0.0340	-0.0184	0.2233	0.0124	-0.0769	0.1742	0.0059
	[-2.11364]	[1.72666]	[1.33603]	[-4.13483]	[-1.13969]	[1.64157]	[-0.71064]	[6.31778]	[2.00706]	[-2.57965]	[4.25792]	[0.81937]
$ECT2_{t-1}$										0.0286	-0.2863	-0.0156
										[0.85684]	[-6.25556]	[-1.94579]
Δi^*_{t-1}	0.3772	-0.1774	-0.1544	-0.1860	-0.0809	-0.0198	-0.3075	-0.2843	-0.0624	-0.2747	-0.2568	-0.0587
	[2.54453]	[-1.03232]	[-2.31055]	[-1.53808]	[-0.75693]	[-0.91310]	[-5.75667]	[-3.90977]	[-4.90663]	[-5.14046]	[-3.50027]	[-4.56844]
Δi^*_{t-2}	-0.2456	0.0392	-0.0236				-0.0449	-0.0103	-0.0262	-0.0269	0.0048	-0.0241
	[-1.53542]	[0.21134]	[-0.32679]				[-0.98411]	[-0.16609]	[-2.40592]	[-0.59354]	[0.07732]	[-2.21316]
Δi^*_{t-3}	-0.0301	-0.0530	0.0823									
	[-0.23066]	[-0.34970]	[1.39623]									
Δf_{t-1}	0.1185	0.1266	-0.1016	0.0425	-0.1844	-0.0209	0.3178	0.0907	0.0244	0.3102	0.0843	0.0235
	[0.80126]	[0.73886]	[-1.52479]	[0.30637]	[-1.50375]	[-0.84044]	[7.37012]	[1.54394]	[2.37324]	[7.27600]	[1.43954]	[2.29257]
Δf_{t-2}	0.0574	-0.0219	0.0691				0.1385	0.1268	0.0210	0.1361	0.1248	0.0207
	[0.43084]	[-0.14200]	[1.15037]				[3.29976]	[2.21914]	[2.10146]	[3.28191]	[2.19209]	[2.07811]
Δf_{t-1}	-0.1183	0.0592	-0.0029									
	[-0.94705]	[0.40838]	[-0.05096]									
Δi^{ed}_{t-1}	0.3017	0.6017	0.6739	2.2697	2.5768	0.1967	1.2929	1.7867	0.1405	1.1124	1.6352	0.1203
	[0.85691]	[1.47424]	[4.24594]	[3.82077]	[4.90990]	[1.85108]	[5.92868]	[6.01778]	[2.70619]	[5.04673]	[5.40340]	[2.26925]
Δi^{ed}_{t-2}	-0.2110	-0.6714	0.0942				0.2442	0.6461	0.1653	0.1162	0.5386	0.1510
	[-0.53629]	[-1.47236]	[0.53106]				[1.11447]	[2.16551]	[3.16862]	[0.53085]	[1.79167]	[2.86661]
Δi^{ed}_{t-3}	0.1173	0.1635	-0.0858									
	[0.32641]	[0.39247]	[-0.52975]									
Constant												
R-squared	0.4762	0.2246	0.3936	0.3067	0.2189	0.0694	0.2546	0.1363	0.0609	0.2742	0.1450	0.0663

Notes:

1. T-statistics in brackets. "." Indicate the variable was not included in the model

Table 4. Johansen Cointegration Tests (continued)

Country	Colombia					
Instrument (data periodicity)	Treasury Bonds 3 Months (daily data)			Deposits 3 Months (daily data)		
Sample	5/14/1999 3/14/2006			5/14/1999 3/14/2006		
	Local instrument yield Δi^*_t	Foreign exchange premium Δf_t	EMBI yield Δi^{ed}_t	Local instrument yield Δi^*_t	Foreign exchange premium Δf_t	EMBI yield Δi^{ed}_t
$ECT1_{t-1}$	-0.0137	0.0023	0.0002	-0.0054	-0.0011	0.0003
	[-5.08629]	[0.44095]	[0.13324]	[-5.10498]	[-0.23091]	[0.29267]
$ECT2_{t-1}$						
Δi^*_{t-1}	-0.6062	-0.0347	0.0018	0.0384	-0.0262	-0.0248
	[-25.2183]	[-0.75860]	[0.16300]	[1.60274]	[-0.23441]	[-0.91576]
Δi^*_{t-2}	-0.4144	-0.0296	-0.0034	0.0080	0.0509	0.0298
	[-15.0342]	[-0.56472]	[-0.26666]	[0.36083]	[0.49023]	[1.18361]
Δi^*_{t-3}	-0.2592	0.0315	-0.0254	-0.0758	-0.1214	-0.0486
	[-9.56110]	[0.60998]	[-2.02549]	[-3.42308]	[-1.17356]	[-1.93884]
Δi^*_{t-4}	-0.1429	0.0294	0.0052	-0.0961	-0.0421	0.0221
	[-6.26030]	[0.67646]	[0.49402]	[-4.43956]	[-0.41656]	[0.89973]
Δi^*_{t-5}				0.3588	-0.0599	0.0031
				[16.4978]	[-0.58980]	[0.12455]
Δi^*_{t-6}				-0.0450	0.0037	-0.0618
				[-1.92205]	[0.03351]	[-2.32999]
Δf_{t-1}	-0.0074	-0.1398	-0.0045	-0.0038	-0.1278	-0.0027
	[-0.56817]	[-5.66406]	[-0.74814]	[-0.73161]	[-5.29203]	[-0.45769]
Δf_{t-2}	0.0210	-0.1253	-0.0061	-0.0038	-0.1220	-0.0065
	[1.59999]	[-5.01956]	[-1.00952]	[-0.72424]	[-5.00239]	[-1.10262]
Δf_{t-3}	0.0070	-0.0668	-0.0099	-0.0017	-0.0589	-0.0116
	[0.53617]	[-2.68323]	[-1.62508]	[-0.32362]	[-2.39821]	[-1.94101]
Δf_{t-4}	-0.0076	-0.0382	-0.0102	-0.0016	-0.0305	-0.0112
	[-0.58251]	[-1.54708]	[-1.69446]	[-0.30103]	[-1.23954]	[-1.88207]
Δf_{t-5}				-0.0036	0.0523	-0.0048
				[-0.68322]	[2.13636]	[-0.81328]
Δf_{t-6}				0.0051	-0.0166	-0.0077
				[0.98876]	[-0.68423]	[-1.31294]
Δi^{ed}_{t-1}	0.1021	-0.1039	0.1375	-0.0073	-0.1121	0.1461
	[1.93212]	[-1.03346]	[5.61451]	[-0.34434]	[-1.13146]	[6.08567]
Δi^{ed}_{t-2}	-0.0469	0.1233	0.0408	-0.0301	0.1104	0.0414
	[-0.88169]	[1.21827]	[1.65559]	[-1.40475]	[1.10237]	[1.70634]
Δi^{ed}_{t-3}	0.0029	0.0334	-0.0005	-0.0282	0.0377	-0.0020
	[0.05467]	[0.33024]	[-0.01984]	[-1.31345]	[0.37615]	[-0.08186]
Δi^{ed}_{t-4}	-0.0504	0.0189	0.0323	-0.0083	0.0256	0.0263
	[-0.95879]	[0.18905]	[1.32692]	[-0.38906]	[0.25536]	[1.08279]
Δi^{ed}_{t-5}				-0.0075	0.1739	0.0018
				[-0.34978]	[1.74177]	[0.07355]
Δi^{ed}_{t-6}				0.0225	-0.2968	-0.0124
				[1.06633]	[-3.00873]	[-0.51745]
Constant						
R-squared	0.2922	0.0345	0.0312	0.1687	0.0421	0.0391

Notes:
1. T-statistics in brackets. "." Indicate the variable was not included in the model

Table 5. Fixed-Effect Regression Results												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
COEFFICIENT	lembig	lembig	lembig	lembig	lembig	lembig	lembig	lembig	lembig	lembig	lembig	lembig
Debt/GDP	0.0370***	0.0382***	0.0383***	0.0362***	0.0406***	0.0402***	0.0406***	0.0401***				
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)				
FB/GDP	-0.0708***	-0.0731***	-0.0710***	-0.0752***								
	(0.0030)	(0.0015)	(0.0016)	(0.00091)								
GR/GDP					-0.0371**	-0.0270**	-0.0321**	-0.0320**				
					(0.023)	(0.048)	(0.012)	(0.012)				
Debt/GR									0.602***	0.581***	0.580***	0.581***
									(0)	(0)	(0)	(0)
GL/BA	0.0183***	0.0191***	0.0160***	0.0132**	0.0150**	0.0181***	0.0162***	0.0165***	0.0172**	0.0205***	0.0205***	0.0197***
	(0.0050)	(0.0013)	(0.0054)	(0.019)	(0.022)	(0.0027)	(0.0059)	(0.0049)	(0.011)	(0.00079)	(0.00074)	(0.0010)
Growthiv	-0.0103	-0.0101			-0.00683	-0.00755			-0.0121	-0.0218**	-0.0219**	-0.0256***
	(0.35)	(0.29)			(0.54)	(0.44)			(0.30)	(0.034)	(0.012)	(0.0010)
IR/M2	-0.00221	-0.00283	-0.00279		-0.00201	-0.00226	-0.00220		-0.000539	-0.0000671	-0.0000595	
	(0.39)	(0.22)	(0.23)		(0.45)	(0.33)	(0.34)		(0.84)	(0.98)	(0.98)	
Trade_depth	-0.0134	-0.0147**	-0.0189***	-0.0188***	-0.0217**	-0.0212***	-0.0229***	-0.0221***	-0.00497	-0.000290		
	(0.14)	(0.045)	(0.0011)	(0.0012)	(0.012)	(0.0030)	(0.000026)	(0.000038)	(0.53)	(0.96)		
Exports_growth	0.00109	0.000590			0.000686	0.000337			-0.00238	-0.00262	-0.00268	
	(0.58)	(0.75)			(0.74)	(0.86)			(0.26)	(0.17)	(0.12)	
DToT	-0.00252	-0.00255*	-0.00215		-0.00302*	-0.00290*	-0.00268*	-0.00264*	0.000648	-0.0000652		
	(0.11)	(0.086)	(0.12)		(0.059)	(0.055)	(0.057)	(0.060)	(0.69)	(0.97)		
Commodity_dependence	0.0430***	0.0428***	0.0417***	0.0367***	0.0376***	0.0359***	0.0359***	0.0351***	0.0359***	0.0353***	0.0353***	0.0326**
	(0.0013)	(0.0012)	(0.0012)	(0.0046)	(0.0044)	(0.0061)	(0.0046)	(0.0055)	(0.0079)	(0.0085)	(0.0081)	(0.013)
US_growth	-0.0155	-0.0192*	-0.0169*	-0.0187*	-0.0130	-0.0214**	-0.0201**	-0.0201**	-0.0130	-0.0136	-0.0136	
	(0.18)	(0.062)	(0.090)	(0.066)	(0.26)	(0.041)	(0.046)	(0.047)	(0.28)	(0.26)	(0.25)	
dumy1996	0.0273				-0.172				-0.243			
	(0.88)				(0.42)				(0.25)			
dumy1997	-0.239*	-0.285***	-0.343***	-0.358***	-0.391***	-0.354***	-0.398***	-0.403***	-0.324**	-0.232***	-0.230***	-0.201***
	(0.071)	(0.00033)	(0.00000053)	(0.00000019)	(0.0073)	(0.0000064)	(5.95e-09)	(3.18e-09)	(0.027)	(0.0048)	(0.0019)	(0.0041)
dumy1998	0.354***	0.298***	0.250***	0.253***	0.204	0.231***	0.196***	0.194***	0.205	0.274***	0.275***	0.324***
	(0.0090)	(0.000081)	(0.00039)	(0.00019)	(0.16)	(0.0017)	(0.0042)	(0.0046)	(0.18)	(0.00070)	(0.00050)	(0.0000053)
dumy1999	0.0517				-0.0453				0.00617			
	(0.70)				(0.75)				(0.97)			
dumy2000	0.0720				0.0423				0.157	0.217***	0.217***	0.257***
	(0.56)				(0.75)				(0.24)	(0.0024)	(0.0015)	(0.000021)
dumy2001	0.198	0.119*	0.128**	0.148**	0.194	0.144**	0.153**	0.157**	0.309**	0.328***	0.327***	0.425***
	(0.12)	(0.082)	(0.048)	(0.021)	(0.14)	(0.038)	(0.020)	(0.017)	(0.021)	(0.00021)	(0.00016)	(8.45e-11)
dumy2002	0.0997				0.0680				0.182	0.216***	0.216***	0.292***
	(0.43)				(0.60)				(0.17)	(0.0052)	(0.0049)	(0.0000099)
dumy2003	-0.144	-0.193***	-0.192***	-0.200***	-0.165	-0.172***	-0.172***	-0.183***	-0.0687			
	(0.17)	(0.0032)	(0.0033)	(0.0024)	(0.13)	(0.0091)	(0.0089)	(0.0049)	(0.53)			
dumy2004	-0.111	-0.141*	-0.136**	-0.159**	-0.131	-0.138*	-0.134*	-0.148**	-0.0481			
	(0.23)	(0.052)	(0.045)	(0.019)	(0.16)	(0.063)	(0.051)	(0.027)	(0.62)			
Constant	-2.599**	-2.510**	-2.232**	-1.868**	-1.250	-1.343	-1.180	-1.236	-2.428**	-2.644***	-2.655***	-2.578***
	(0.012)	(0.011)	(0.019)	(0.050)	(0.19)	(0.13)	(0.17)	(0.15)	(0.014)	(0.0047)	(0.0034)	(0.0042)
Observations	213	213	217	219	213	213	217	217	213	213	213	215
Number of cod	7	7	7	7	7	7	7	7	7	7	7	7
R-squared (within)	0.751	0.750	0.741	0.726	0.746	0.742	0.736	0.735	0.721	0.716	0.716	0.710
R-squared (between)	0.200	0.215	0.209	0.198	0.270	0.303	0.288	0.278	0.222	0.225	0.224	0.227
R-squared (overall)	0.206	0.217	0.223	0.221	0.263	0.295	0.293	0.287	0.228	0.236	0.235	0.251
R-squared (overall)	-0.846	-0.846	-0.852	-0.832	-0.831	-0.809	-0.819	-0.814	-0.771	-0.741	-0.742	-0.719

p values in parentheses

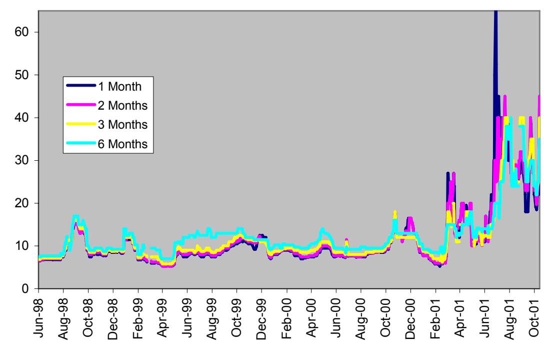
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Fixed Effects (Robust Standard Errors and AR(1) residual structure)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
COEFFICIENT	lembig	lembig	lembig	lembig	lembig	lembig	lembig	lembig
Debt/GR	0.602***	0.605***	0.608***	0.597***	0.670***	0.655***	0.669***	0.680***
	(0.078)	(0.040)	(0.038)	(0.037)	(0.079)	(0.070)	(0.070)	(0.071)
GL/BA	0.0172**	0.0163**	0.0151**	0.0162**	0.00416	0.00464	0.00240	
	(0.0068)	(0.0073)	(0.0070)	(0.0069)	(0.0093)	(0.0089)	(0.0089)	
Growthiv	-0.0121	-0.0137	-0.0153	-0.0230***	-0.0215*	-0.0250**	-0.0226**	-0.0218**
	(0.013)	(0.013)	(0.011)	(0.0087)	(0.012)	(0.012)	(0.011)	(0.011)
IR/M2	-0.000539	-0.000818			0.00302	0.00348		
	(0.0031)	(0.0026)			(0.0034)	(0.0033)		
Trade_depth	-0.00497	-0.00521	-0.00724		-0.000216	0.00384		
	(0.0081)	(0.0066)	(0.0052)		(0.011)	(0.0098)		
Exports_growth	-0.00238	-0.00255			-0.00520**	-0.00594***	-0.00566***	-0.00544***
	(0.0020)	(0.0017)			(0.0022)	(0.0020)	(0.0019)	(0.0019)
DToT	0.000648	0.000514			-0.00137	-0.00140	-0.00133	
	(0.0017)	(0.0017)			(0.0017)	(0.0017)	(0.0016)	
Commodity_dependence	0.0359***	0.0347**	0.0322**	0.0314**	0.0206	0.0173	0.0164	
	(0.014)	(0.014)	(0.014)	(0.014)	(0.019)	(0.018)	(0.017)	
US_growth	-0.0130	-0.0126			-0.000237	-0.00238		
	(0.012)	(0.011)			(0.0086)	(0.0079)		
dumy1995	0							
	(0)							
dumy1996	-0.243	-0.227	-0.239**	-0.159*	-0.295			
	(0.21)	(0.14)	(0.11)	(0.087)	(0.29)			
dumy1997	-0.324**	-0.299***	-0.295***	-0.231***	-0.190	-0.0382		
	(0.16)	(0.094)	(0.089)	(0.069)	(0.20)	(0.095)		
dumy1998	0.205	0.219**	0.244***	0.291***	-0.0931			
	(0.16)	(0.093)	(0.090)	(0.089)	(0.18)			
dumy1999	0.00617				-0.270	-0.208**	-0.205**	-0.267***
	(0.19)				(0.18)	(0.090)	(0.089)	(0.077)
dumy2000	0.157	0.181**	0.220***	0.239***	0.103	0.150*	0.140	
	(0.15)	(0.074)	(0.061)	(0.064)	(0.16)	(0.091)	(0.087)	
dumy2001	0.309**	0.328***	0.415***	0.416***	0.176	0.185**	0.186**	
	(0.13)	(0.086)	(0.067)	(0.067)	(0.16)	(0.087)	(0.082)	
dumy2002	0.182	0.204***	0.271***	0.283***	0.0167			
	(0.14)	(0.068)	(0.056)	(0.056)	(0.16)			
dumy2003	-0.0687				-0.141	-0.102	-0.0955	
	(0.11)				(0.13)	(0.081)	(0.080)	
dumy2004	-0.0481				-0.0837			
	(0.075)				(0.11)			
dumy2005	0							
	(0)							
Constant	-2.428**	-2.342**	-2.202**	-2.461**	-1.601**	-1.587***	-1.236***	-0.182**
	(0.94)	(1.02)	(1.00)	(0.97)	(0.62)	(0.54)	(0.45)	(0.071)
Observations	213	213	215	215	206	206	206	207
Number of cod	7	7	7	7	7	7	7	7
R-squared (within)	0.72	0.72	0.71	0.71	.	.	.	.
R-squared (between)	0.222	0.226	0.230	0.205	0.140	0.138	0.176	0.279
R-squared (overall)	0.228	0.232	0.248	0.231	0.204	0.206	0.239	0.353
R-squared (overall)	-0.771	-0.765	-0.751	-0.737	-0.741	-0.702	-0.690	-0.386

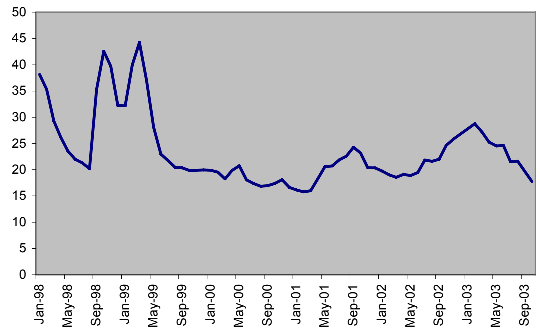
p values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 1.A. Domestic Interest Rates in Local Currency
(Annual percentage rates)

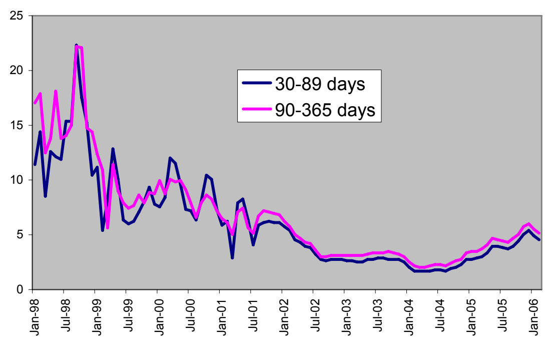
ARGENTINA: Certificates of Deposit



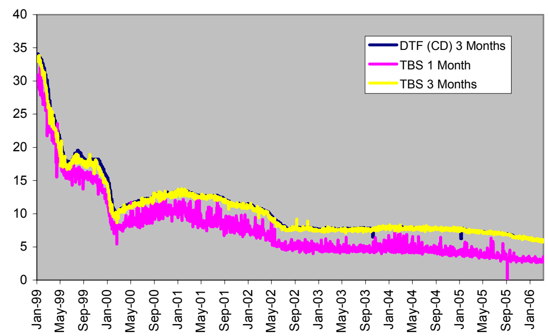
BRAZIL: Treasury Bill (LTN), 6 months



CHILE: Captaciones



COLOMBIA: Certificates of deposit and Time depositis



MEXICO: Treasury Bills (CETES)

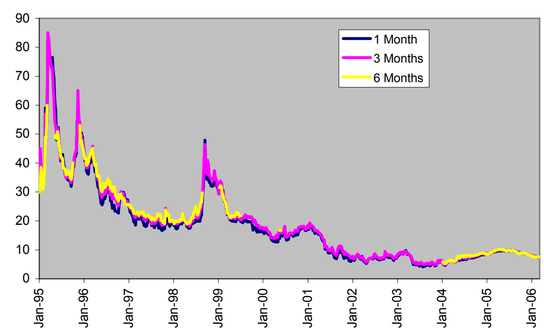
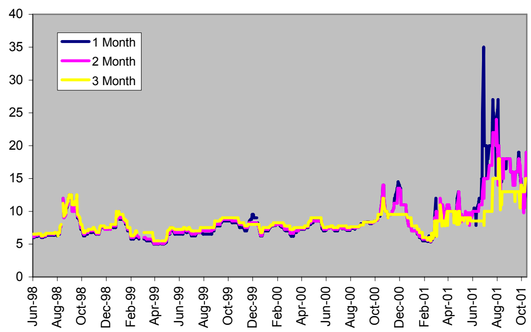
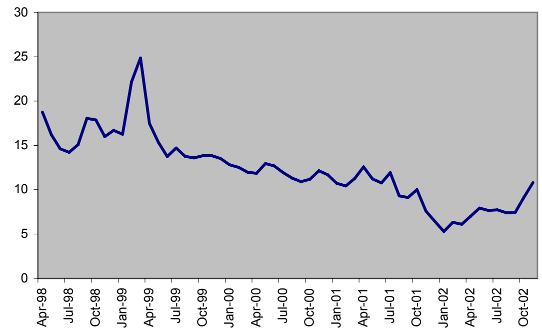


Figure 1.B. Domestic Interest Rates in Foreign Currency
(Annual percentage rates)

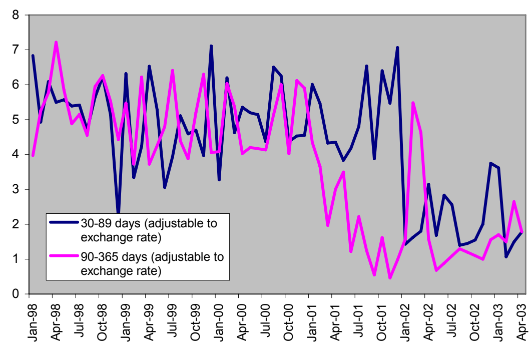
ARGENTINA: Certificates of Deposit



BRAZIL: Treasury Note (NTN), 6 Months



CHILE: Captaciones



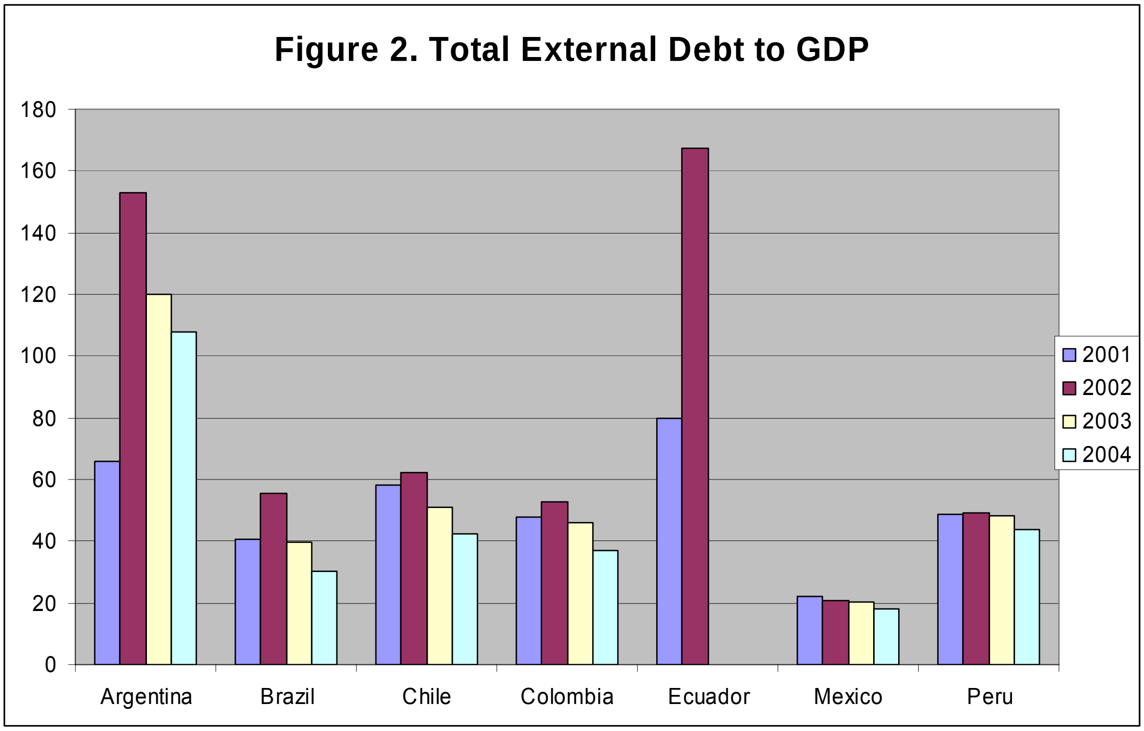


Figure 2. Total External Debt to GDP
180
160
140
120
100
80
60
40
20
0
Argentina
Brazil
Chile
Colombia
Ecuador
Mexico
Peru
2001
2002
2003
2004

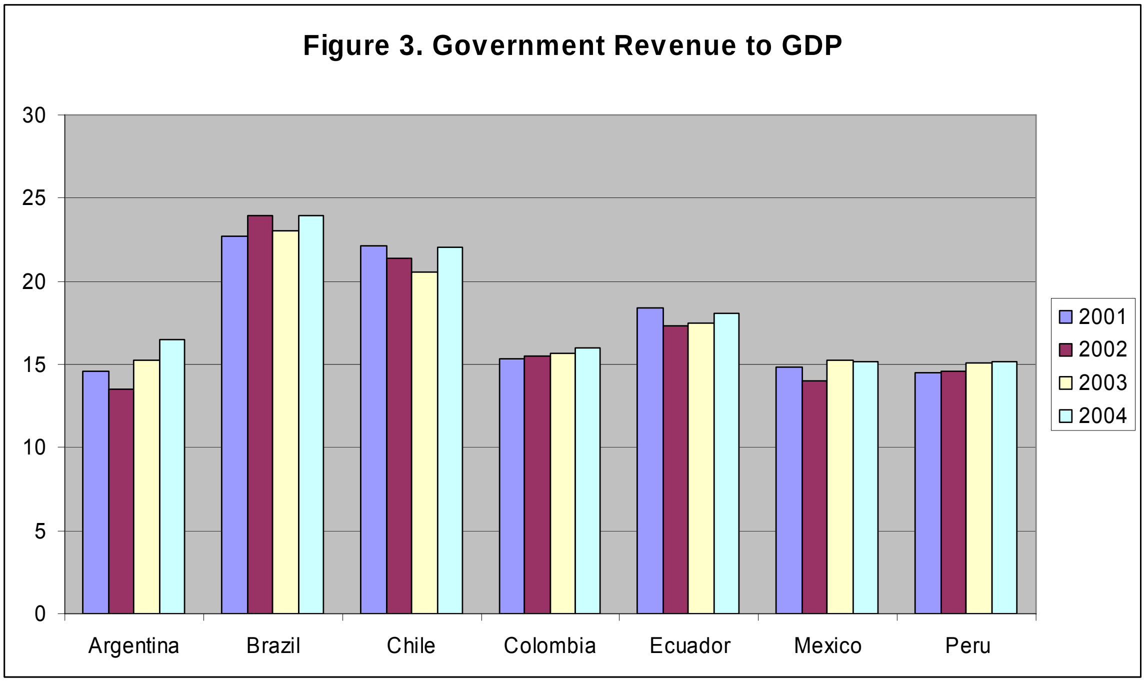


Figure 3. Government Revenue to GDP
30
25
20
15
10
5
0
Argentina
Brazil
Chile
Colombia
Ecuador
Mexico
Peru
2001
2002
2003
2004

Annex I: ADF Unit Root Tests 1/ 2/

ARGENTINA
Sample: 6/19/1998 - 10/31/2001
(Frequency: daily)

	Statistic	Lags
Local Instruments		
CD USD 1 Month	-2.82 **	3
CD USD 3 Months	-1.99 **	2
CD Pesos 1 Month	-1.38 **	8
CD Pesos 3 Months	-2.41 **	3
EMBI		
1 Month	0.05 **	7
3 Months	0.07 **	7
Foreign Exchange Premium		
1 Month	-2.53 **	8
3 Months	-1.32 **	9

CHILE
Sample 1: 1998:01 - 2003:04; Sample 2: 1998:01 - 2006:02
(Frequency: monthly)

	Statistic	Lags
Local Instruments		
Captaciones USD 30 to 90 days (S1)	-2.59 **	1
Captaciones USD 90 to 365 days (S1)	-2.90 **	0
Captaciones Pesos 30 to 90 days (S2)	-2.40 **	0
Captaciones Pesos 90 to 365 days (S2)	-1.67 **	4
EMBI		
1 Month (S1)	-0.18 **	0
3 Months (S1)	-0.19 **	0
1 Month (S2)	-1.36 **	0
3 Months (S2)	-1.37 **	0
Foreign Exchange Premium		
1 Month	-3.34 *	0
3 Months	-2.08	0

MEXICO
Sample: 7/14/1995 - 3/10/2006
(Frequency: weekly)

	Statistic	Lags
Local Instruments		
CETES Pesos 1 Month	-2.39 **	1
EMBI		
1 Month	-1.77 **	0
Foreign Exchange Premium		
1 Month	-2.66 **	0

BRAZIL
2003:10
(Frequency: monthly)

	Statistic	Lags
Local Instruments		
NTN USD 6 Months	-2.53 **	0
LTN Reais 6 Months	-2.22 **	4
EMBI		
6 Months (S1)	-2.88 **	1
6 Months (S2)	-3.00 *	1
Foreign Exchange Premium		
6 Month	-2.52 **	0

COLOMBIA
Sample: 5/14/1999 - 3/14/2006
(Frequency: daily)

	Statistic	Lags
Local Instruments		
COMM90	-2.72 **	4
DTF 90	-2.23 **	10
EMBI		
3 Months	-0.89 **	1
Foreign Exchange Premium		
3 Months	-2.09 **	2

1/ The number of lags is chosen using the Schwartz Information Criterion (SIC) which gives consisten results regardless of the maximum number of potential lags. With the exception of foreign-currency local instruments in Chile, we fail to reject the unit root null hypothesis across specifications. In the case of Chile, the null is rejected when including a trend, but we dismiss the case because of its lack of meaning.

2/ *,** indicate failure to reject the null hypothesis at the 1% and 5% levels respectively

Annex II. Tests for Block Exogeneity

Argentina

CD USD 1 Month

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	24.66	0.0000
EMBI yield is block exogenous	10.09	0.0000

CD USD 3 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	17.02	0.0000
EMBI yield is block exogenous	13.36	0.0000

Brazil

Treasury Notes 6 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	14.74	0.0000
EMBI yield is block exogenous	3.25	0.0390

Chile

Captaciones 1 to 3 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	13.17	0.0000
EMBI yield is block exogenous	1.34	0.2616

Captaciones 3 to 12 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	9.27	0.0001
EMBI yield is block exogenous	1.34	0.2627

Annex III. Tests for Block Exogeneity

Argentina

CD USD 1 Month

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	42.40	0.0000
Exchange premium is block exogenous	13.74	0.0000
EMBI yield is block exogenous	11.87	0.0000

CD USD 3 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	42.94	0.0000
Exchange premium is block exogenous	14.02	0.0000
EMBI yield is block exogenous	18.87	0.0000

Brazil

Treasury Notes 6 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	1.97	0.0551
Exchange premium is block exogenous	1.62	0.1255
EMBI yield is block exogenous	3.12	0.0027

Chile

Captaciones 1 to 3 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	20.24	0.0000
Exchange premium is block exogenous	15.03	0.0000
EMBI yield is block exogenous	2.27	0.0786

Colombia

TBS 90 days

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	4.51	0.0000
Exchange premium is block exogenous	5.90	0.0000
EMBI yield is block exogenous	6.81	0.0000

Deposits 90 days

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	2.39	0.0033
Exchange premium is block exogenous	1.48	0.1153
EMBI yield is block exogenous	2.77	0.0006

Mexico

Captaciones 1 to 3 Months

Null Hypothesis	Chi-statistic	P-value
Local yield is block exogenous	39.40	0.0000
Exchange premium is block exogenous	18.34	0.0000
EMBI yield is block exogenous	6.52	0.0000

APPENDIX: Instruments considered in the cointegration analysis

Table A. Instruments denominated in local currency

Country	Characteristics	Source	Frequency
Argentina	Certificates of deposit, 1 month, 2 months, 3 months, 6 months and 12 months	Bloomberg	Daily
Brazil	Interest rate on a floating-fixed (DI x PRE) swaps, 1 month, 3 months, 6 months, 12 months, 18 months, and 24 months (where DI is the Brazilian interbank deposit average rate).	Central Bank of Brazil and Bloomberg	Daily
	Treasury bills referenced hereby as Letras do Tesouro Nacional, Pre-fixada (LTN).[39]	Ministério da Fazenda	Monthly
Chile	Bank deposits (Captaciones en el sistema financiero), simple annualized average, 30 to 89 days and 90 to 365 days, non adjusted rate	Bloomberg	Monthly
Colombia	Annual effective, weighted-average deposit rate of certificates of deposit (DTF), 90 days, offered by the Colombian financial system	Bloomberg	Daily
	Time deposits of banks yield curve, also known as TBS (Tasa Basica de la Superintendencia Bancaria), maturing in 30 and 90 days.	Bloomberg	Daily

[39] Issued for coverage of budget deficits as well as for credit operations based on anticipated revenues, duly complying with the limits defined by the legislature. Discount represented by the difference in monetary terms between the price of placement by the Central Bank and the nominal value of redemption. Nominal value: multiples of R$1.00 (one real), modality is nominal and negotiable, custody is the Selic.

Mexico	Treasury bills (Cetes), 1, 3 and 6 months maturities.	Bloomberg	Weekly

Table B. Instruments denominated in US$

Country	Characteristics	Source	Frequency
Argentina	Certificates of deposit, 1 month, 2 months, 3 months, 6 months	Bloomberg	Daily
Brazil	Treasury bills referenced hereby as Notas do Tesouro Nacional, Serie D, indexadas ao Dolar Comercial (NTN).[40]	Ministério da Fazenda	Monthly
Chile	Bank deposits (Captaciones en el sistema financiero), simple annualized average, 30 to 89 days and 90 to 365 days, adjusted to the variation in the exchange rate	Bloomberg	Monthly

[40] Issued for coverage of budget deficits as well as for credit operations based on anticipated revenues, duly complying with the limits defined by the legislature. Interest rate of 6% per year assessed on the updated nominal value; modality is nominal and negotiable, nominal value: multiple of R$1,000 (one thousand reals); updating of nominal value: according to the change in the sale rate of the U.S. dollar on the free rate exchange market, as announced by the Central Bank of Brazil, utilizing the average rates of the business day immediately prior to the dates of issue and maturity of the paper in question; payment of interest up to six months: at redemptions; redemption of principal: in a single payment on the date of maturity; custody is the Selic.