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BANCO DE ESPAÑA

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Abstract

This paper builds upon the empirical literature on the macroeconomic impact of real exchange rate depreciations for a sample of 27 emerging economies. We find that real exchange rate depreciations tend to increase a country's risk premium. This effect is neither linear nor symmetric: large real exchange depreciations are much more detrimental and real appreciations do not seem to reduce the risk premium. We also show that the main channels for the real exchange rate to affect country risk are external and domestic balance sheet effects, stemming from the sudden increase in the stock of external or domestic dollar-denominated debt, respectively. This is particularly the case in the countries with the largest financial imperfections. Competitiveness is not an important enough factor to outweigh this negative effect. Finally, fixed exchange rate regimes tend to amplify balance sheet effects, beyond the extent of real depreciations. The data indicates that it could be due to a larger accumulation of external debt under fixed regimes.

JEL classification: F31, F34, F41
Key words: balance sheet effects, financial accelerator theories, exchange rate regime

1 Introduction

During the second half of the 1990s emerging countries have experienced very large swings in the external cost of capital as well as several financial crises, with a large impact on economic growth. For this reason, academics and practitioners interested in emerging economies are paying increasing attention to the determinants of a country's risk premium. An important one is the real exchange rate, since it is particularly volatile in emerging regions, as compared to industrial ones. Besides, there is a strand of literature exploring the direct link between real exchange fluctuations and economic performance, which can serve as a basis to analyze the relation between the real exchange rate and the risk premium.

Conventional open economy models, and in particular the influential Mundell-Fleming, argue that real depreciations have an expansionary effect by switching global demand towards domestic production. Already in 1986, Edwards (1986) challenges this view on several grounds: the possible contractionary effect of a higher price level after a devaluation as well as a potential negative impact on income distribution. He also finds some evidence of a small contractionary effect for a sample of 12 developing countries. More recently, theories based on what has started to be known as the open economy Bernanke-Gertler-Gilchrist financial accelerator, have challenged the Mundell-Fleming view. If a country's debt is denominated in foreign currency, a real depreciation will reduce the country's net worth through a balance sheet effect and, in the presence of financial imperfections, may increase the cost of capital. This is particularly relevant for emerging economies given their relatively large share of foreign currency denominated debt, the frequency of large real depreciations and the presence of financial imperfections.

In an earlier work, Berganza, Chang and García-Herrero (2003) develop a simple theoretical framework to understand the relation between balance sheets –stemming from the increase in the external debt service after a real depreciation– and a country's risk premium and find evidence of a positive relation between the two. This could have several policy implications, such as the need to reduce foreign currency indebtness and/or limit, to the extent possible, financial imperfections. It could also have implications for the choice of the exchange rate regime since avoiding real exchange rate depreciations becomes crucial for a country's cost of credit.

Given the relevance of the matter, it seems worthwhile investigating the issue further. In particular, we would like to understand why –and under which circumstances– balance sheet effects increase a country's cost of borrowing. Among these questions we shall study: i) Whether real exchange depreciations are detrimental for country risk; and to what extent and under which circumstances this is the case. (ii) Whether real exchange appreciations are beneficial. (iii) Which are the channels of influence of a real depreciation on country risk; in particular, whether "domestic" balance sheets, stemming from the increase in domestic foreign currency denominated debt after a real depreciation are as important as "external" balance sheet effects. (iv) What is the role of competitiveness, as the most important channel in the traditional literature of the expansionary effects of real depreciations. (v) Whether balance sheet effects are influenced by the existence of financial imperfections, as one would expect from the financial accelerator literature. And, finally (vi) Whether the exchange rate regime plays a role in how balance sheets affect country risk, beyond the extent of real depreciation.

Investigating these issues will help us delimit the extent to which emerging countries should worry about real depreciations, depending on their own characteristics. In the same vein, it should contribute to identifying which are the most appropriate policy actions to minimize this problem.

2 Review of the literature

Most theoretical models on the impact of balance sheet effects draw from the open economy version of the financial accelerator, developed by Gertler, Gilchrist and Natalucci (2003). They generally show that balance sheet effects, related to a sudden reduction in net wealth, are detrimental either in terms of the cost of capital or output. However, this result hinges on the existence of financial imperfections. Given these conditions, the ultimate answer to the question of whether balance sheet effects are detrimental and when will be an empirical one.

To our knowledge the only work which deals with this issue at the macro level is that of Berganza, Chang and García-Herrero (2003), who find that balance sheet effects –stemming from the increase in the external debt service after a real depreciation– raise a country's risk premium for emerging economies. As for firm-level data, Forbes (2002) analyzes the impact of 12 major depreciations on a sample of emerging countries' large firms and finds no significant balance sheet effects on performance although firms with higher debt ratios tend to show lower net income growth. It should be noted, though, that Forbes does not take into account the currency composition of debt. In the same vein, Bleakley and Cowan (2002) show evidence that the competitiveness effect associated with exchange rate depreciations offsets the potential contractive balance sheet effect on investment for a panel of Latin American firms. The authors, therefore, conclude that there is no severe currency mismatch of output and liabilities in their sample. This optimistic result should, however, be taken cautiously, since no country fixed effects are considered and Brazilian firms account for half of the observations. In fact, when each country is analyzed separately, always with firm-level data, there is evidence of detrimental balance sheet effects on investment in some countries (namely, Colombia, Mexico and Peru) but not in others (Brazil, Chile)[1]. Furthermore, a macroeconomic empirical analysis, such as ours, may offer a more pessimistic picture of balance sheet effects in as far as it is not only the tradable sector which is considered but the whole economy. This has fewer possibilities to hedge its negative wealth in foreign currency than the group of large firms considered in the firm-level empirical studies.

1. Galindo, Panizza and Schiantarelli (2003) offer a survey of the results.

3 Objective of the paper

The objective of this paper is to investigate, at the aggregate level, whether and in which way real exchange rate depreciations increase a country's risk premium, with particular attention to balance sheet effects. To this end, a number of questions are analyzed.

The first is whether an exchange rate depreciation increases a country's risk premium and under which circumstances this is the case. In principle, this should happen if balance sheet effects more than counterweigh the expected increase in competitiveness associated with a real depreciation. The question is why it is so for some countries and not for others. Identifying these differences is not an easy task but certainly interesting for policy makers, so as to know to which extent they should worry about real depreciations.

A second interesting question is whether the impact of real exchange rate depreciations and appreciations is symmetric. An asymmetry –whereby appreciations had no significant impact– would make the volatility of the real exchange rate more of a cause of concern for policy makers since there would be no instance to benefit from it (i.e., from appreciations). Financial accelerator theories argue in favor of an asymmetric effect of changes in net wealth since agency problems may only be binding when the debtor's situation worsens [Bernanke and Gertler (1989)]. Another reason for such an asymmetry could be drawn from the literature on liquidity constraints, which should only be relevant when a sudden increase in indebtness occurs and not when there is a net worth gain. A related question is whether the extent of a real depreciation affects the risk premium more than proportionally; that is, if its impact is non-linear. If the answer is yes, this may have a bearing on the choice of the exchange rate regime since there may be no need to worry about small depreciations but only about large events. Such non linearity could be expected on the basis of the same arguments as before since large changes in net worth should make financial and liquidity problems much more binding than relatively smaller ones.

The third question relates to the channels through which real exchange depreciations affect the risk premium. The most well known channel, the gain in competitiveness, should reduce the risk premium the more open a country is to trade. The other crucial channel is that of balance sheet effects, stemming from a sudden reduction in net financial wealth. In the case of emerging countries, it seems safe to think of negative net financial wealth because of the generally large stock of debt that they have accumulated. In the financial accelerator literature, however, balance sheet effects hinge on the existence of financial imperfections, which we also need to test for. One interesting issue for policy makers is whether all balance sheets are the same; in other words, whether an increase in the stock of foreign currency-denominated debt held by non residents ("external" balance sheets) can have the same detrimental effect on the risk premium as an increase in the stock of foreign currency-denominated debt held by residents ("domestic" balance sheet effects). If the former were larger, this would be an argument in favor of increasing a country's domestic indebtness, even if in foreign currency, as compared to external indebtness[2]. The rationale behind a lower cost of domestic balance sheet effects may be that having residents as holders of a country´s dollar liabilities, these will benefit from a real depreciation compensating, at least partially, the loss of wealth of the borrowers. In other words, the real depreciation will have distributional effects but will not necessarily reduce net financial wealth, as for external balance sheets. The extent of the wealth effects of domestic balance sheets may depend on what resident creditors do with their wealth gain. If they are uncertain about

2. This, however, might not be in the range of options available to policymakers if domestic savings are very low.

repayment and/or the economic situation deteriorates sharply, they may opt for capital flight, eliminating the positive impact of the wealth gain on domestic spending or investment. The extent to which they reinvest their additional wealth may actually hinge on the existence of financial imperfections.

The fourth question relates to the existence of financial imperfections, a crucial condition for balance sheet effects to be relevant in the financial accelerator theories. Given that our sample is composed of emerging countries, one could argue that they all suffer from financial imperfections. However, the degree to which this is the case varies from country to country. This is why it seems worth testing whether the countries with larger imperfections are also those which suffer from larger balance sheet effects. In addition, the role of financial imperfections could be different for domestic and external balance sheets. On the one hand, one could argue that external creditors are less affected by financial imperfections if the external debt is issued outside the country, but it is also true that the sovereign debtors have the power to change the rules of the game even in this case. In addition domestic creditors may be better informed of their rights, or possible changes in their rights.

The fifth and final issue is the role of the exchange rate regime on how balance sheets affect country risk, beyond the extent of exchange rate change. Several authors have developed this idea theoretically but no empirical test exists yet. Based on the financial accelerator literature, Gertler, Gilchrist and Natalucci (2003) argue that fixed exchange regimes amplify balance sheet effects because they force the central bank to adjust interest rates in a manner that enhances financial distress. Céspedes, Chang and Velasco (2004) show that flexible exchange rates play an insulating role in the presence of real external shocks so that they output and investment fall by less than under fixed exchange regimes. The channel is the higher expected real depreciation under a pegged regime, and thereby the increase in interest rates, since policy makers will tend to maintain the exchange rate regime during a relatively long period so as to minimize the size of the change in the relative prices. Another idea for pegged exchange rate regimes to be detrimental for financial fragility is that agents tend to feel more protected from exchange rate risk and do not hedge against it [Burnside, Eichenbaum and Rebelo (2001)]. In this line, Ize and Levy-Yeyati (2003) and Broda and Levy-Yeyati (2003) argue that a pegged exchange regime may induce dollar-denominated indebtness, and financial dollarization in general, because it can be taken as an implicit insurance by the private sector, as well as a demonstration effect from the part of the government that the exchange rate regime is credible and will be maintained[3]. On the other hand, Elekdag and Tchakarov (2004) show that fixed regimes can be superior for countries with a high level of indebtness and whose monetary policy is constrained. This is, therefore, a question worth tackling empirically. We interact each country's exchange rate regime with external and domestic balance sheets, and test whether their detrimental effect on the risk premium is larger for fixed regimes. Both de jure and de facto regime classifications are used.

3. Although this idea cannot be fully tested with the data available, Galiani, Levy-Yeyati and Schargrodsky (2003) find indirect evidence that the currency board acted as an implicit insurance for the case of Argentina.

4 Data issues and empirical strategy

The focus on the country as a whole and, thus, the use of macroeconomic data substantially limits the number of observations for this study. This is even more the case given the difficulties of proxying our dependent variable, country risk. The most widely used proxy in the literature are the returns implicit in the Emerging Markets Bond Indices (Embi) provided by JPMorgan, after having subtracted total returns of US treasury bonds[4] (from now onwards this variable shall be named *Embi*). Appendix II offers details on variable definitions and data sources. The choice of the *Embi*, together with the condition we impose that at least four observations of Embi returns exist, limits our sample to 27 emerging economies and to the period 1993 to 2002 for most countries (for some countries the timeframe is even shorter). This yields an unbalanced panel with a total of 210 annual observations (Table 1 in Appendix I).

The geographical distribution of the observations among regions can be found in Table 2 in Appendix I. All major emerging regions are represented although Latin America is overweighted (with 9 countries and 71 of the observations) and the Middle East is underweighted.

Apart from the dependent variable (*Embi*), the focus of this study is the change in the real exchange rate. Two different measures are calculated: The first is relevant for foreign currency indebtness, namely the bilateral nominal exchange rate against the US dollar adjusted by the domestic inflation (*Real Exchange Rate Change*). We use the bilateral exchange rate since we assume that all foreign currency debt is denominated in US dollar. This is a relatively safe assumption for the countries in our sample. The second measure is relevant for competitiveness, namely the effective real exchange rate against the major trading partners (*Multilateral Real Exchange Rate Change*).

The other crucial concept is that of balance sheet effects, which stem from a reduction in financial net wealth after a real depreciation. In emerging countries we can safely assume that financial wealth is negative and corresponds with the stock of foreign currency-denominated debt. In other words, although we use a concept of gross (negative) financial wealth, net financial wealth is bound to be negative, although probably smaller. The main difference probably lies in the size of international reserves, which we shall include as a robustness exercise. Our results do not change. Another interesting issue is whether what matters to measure balance sheet effects is the change in the stock of debt, because of the depreciation, or the change in the amount a country needs to pay on that year (the debt service). We shall use the stock of debt as first option, since it is more in line with the concept of net wealth in the financial accelerator literature, but robustness test will be conducted with the debt service. The results do not change.

We differentiate between domestic and external balance sheet effects. *External Balance Sheets* are composed by the foreign-currency denominated debt held by non residents at the end of the previous period (*External Debt_1*) multiplied by the *Real Exchange Rate Change.* In turn, *Domestic Balance Sheets* are composed of the foreign-currency denominated debt held by residents at the end of the previous period (*Domestic Debt_1*) multiplied by the *Real Exchange Rate Change*. We take the previous period to avoid mixing quantity effects, stemming from new indebtness from t-1 to t, with price effects, from the real exchange rate change. The best available proxy for *Domestic Debt* for the sample of

4. It should be noted that Embi spreads reflect sovereign risk while our objective is broader: country risk in general since we do not concentrate on public debt only but in all debt denominated in foreign currency, be it public or private. In any event, the Embi spread continues to be the best available proxy as sovereign spreads are generally a floor for private sector country risk.

countries in this study[5], are the banking system's dollar denominated deposits. De Nicoló, Honohan and Ize (2003) and Levy-Yeyati (2004) argue that the banking system's dollar denominated deposits should be very close to the banking system dollar-denominated credit to the private sector. In fact, prudential regulations generally oblige banks to maintain very small open positions in foreign currency. In addition, banks' dollar denominated credit to the private sector should practically be equal to the total domestic indebtness of the private sector in foreign currency except for the dollar-denominated debt this sector may issue domestically. This is bound to be negligible in most emerging countries. As for the case of *External Debt*, *Domestic Debt* is a gross concept of (negative) financial wealth since the private sector can hold assets in foreign currency and not only liabilities. The difference between the two, however, is that *External Debt* includes all sectors of the economy and *Domestic Debt* only the private sector. In any event, it seems reasonable to think that public sector will also have negative wealth in foreign currency held by residents.

Financial imperfections are proxied by a variable measuring the quality of the institutional setting affecting the risk of investment (*Creditor Rights*). It is the sum of three subcomponents: contract viability or expropriation, profits repatriation and payment delays. Since this definition of creditor rights is more oriented towards external creditors, we can consider it as a ceiling for the creditor rights of domestic creditors in as far as emerging countries generally give priority to external debt payments in case of difficulty.

Competitiveness, the other relevant channel of influence of real exchange rate depreciations, is measured by the interaction of a country's openness (*Openness*) and the change in the effective real exchange rate (*Multilateral Real Exchange Rate Change*).

As regards the exchange rate regime, we use both de facto and de jure classifications. In the former, the underlying exchange rate regime is inferred from the observed exchange rate movement. The classification by Rogoff and Reinhart (2004) is the preferred option since it allows us to keep a larger number of observations than other classifications, such as Levy-Yeyati and Sturzenneger (2003). The de jure classification is based on the IMF *Annual Reports on Exchange Rate Arrangements and Exchange Restrictions*. Given the data limitations, we opt for grouping the classification into three broad ones: fixed, intermediate and flexible regimes (see Appendix II for details).

Finally, a number of control variables are included in all specifications. The first is the lag of the sovereign risk (*Embi_1*), to account for its persistence, as will be shown later. The second is the *Embi* spread for all emerging countries for which it is available (*Emerging Embi*). This should capture a possible similar co-movement stemming from the market integration of this asset class and potential contagion effects. At the same time, this control variable allows us to pick up possible time effects in the regression.

From the statistical tables in Appendix 1 (3, 4 and 5), some stylized facts are worth mentioning. First, the average of the *Real Exchange Rate Change* is a small real appreciation, as opposed to a slight real depreciation in the case of the *Multilateral Real Exchange Rate Change*. Second, the average *External Debt* is around five times that of *Domestic Debt*. Third, the average *Real Exchange Rate Change* varies only slightly among different exchange rate regimes, both in the de jure and de facto classifications: de jure, flexible exchange rate regimes appreciate slightly on average while the other two depreciate; de facto, intermediate regimes appreciate slightly while the other two depreciate. As could be expected, the largest standard deviation is that of de facto flexible exchange rate regimes. These differences between classifications can be better understood comparing where each observation stands in the two classifications, as shown in Table 4 of Appendix 1. From the 203 available observations only 111 find themselves in the same exchange rate regime in the de facto and de jure classifications. 51 are more flexible de jure than de facto, which we could generally

5. We would also like to use data on domestic public debt denominated in foreign currency as collected by Reinhart, Rogoff and Savastano (2003) but it is only available for a small number of the countries we have included in our analysis.

label as "fear of floating" cases. The remaining 41 are more flexible de facto than announced, which in 16 of cases coincide with "freely falling" experiences of relatively fixed regimes, as labelled by Rogoff and Reinhart (2004).

Finally, from the matrix of correlations in Table 5, Appendix 1, we can outline other characteristics of the data. First, the dependent variable (*Embi*) is very persistent (with a correlation of 0.71 between t and t-1). Second, the correlation between *Embi* and either the *Real Exchange Rate Change* or the *External Debt*, and therefore *External Balancesheet*, is positive, in line with the a priori of the financial accelerator literature. However, the correlation betwen *Embi* and Δ*External Debt* is negative, which hints at the idea (confirmed later in our results) that it is not so much the new external indebtness that matters for country risk, but the sudden increase in the stock of external debt due to a real depreciation (in other words, the balance sheet effect and not the quantity effect). Third, while the correlation between *Embi* and *Domestic Debt* is negative but very close to zero, that between *Embi* and *Domestic Balancesheet* is positive and relatively high (higher than for *External Balance sheet*). Only judging from these correlations, we should expect a negative net wealth effect also in the case of domestic balance sheets and not only for external ones. Fourth, the fact that the correlation between *External Debt* and *Domestic Debt* is close to zero seems to indicate that there is no clear pattern of complementarity or substitution between the two. Finally, as one would expect, the quality of *Creditor Rights*, Δ*Exports* and *Openness* are negatively correlated with the dependent variable but, contrary to the theoretical literature, the degree of *Competitiveness* (i.e., the product of *Openness* and *Real Exchange Rate Change*) is positively correlated.

As for the empirical strategy, we opt for a Generalized Method of Moments (GMM), following Arellano, and Bover (1995). We prefer this option to using OLS so as to (i) remove unobserved time-invariant country-specific effects; (ii) account for the potential endogeneity arising from the inclusion of the lagged dependent variable in addition to other possibly endogenous right-hand side variables (particularly the real exchange rate); and (iii) deal with the possibility that the dependent variable is not stationary. The second reason is particularly important since there might be instances of reverse causality (from country risk to the real exchange). The GMM empirically strategy allows us to take our results on safer grounds.

The Arellano-Bover estimator, or GMM system estimator, combines the regression expressed in first differences (lagged values of the variables in levels are used as instruments) with the original equation expressed in levels (this equation is instrumented with lagged differences of the variables)[6]. The disadvantage with this empirical strategy, though, is the relatively small number of observations while the conditions to use GMM should be complied with asymptotically. As a robustness test, we run all regressions in OLS, with robust standard errors. The results remain unchanged.

6. In all the estimations we present results for a Sargan test of over-identifying restrictions that checks the overall validity of the different moment conditions and in all the cases we fail to reject the null hypothesis.

5 Results

5.1 The net impact of real exchange depreciations and appreciations

As a first step, it seems important to confirm whether real exchange rate depreciations raise a country's risk premium. Controlling exclusively for the persistency of the risk premium (*Embi_1*) and the evolution of the asset class (*Emerging Embi*), a statistically significant positive relation is found between the change in the real exchange rate and the risk premium (Table 1, column I). Although this first approximation is very general and does not specify the channels through which the real exchange rate influences country risk, the result could be understood as a net effect. Such negative relation, more in line with the recent open-macro financial accelerator models than with the more traditional literature, offers a warning signal to emerging countries, which often suffer from real exchange rate depreciations.

It seems interesting to test whether the effects of real exchange rate changes on a country's risk premium are symmetric, in other words, whether real appreciations lower the country risk premium in the same way as real appreciations raise it. As Table 1, column II indicates, real exchange rate appreciations (*Appr*Real Exchange Rate Change*) do not seem to contribute to reducing country risk since we cannot reject the hypothesis that their coefficient is equal to zero[7]. This result is in line with the models of financial imperfections, which expect detrimental effects of balance sheets only for negative shocks to productivity, based on the argument that agency problems may only be binding on the down side [Bernanke and Gertler (1989)]. Another plausible explanation are liquidity constraints. The asymmetric impact of real depreciations and appreciations may has an important policy implication: other things given, it should make emerging countries more reluctant to allow for fluctuations in the real exchange rate, not being able to profit from the "good times" (real appreciations) while suffering from the bad ones (real depreciations, particularly if sharp). In particular, a real exchange depreciation of one percentage point has an immediate impact on the risk premium of 25 basis points.

The question is whether the impact of a real exchange rate depreciation is linearly proportional to the size of the latter. In other words, whether it is the same in terms of the country's risk premium to experience small depreciations over time or a sudden large real one. Our results offer a negative answer. Table 1, column III shows evidence of an non-linear effect of real exchange rate depreciations, accounted for as the square of this variable, and the country risk premium.

7. It should be noted that the asymmetry is a short-run effect, which may disappear in the long run. If the current coefficients could be interpreted as long-run ones (dividing them by one minus the estimated coefficient for *Embi_1*), the asymmetry could disappear.

Table 1: Impact of real exchange rate changes on the country risk premium[1/]

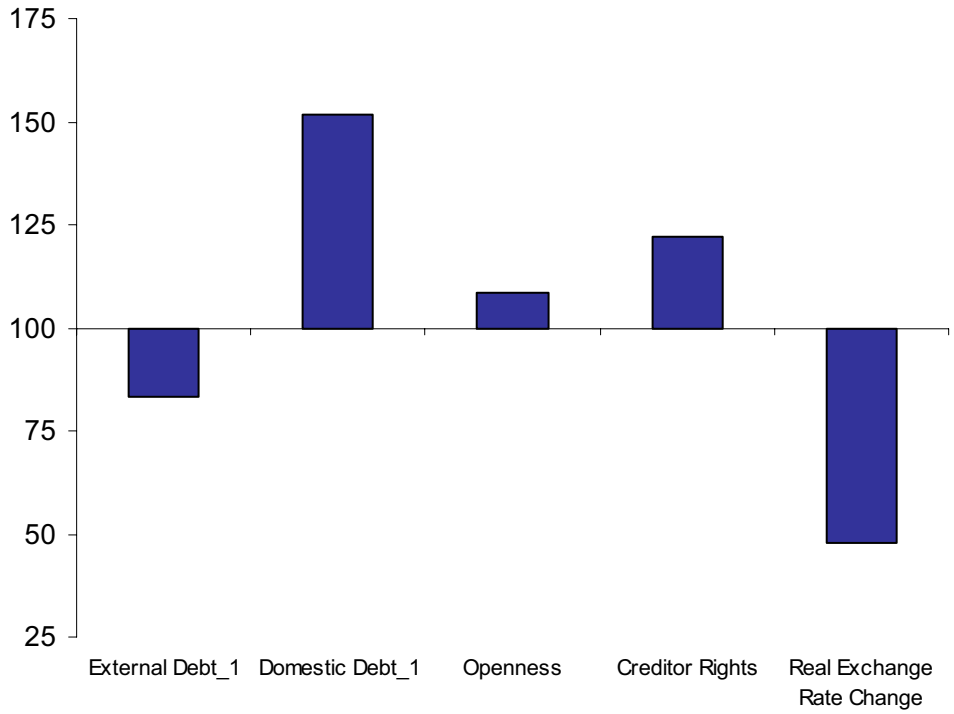
Specifications	I	II	III
Number of obs	183	183	183
Dependent variable: Embi			
Embi_1	0.78 ***	0.64 ***	0.68 ***
	(0.10)	*(0.11)*	*(0.11)*
Emerging Embi	0.64 ***	0.33 *	0.39 **
	(0.18)	*(0.18)*	*(0.17)*
Real Exchange Rate Change	1533.62 **		
	(606.38)		
Appr * Real Exchange Rate Change (β_1)		-97.28	120.95
		(604.54)	*(649.11)*
Diff Effect Dep * Real Exchange Rate Change (β_2)		2474.57 ***	-892.38
		(634.17)	*(623.40)*
[Real Exchange Rate Change] ^{2}			4170.78 ***
			(545.02)
Constant	-260.77 **		
	(119.04)		
Appr Constant		-62.98	-122.95
		(114.57)	*(95.72)*
Diff Effect Dep Constant		-99.01	129.59 *
		(85.62)	*(75.57)*
Sargan test	25.56 (1.00)	22.49 (1.00)	19.69 (1.00)
		H_o: $\beta_1+\beta_2=0$	
		(p-value) 0.00	
		H_0 can be rejected	

The dynamic panel estimation uses one step GMM system estimators with heteroskedasticity-consistent standard errors.
Lags dated t-2, t-3 and t-4 for Real Exchange Rate Change, Appr * Real Exchange Rate Change, Diff Effect Dep * Real Exchange Rate Change and [Real Exchange Rate Change] ^{2} were included as instruments.
Standard errors in parenthesis (p-values for the Sargan tests).
Significance of coefficients: * at 10% ; ** at 5%; *** at 1%

1/ Results are maintained (i) using OLS with robust standard errors instead of GMM, (ii) including the debt service instead of the stock of debt, and/or (ii) subtracting a country's international reserves to the stock of debt.

Although real depreciations tend to be detrimental for a country risk premium, we find a few observations where the opposite is true. The question is what makes these cases different. As a tentative answer, since the small number of observations does not allow us to explore the issue more rigorously, we look at the commonalities in the observations in which exchange rate depreciations lead to a reduction in a country's risk premium (23 out of a total of 75 depreciations). We refer to this group as the optimistic case. Taking the general case as a benchmark (namely the 52 observations in which real exchange rate depreciations lead to an increase in the risk premium) and making them equal to 100, the optimistic case is characterized by a lower external debt (about 20% lower than in the general case), higher tradability (15% higher), and better creditor rights, all as expected (Figure 1). However, they also have a much higher domestic dollar-denominated debt (50% more on average than in the general case). It is important to notice that exchange rate depreciations are much smaller in the optimistic case, which mitigates the relevance of the previously mentioned differences. We shall analyze this issue in more detail later.

Figure 1: Characteristics of the optimistic case[1/] against the general one[2/]

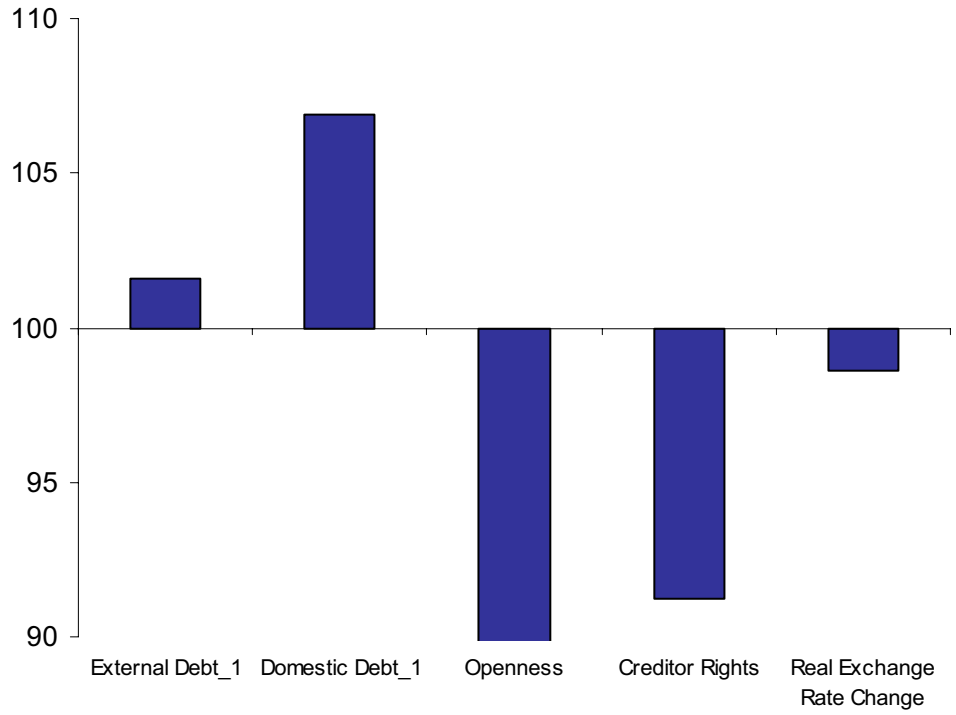


1/ Real depreciations reduce the cost of borrowing

2/ Real depreciations increase the cost of borrowing.

In the case of real appreciations, there are a few observations where we find the expected positive impact (i.e., a reduction in country risk). We call this the "optimistic case", since it is not generally confirmed in our empirical results, and compare it with the "pessimistic one" (where real exchange rate appreciations increase the risk premium). As one would expect, the former has more debt (both external and domestic dollar denominated) so that it can profit more from its reduction in value after the appreciation. It is also less opened to trade, so that it is less damaged by the appreciation. Creditor rights are lower but this is probably a less relevant variable than for depreciations since we are not in a binding situation, when net wealth falls.

Figure 2: Characteristics of the pessimistic case [1/] against the optimist one one [2/]



1/ Real appreciations increase the cost of borrowing

2/ Real appreciations decrease the cost of borrowing.

5.2 Channels for a real exchange depreciation to influence the risk premium

We, now, specify the channels through which the real exchange rate may influence a country's cost of borrowing, based on the existing literature. The most important ones might be balance sheet effects, from external and domestic dollar denominated debt, and competitiveness. Also financial imperfections could be a potential channel in as far as financial accelerator theories make balance sheet effects dependent on the existence of such imperfections. Focusing exclusively on the external debt, we find that the *External Balancesheets* after a depreciation clearly increase the risk premium while they are not significant after an appreciation. (Table 2, column I). The same result is found for *Domestic Balancesheets* (Table 2, columns II and III)[8]. The latter seems to indicate that domestic private sector indebtness in foreign currency has negative wealth effects and not only redistributive ones. In turn, competitiveness affects country risk symmetrically and in the expected direction (reducing it with a real depreciation and increasing it with an appreciation)[9]. Better creditor rights tend to lower country risk.

Finally, we try to separate quantity effects from price ones by including in the regression the increase in external and domestic dollar denominated debt and export growth, all in US dollar. None of the quantity effects are found significant. In the case of external and domestic debt, this result can be understood as if the country risk premium were not affected by new indebtness but rather by the sudden reduction in net wealth, due to real depreciation. This is in line with financial accelerator theories.

8. The significance of domestic balance sheets, after a depreciation, is weakened (from a level of significance of 1% to 10%) when both external and domestic balance sheets are included in the regression (Column III). This is probably due to the collinearity between the two variables (Table 5 in Appendix I show a correlation of 0.52).

9. The correlation between External Balancesheet and Competitiveness is very high, pointing to collinearity problems. An analysis of the correlation between parameters confirms this problem. This is why we shall exclude Competitiveness in the following regressions, substituting it for Increase Exports which accounts mainly for the quantity effect, as Exports are measured in dollars.

Table 2: Channels of influence of changes in the real exchange rate[1/]

Specifications	I	II	III	IV
Number of obs	179	152	152	122
Dependent variable: Embi				
Embi_1	0.65 ***	0.65 ***	0.61 ***	0.61 ***
	(0.11)	*(0.07)*	*(0.08)*	*(0.06)*
Emerging Embi	0.25 *	0.20	0.15	0.25 ***
	(0.14)	*(0.14)*	*(0.14)*	*(0.16)*
Appr * External Balancesheet	-399.45		-427.05	-357.98
	(776.30)		*(834.89)*	*(1.036.92)*
Diff Effect Dep * External Balancesheet	4917.25 ***		3324.59 **	3496.77 ***
	(1.567.73)		*(1.673.84)*	*(1.737.62)*
Increase External Debt				-0.46
				(1.89)
Appr * Domestic Balancesheet		-466.38	-262.96	-583.40
		(388.54)	*(497.92)*	*(808.42)*
Diff Effect Dep * Domestic Balancesheet		14455.44 ***	7826.11 *	-1758.74
		(2.111.46)	*(4.819.81)*	*(4.752.85)*
Increase Domestic Debt				0.02
				(0.03)
Appr * Competitiveness	2205.09 **	1846.57 **	2096.28 **	2277.10 *
	(977.31)	*(784.68)*	*(968.15)*	*(1.246.20)*
Diff Effect Dep * Competitiveness	-5048.16 ***	-898.91	-4062.94 ***	-4441.31 ***
	(1.792.62)	*(1.045.50)*	*(1.500.05)*	*(1.672.54)*
Increase Exports				-495.61
				(311.58)
Creditor Rights	-37.04 *	-48.43 **	-47.41 **	-56.76 *
	(21.30)	*(23.01)*	*(21.44)*	*(30.01)*
Appr * Constant	283.62	393.01 *	428.82 *	-7.90
	(237.24)	*(227.28)*	*(223.46)*	*(46.84)*
Diff Effect Dep * Constant	-55.37	21.35	-18.03	480.10
	(49.99)	*(55.48)*	*(45.17)*	*(291.02)*
Sargan test	19.42 (1.00)	15.39 (1.00)	6.96 (1.00)	11.98 (1.00)

The dynamic panel estimation uses one step GMM system estimators with heteroskedasticity-consistent standard errors.
Lags dated t-2, t-3 and t-4 for Appr * External Balancesheet, Diff Effect Dep * External Balancesheet, Increase External Debt, Appr * Domestic Balancesheet, Diff Effect Dep * Domestic Balancesheet, Increase Domestic Debt, Appr * Competitiveness and Diff Effect Dep * Competitiveness were included as instruments.
Standard errors in parenthesis (p-values for the Sargan tests).
Significance of coefficients: * at 10% ; ** at 5%; *** at 1%

1/ Results are maintained (i) using OLS with robust standard errors instead of GMM, (ii) including the debt service instead of the stock of debt, and/or (ii) subtracting a country's international reserves to the stock of debt.

5.3 How do financial imperfections influence balance sheet effects?

In the previous set of regressions we have found direct evidence of the detrimental effect of financial imperfections on the risk premium. However, financial accelerator theories consider financial imperfections more as a condition under which balance sheet effects can increase the cost of borrowing than as a separate channel. To test this hypothesis, we interact each country's financial imperfections –proxied with the quality of creditor rights– with balance sheet effects, both external and domestic. We separate countries in three groups, those with the best creditor rights, those with intermediate ones and those with the poorest. Balance sheet effects are clearly larger in the last group, followed by the intermediate one (Table 3, columns I and II, respectively). In particular, for the domestic debt only do countries with the poorest creditor rights see their risk premium increase because of domestic balance sheet effects. In the case of intermediate creditor rights we cannot reject the hypothesis that domestic balance sheets have no effect on the risk premium or is even negative for good creditor rights (Table 3, bottom of Column III). This could be explained by the fact that domestic creditors in the countries with the poorest creditor rights do not trust the system enough to use –or keep– their additional net worth at home.

Table 3: Financial imperfections and the influence of external and domestic balance sheet effects on the risk premium[1/]

Specifications	I	II
Number of obs	174	151
Dependent variable: Embi		
Embi_1	0.78 ***	0.63 ***
	(0.11)	*(0.04)*
Emerging Embi	0.51 ***	0.49 ***
	(0.18)	*(0.19)*
Low Creditor Rights * External Balancesheet (γ_1)	2514.32 ***	
	(867.58)	
Diff Effect Medium Creditor Rights * External Balancesheet (γ_2)	-659.22	
	(882.47)	
Diff Effect High Creditor Rights * External Balancesheet (γ_3)	-1483.08 *	
	(853.56)	
Low Creditor Rights * Domestic Balancesheet (δ_1)		15868.14 ***
		(1.708.31)
Diff Effect Medium Creditor Rights * Domestic Balancesheet (δ_2)		-15148.19 ***
		(1.901.49)
Diff Effect High Creditor Rights * Domestic Balancesheet (δ_3)		-18861.95 ***
		(2.705.78)
Increase Exports	-493.69 **	-440.31
	(242.89)	*(343.59)*
Low Creditor Rights Constant	-37.79	86.13
	(189.81)	*(166.94)*
Diff Effect Medium Creditor Rights Constant	-156.65	-237.62 **
	(99.92)	*(119.19)*
Diff Effect High Creditor Rights Constant	-174.69 *	-279.09 **
	(109.67)	*(123.16)*
Sargan test	20.25 (1.00)	17.33 (1.00)
	H_o: $\gamma_1+\gamma_3=0$	H_o: $\delta_1+\delta_2=0$
	(p-value) 0.01	(p-value) 0.46
	H_0 can be rejected	H_0 cannot be rejected
		H_o: $\delta_1+\delta_3=0$
		(p-value) 0.04
		H_0 can be rejected

The dynamic panel estimation uses one step GMM system estimators with heteroskedasticity-consistent standard errors.

Lags dated t-2, t-3 and t-4 for Low Creditor Rihgts * External Balancesheet, Diff Effect Medium Creditor Rights * External Balancesheet, Diff Effect High Creditor Rights * External Balancesheet, Low Creditor Rights * Domestic Balancesheet, Diff Effect Medium Creditor Rights * Domestic Balancesheet, and Diff Effect High Creditor Rights * Domestic Balancesheet were included as instruments.

Standard errors in parenthesis (p-values for the Sargan tests).

Significance of coefficients: * at 10% ; ** at 5%; *** at 1%

1/ Results are maintained (i) using OLS with robust standard errors instead of GMM, (ii) including the debt service instead of the stock of debt, and/or (ii) subtracting a country's international reserves to the stock of debt.

5.4 How does the exchange rate regime influence balance sheet effects?

After identifying when balance sheet effects are particularly a problem, we now analyze to what extent they are influenced by the exchange rate regime in place. This is particularly interesting if we consider that the exchange rate regime is an important policy variable for the economic authorities.

As previously mentioned, several theoretical models argue that a fixed exchange rate regime amplifies balance sheet effects on the risk premium, This is confirmed in our results, when interacting the exchange rate regime and domestic and external balance sheet effects. The exchange rate regime is lagged one period to avoid that what was originated by a certain

regime is assigned to another one. We use both de jure and de facto classifications and compare the results.

Starting with external balance sheet effects, fixed exchange rate regimes, de jure, amplify their detrimental impact on the cost of borrowing (Table 4, column III). This is so when compared with the average balance sheet effect, i.e., when the exchange rate regime is not considered (Table 4, column I). The flexible regime is clearly superior since we cannot reject the hypothesis that external balance sheets under this regime leave the risk premium unchanged (Table 4, bottom of column III). When taking the de facto classification, fixed regimes are also the most detrimental (Table 4, column II), with a larger coefficient than the average case (Table 4, column I). This time the differential effect of the flexible exchange rate is not significant but the intermediate one is clearly better than the pegged, although not to the extent of eliminating the detrimental effect of external balance sheets on the risk premium. In sum, although the results are relatively similar in the two classifications for the fixed exchange rate regime, this is not the case for the intermediate and flexible ones. One possible explanation is that the de facto classification has twice as many observations under the intermediate regime than the de jure classification. The opposite is true for flexible exchange rate regimes. This difference is probably explained by the well-known phenomenon of "fear of floating", as countries tend to announce that the exchange rate will move more flexibly than they actually allow for.

Table 4: The exchange rate regime and external balance sheets [1/]

Specifications	I	II	III
Number of obs	178	170	177
		DE FACTO	***DE JURE***
Dependent variable: Embi			
Embi_1	0.78 ***	0.71 ***	0.73 ***
	(0.13)	*(0.15)*	*(0.12)*
Emerging Embi	0.55 ***	0.59 ***	0.57 ***
	(0.16)	*(0.14)*	*(0.17)*
External Balancesheet	2489.84 ***		
	(769.48)		
Fixed_1 * External Balancesheet (Θ_1)		3333.64 ***	3145.73 ***
		(1.158.73)	*(1.226.52)*
Diff Effect Intermediate_1 * External Balancesheet (Θ_2)		-2741.70 **	-439.06
		(1.283.98)	*(1.633.45)*
Diff Effect Flexible_1 * External Balancesheet (Θ_3)		-1844.16	-2488.72 **
		(1.591.65)	*(1.244.84)*
Creditor Rights	-50.21 *	-29.35 **	-44.53 **
	(29.69)	*(12.18)*	*(22.60)*
Increase Exports	-470.18 **	-366.91 **	-544.85 **
	(249.37)	*(178.14)*	*(276.72)*
Constant	194.83		
	(324.66)		
Constant Fixed_1		147.72	238.28
		(171.55)	*(276.96)*
Diff Effect Intermediate_1 Constant		-140.66 **	-38.73
		(66.87)	*(60.47)*
Diff Effect Flexible_1 Constant		-170.01 ***	-128.84 **
		(64.07)	*(58.78)*
Sargan test	22.84 (1.000)	23.20 (1.000)	18.11 (1.000)
		H_o: $\Theta_1+\Theta_2=0$	H_o: $\Theta_1+\Theta_3=0$
		(p-value) 0.06	(p-value) 0.16
		H_0 can be rejected	H_0 cannot be rejected

The dynamic panel estimation uses one step GMM system estimators with heteroskedasticity-consistent standard errors.

Lags dated t-2, t-3 and t-4 for External Balancesheet, Fixed_1 * External Balancesheet, Diff Effect Intermediate_1 * External Balancesheet, Diff Effect Flexible_1 * External Balancesheet were included as instruments.

Standard errors in parenthesis (p-values for the Sargan tests).

Significance of coefficients: * at 10% ; ** at 5%; *** at 1%

1/ Results are maintained (i) using OLS with robust standard errors instead of GMM, (ii) including the debt service instead of the stock of debt, and/or (ii) subtracting a country's international reserves to the stock of debt.

In the case of domestic balance sheets, pegged regimes are clearly worse on the basis of the de jure classification with double the coefficient than for the average case (Table 5, columns III and I, respectively). Intermediate and flexible regimes are clearly superior since we cannot reject the hypothesis that balance sheet effects under any of these two regimes leave the risk premium unchanged (Table 5, bottom of column III). The differences among de facto regimes are not significant (Table 5, column II).

Table 5: The exchange rate regime and domestic balance sheets[1/]

Specifications	I	II	III
Number of obs	151	143	177
		DE FACTO	***DE JURE***
Dependent variable: Embi			
Embi_1	0.61 ***	0.54 ***	0.63 ***
	(0.07)	*(0.12)*	*(0.06)*
Emerging Embi	0.43 **	0.52 ***	0.51 ***
	(0.18)	*(0.15)*	*(0.15)*
Domestic Balancesheet	8100.45 *		
	(4614.37)		
Fixed_1 * Domestic Balancesheet (ρ_1)		6710.74	16319.13 ***
		(5.110.24)	*(717.04)*
Diff Effect Intermediate_1 * Domestic Balancesheet (ρ_2)		-2323.34	-15153.64 ***
		(5.545.48)	*(1.605.39)*
Diff Effect Flexible_1 * Domestic Balancesheet (ρ_3)		-674.53	-13334.29 ***
		(9.472.57)	*(1.987.78)*
Increase Exports	-411.67	-236.83	-495.17
	(374.42)	*(175.40)*	*(332.18)*
Creditor Rights	-67.37 **	-35.85 **	-48.43 *
	(46.55)	*(10.29)*	*(28.94)*
Constant	500.59		
	(471.63)		
Constant Fixed_1		309.68	267.86
		(156.25)	*(278.76)*
Diff Effect Intermediate_1 Constant		-149.44	80.70
		(104.02)	*(62.24)*
Diff Effect Flexible_1 Constant		-132.10	-37.61
		(105.82)	*(38.23)*
Sargan test	20.32 (1.000)	17.51 (1.000)	15.10 (1.000)
			H_o: $\rho_1+\rho_2=0$
			(p-value) 0.41
			H_0 cannot be rejected
			H_o: $\rho_1+\rho_3=0$
			(p-value) 0.22
			H_0 cannot be rejected

The dynamic panel estimation uses one step GMM system estimators with heteroskedasticity-consistent standard errors.

Lags dated t-2, t-3 and t-4 for Domestic Balancesheet, Fixed_1 * Domestic Balancesheet, Diff Effect Intermediate_1 * Domestic Balancesheet, and Diff Effect Flexible_1 * Domestic Balancesheet were included as instruments.

Standard errors in parenthesis (p-values for the Sargan tests).

Significance of coefficients: * at 10% ; ** at 5%; *** at 1%

1/ Results are maintained (i) using OLS with robust standard errors instead of GMM, (ii) including the debt service instead of the stock of debt, and/or (ii) subtracting a country's international reserves to the stock of debt.

Given its policy implications, it seems worth exploring why it is the case that pegged regimes behave worse than others. As a tentative answer (since the small number of observations does not allow us to explore the issue more rigorously) we look at the commonalities in the observations under a fixed regime and compare them with those for intermediate and flexible regimes[10].

Fixed exchange rate regimes tend to accumulate more external debt and domestic dollar-denominated debt, as argued by Ize and Levy-Yeyati (2003) and Broda and Levy-Yeyati (2003)[11]. This is more the case in de facto than de jure classification (Figure 3 and 4), which might be explained by the fact that some of the announced pegged

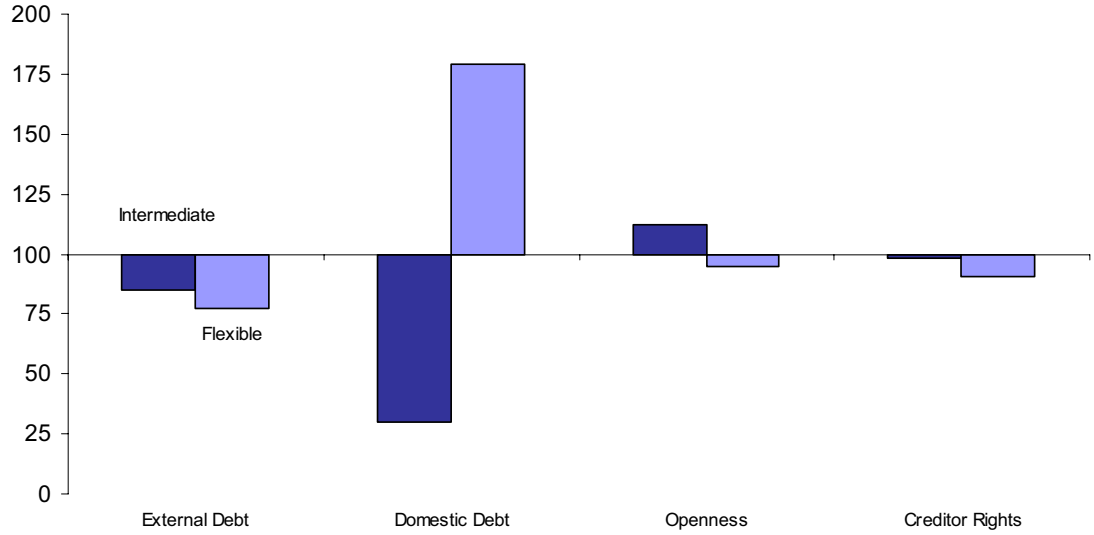
10. The number of observations for each group can be found in Table 3, Appendix 1.

11. This is the case not only in levels, as shown in Figures 3 and 4, but much more so when we look at the rates of change of external debt form t-1 to t. This is not included in the graph because of the differences in scale.

regimes are not expected to be maintained (in fact there are much fewer observations for de facto pegs than de jure). The same might be true for some of the intermediate regimes which are announced (particularly crawling pegs). No clear trend appears for *Domestic Debt*.[12]

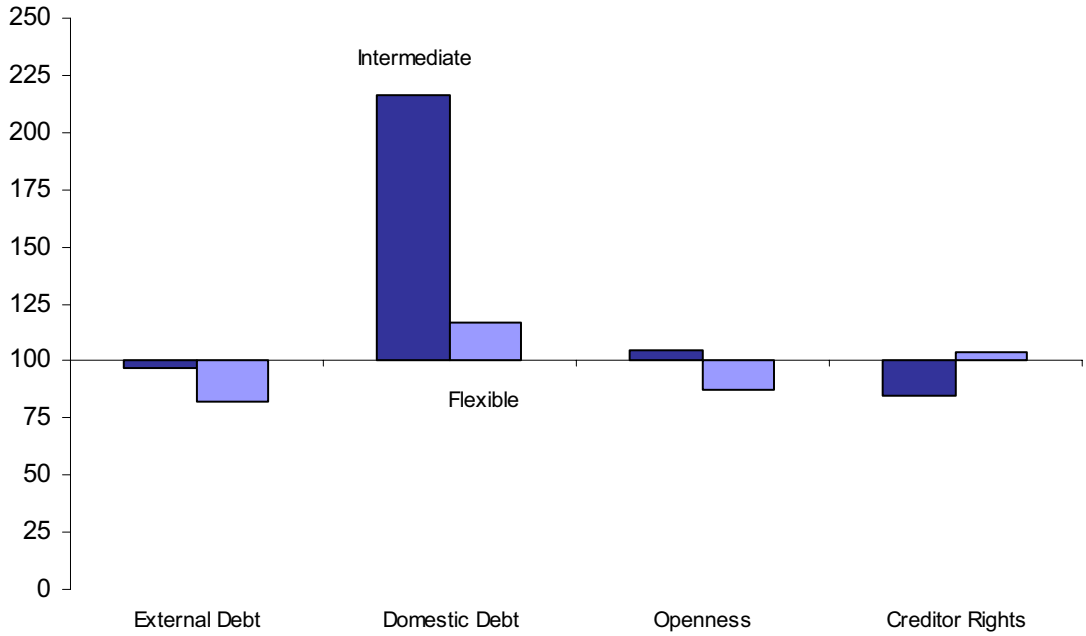
Another plausible explanation, other than the accumulation of foreign currency debt, could be that real exchange rate depreciations are larger under fixed exchange rate regimes. As Table 3 in Appendix 1 shows, this is not the case either in the de jure or de facto classifications, since the observations under the pegged regime do not have the largest average real depreciation. It could, nevertheless, happen that pegs suffer more frequently from events of very large depreciations, which we have shown to be more detrimental. Looking at the 5% extreme values of the right tail of our distribution (i.e., the largest real depreciations), this does not seem to be the case. In fact, most of the extreme observations fall under intermediate regimes both in the de jure or de facto classifications.

Figure 3: Characteristics of managed and flexible exchange rate regimes against fixed ones: De facto classification



12. In the specific intermediate regimes, de facto, domestic dollar denominated debt is actually lower.

Figure 4: Characteristics of managed and flexible exchange rate regimes against fixed ones: De jure classification



In sum, from this cursory exploration of the data, the most plausible explanation for the more detrimental balance sheet effects under pegged regimes is the relatively larger accumulation of external dollar-denominated debt, coupled with the existence of poorer creditor rights, and not so much the accumulation of a larger depreciation or extreme depreciation events under pegged regimes. This is in line with the idea that fixed exchange rates tend to be perceived as an implicit insurance by the private sector and that public authorities may increase their dollar-denominated indebtness as a demonstration effect that the regime will be maintained.

6 Conclusions and policy implications

This paper builds upon the empirical literature on the impact of real exchange rate depreciations for the economy as a whole. In particular, it confirms Berganza, Chang and García-Herrero (2003)'s finding of a positive relation between changes in the real exchange rate and a country's risk premium for a sample of 27 emerging economies and explores additional questions to determine what makes balance sheet effects so detrimental for the risk premium.

We show evidence that the effect of a real depreciation is neither symmetric nor linear. On the former, real appreciations are not found significant in reducing a country's risk premium, while real depreciations clearly increase it. The immediate effect of a real depreciation of one percentage points is an increase in the country risk premium by 25 basis points. On the latter, sharp real depreciations have much larger negative effects than smaller ones. This should make policy makers wary of real exchange rate volatility, particularly if large, since there is no period when they clearly benefit from it. There are, however, a few cases in our sample, where exchange rate depreciations reduce the risk premium. A cursory look at the characteristics of these observations points to the importance of having a relatively low level of external debt, higher trade openness and better creditor rights, for real exchange rate depreciations to be beneficial.

We also show that the main channels for the exchange rate to affect country risk are external and domestic balance sheets, stemming from the sudden increase in the stock of external debt and domestic dollar-denominated debt after a real depreciation. In the case of domestic balance sheets, this can be interpreted as evidence of the presence of wealth effects and not only redistribution ones. In addition, the same asymmetric impact is found for balance sheets as for the real exchange rate; that is, the reduction in the stock of foreign-currency debt after a real appreciation does not reduce country risk. On the contrary, the degree of competitiveness appears to have a symmetric effect –and with the expected sign– on country risk. In any event, the evidence of a positive and highly significant relation between the exchange rate change and country risk, which can be considered a net effect, indicates that competitiveness is not an important enough factor to outweigh the detrimental impact of balance sheets. New external and domestic dollar denominated indebtness is not found significant, suggesting that what matters is not so much the amount of new borrowing but rather the sudden reduction in net financial wealth because of a price change.

When financial imperfections are considered (proxied by the quality of creditor rights) our results confirm the a priori of the financial accelerator literature: the poorer creditor rights are, the more external and domestic balance sheet effects increase the risk premium. Finally, fixed exchange rate regimes appear to amplify the negative impact of balance sheet effects on the risk premium. This seems to be related to the fact that pegged regimes have a bigger (and faster growing) stock of external debt, on average, and not so much to the extent of the real depreciation. The latter is not larger, on average, under this regime, not even the number of events of large depreciations, which have been found to be particularly detrimental through the result of non-linearity. A plausible explanation for the potential causal relation between a pegged regime and a larger external debt is that this regime is perceived as an implicit insurance by the private sector. In the same vein, public authorities may increase their dollar-denominated indebtness as a demonstration effect that the peg will be maintained.

In sum, a number of policy conclusions can be drawn from these results. The volatility of the real exchange rate, especially if large, is something to worry about in emerging countries. This is because it tends to increase country risk, a key variable for economic

growth, in an asymmetric and non-linear way. The main channels through which the real exchange rate affect the risk premium are external and domestic balance sheet effects and, to a lesser extent, competitiveness, in the opposite direction. Therefore, the countries that should worry most are those with small trade openness, large financial imperfections and pegged exchange rate regimes, which are associated with bigger and faster growing external indebtness. The combination of these three characteristics can make real exchange rate depreciations particularly detrimental for a country's risk premium, an extremely important variable for emerging countries in need of external financing because of its strong impact on economic growth. Given that these three characteristics can be influenced by economic authorities, there is clear a role for policy action to mitigate the problem.

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APPENDIX I : STATISTICAL ISSUES

Table 1
Countries and years included

Country name	*Years*	*Number of years*
Algeria	1999-2002	4
Argentina	1993-2002	10
Brazil	1993-2002	10
Bulgaria	1994-2002	9
Chile	1999-2002	4
China	1994-2002	9
Colombia	1997-2002	6
Cote D´Ivoire	1998-2002	5
Croatia	1996-2002	7
Ecuador	1995-2002	8
Malaysia	1996-2002	7
Mexico	1993-2002	10
Morocco	1993-2002	10
Nigeria	1993-2002	10
Panama	1996-2002	7
Peru	1997-2002	6
Philippines	1993-2002	10
Poland	1994-2002	9
Republic of Lebanon	1998-2002	5
Russian Federation	1997-2002	6
Slovakia	1993-2002	10
South Africa	1994-2002	9
South Korea	1993-2002	10
Thailand	1997-2002	6
Turkey	1996-2002	7
Venezuela	1993-2002	10
Zimbabwe	1997-2002	6
No. of observations		210

Table 2
Geographical distribution of the sample

Region	*Number of countries*	*Number of observations*	*as a % of total sample*
Asia	5	42	20.0
Latin America	9	71	33.8
Eastern Europe	6	48	22.9
Africa	6	44	21.0
Middle East	1	5	2.4
TOTAL	27	210	100

Table 3

Descriptive Statistics of the regression variables

Variable	*No. Obs.*	*Mean*	*Std. Deviation*	*Minimun*	*Maximun*
Embi	210	560.40	515.95	60.233	3925.75
Emerging Embi	210	617.47	143.61	352.72	1007.55
Real Exchange Rate Change	208	-0.019	0.1561	-0.8126	0.895
Fixed real exchange rate change *de facto*	55	-0.009	0.152	-0.319	0.895
Intermediate real exchange rate *de facto*	109	0.011	0.115	-0.257	0.415
Flexible real exchange rate *de facto*	38	-0.036	0.231	-0.813	0.616
Fixed real exchange rate change *de jure*	73	-0.009	0.164	-0.448	0.895
Intermediate real exchange rate *de jure*	68	-0.012	0.167	-0.813	0.529
Flexible real exchange rate *de jure*	67	0.0159	0.135	-0.266	0.415
Effective real exchange rate change	210	0.0044	0.1477	-0.3746	1,137
External Debt	209	0.5683	0.2589	0.1473	1,561
Increase External Debt	208	3.75	10.43	-17.43	41.66
External Balancesheet	207	0.0018	0.0928	-0.3071	0.6432
Domestic Debt	155	0.1132	0.2721	0	2,109
Increase Domestic Debt	143	69.68	478.83	-100	5091.47
Domestic Balancesheet	172	-0.0024	0.0248	-0.1485	0.163
Openness	208	0.3642	0.2107	0.05903	1,195
Competitiveness	207	-0.0017	0.0388	-0.1348	0.2254
Increase Exports	203	0.0714	0.1485	-0.3651	0.7998
Creditor rights	208	7.21	2.11	2	12

Table 4

Relation between the classification of de jure and de facto exchange rate regimes

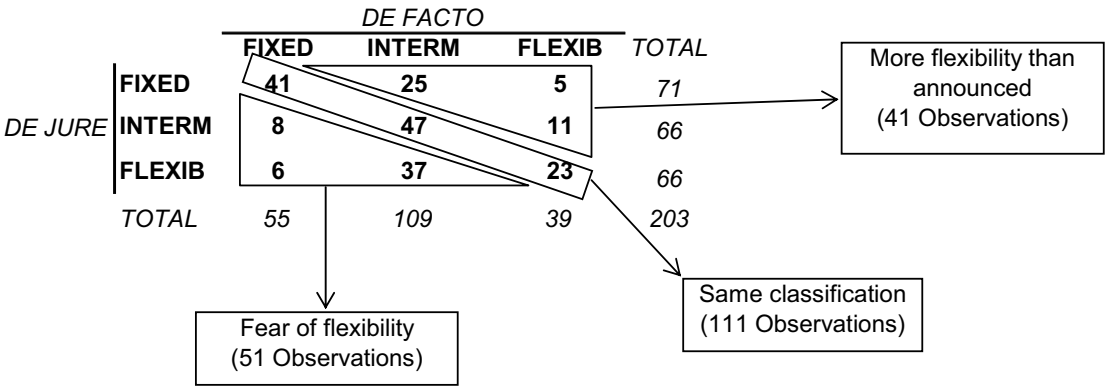

Table 5:
Matrix of correlation

	Embi	Embi_1	Emerging Embi	Real Exchange Rate Change	Multilateral Real Exchange Rate Change	External Debt	Increase External Debt	External Balancesheet	Domestic Debt	Increase Domestic Debt	Domestic Balancesheet	Openness	Competitiveness	Increase Exports	Creditor Rights
Embi	1.00														
Embi_1	0.71	1.00													
Emerging Embi	0.18	0.07	1.00												
Real Exchange Rate Change	0.31	0.00	0.00	1.00											
Multilateral Real Exchange Rate Cl	0.35	0.06	0.16	0.83	1.00										
External Debt	0.36	0.35	0.01	-0.02	-0.02	1.00									
Increase External Debt	-0.29	-0.33	-0.02	-0.22	-0.13	-0.20	1.00								
External Balancesheet	0.32	0.02	0.07	0.93	0.87	0.00	-0.17	1.00							
Domestic Debt	-0.07	-0.11	0.01	-0.09	-0.08	0.04	0.09	-0.09	1.00						
Increase Domestic Debt	0.06	0.02	0.02	-0.10	-0.15	-0.02	-0.03	-0.10	-0.05	1.00					
Domestic Balancesheet	0.35	0.14	-0.04	0.51	0.45	-0.02	-0.13	0.52	-0.81	0.01	1.00				
Openness	-0.17	-0.09	-0.03	-0.04	-0.06	0.36	-0.02	-0.04	-0.22	-0.05	0.10	1.00			
Competitiveness	0.20	-0.10	0.04	0.71	0.84	-0.13	-0.17	0.75	-0.02	-0.11	0.26	-0.12	1.00		
Increase Exports	-0.10	0.11	0.15	-0.17	-0.10	-0.14	0.16	-0.15	0.05	-0.05	-0.16	0.08	-0.10	1.00	
Creditor Rights	-0.40	-0.32	-0.16	-0.07	-0.14	-0.01	0.01	-0.11	0.09	-0.20	-0.08	0.21	-0.10	-0.10	1.00

APPENDIX II: DATA SOURCES AND VARIABLE DEFINITIONS

Below we list the variables and sources used for this study, as well as the transformations made to the data. The data are annual and cover the periods and countries shown in Table 1.

Dependent variable

* ***Embi:*** Country risk premium or spread in the external cost of borrowing: equals returns for US dollar-denominated Brady bonds, loans, Eurobonds, and US dollar-denominated local markets instruments for emerging markets minus total returns for U.S. Treasury bonds with similar maturity (the stripped yields of the Emerging Markets Bond Index, *Embi*, for each country). The spreads are measured in basis points.
Source: JP Morgan.

Objective variables

* ***External Debt:*** equals the total debt in convertible currencies owed to nonresidents, as the end of the reporting year in US dollars divided by the nominal GDP in 1995 in US dollars, so as to take into account the relative size of the country.
Source: The Institute of International Finance (IIF).

* ***Domestic Debt:*** proxied by the domestic deposits in U.S. dollars divided by the nominal GDP in 1995 US dollars to take into account the relative size of the country.
Source: International Financial Statistics (IFS) of the International Monetary Fund (IMF) and Levy-Yeyati (2004).

* ***"Real" Exchange Rate:*** equals the average number of units of local currency per U.S. dollar during the year adjusted by the inflation price index (with 1995=1) divided by the nominal exchange rate in 1995. Thus, in 1995, *Real Exchange Rate* is equal to 1 and an increase (decrease) in *Real Exchange Rate* is a depreciation (appreciation).
Source: IIF.

* ***Multilateral Real Exchange Rate:*** is an annual average index of the nominal effective exchange rate of the local currency with respect to six leading trading partners, deflated by the relative consumer prices. An increase (decrease) in *Multilateral Real Exchange Rate* is a depreciation (appreciation).
Source: IIF.

* "***Real" Exchange Rate Change:*** equals the changes in *"Real" Exchange Rate* between year t and year t-1. (*Δln* "real" exchange rate).

* ***Multilateral Real Exchange Rate Change:*** equals the changes in *Multilateral Real Exchange Rate* between year t and year t-1. *(Δln* effective real exchange rate).

* ***Exports***: equals the total value of export of goods and services to nonresidents, valued at market prices in millions of US dollars.
Source: IIF.

**** Openness:*** is defined as the ratio of *Exports* to the nominal GDP in 1995 U.S. dollars.
Source: IIF.

* ***External Balancesheet:*** equals the product of *External Debt* in year t-1 and "*Real" Exchange Rate Change* between the years t-1 and t.

* ***Domestic Balancesheet:*** equals the product of *Domestic Debt* in year t-1 and "*Real" Exchange Rate Change* between the years t-1 and t.

* ***Competitiveness:*** equals the product of *Openness* in year t-1 and *Multilateral Real Exchange Rate Change* between the years t-1 and t.

*** *Creditor Rights:*** measure the quality of the institutional setting affecting the risk of investment. The rating assigned is the sum of three subcomponents, each with a maximum score of 4 and a minimum score of 0. A score of 4 indicates a very good environment for creditors and 0 a very poor. The subcomponents are: contract viability/expropriation, profits repatriation and payment delays. Countries are divided into three groups: ***low***, ***medium*** and ***high*** creditor rights.
Source: International Country Risk Guide.

Control variables

*** *Emerging Embi***: equals the average of the stripped yields of the Emerging Markets Bond Index, *Embi*.
Source: JP Morgan.

* ***Appreciation (Appr)****:* is a dummy variable that takes on a value of one if *Real Exchange Rate Change* is negative and zero otherwise. *Real Exchange Rate Change* is never zero throughout our sample.

*** De facto** classification of exchange rate regimes: From the 15 groups considered in Rogoff and Reinhart (2004), we group them in three groups: (i) ***fixed***, which includes codes such as "no separate legal tender", "pre announced peg or currency board arrangement", "pre announced horizontal band" and "de facto peg"; (ii) ***intermediate***, composed of "pre announced crawling peg", "pre announced crawling band", "de facto crawling peg", "de facto crawling band", "moving band" and "managed floating"; and (iii) ***flexible,*** including "freely floating" and "freely falling". The group "dual market in which parallel market data is missing" (7 observations in our sample) is left out of the classification. A dummy variable is defined for each group.
Source: Rogoff and Reinhart (2004).

* **De jure** classification of exchange rate regimes: Every IMF member country is required to report and publish each year the stated intentions of the central bank yielding a de jure classification. From the 8 groups considered, we group them in three groups: (i) ***fixed***, which includes "exchange arrangement with no separate legal tender", "currency board arrangement", "conventional pegged arrangement" and "pegged exchange rate within horizontal bands"; (ii) ***intermediate,*** composed of "crawling peg", "crawling band" and "managed floating with no pre-announced path for the exchange rate"; and, (iii) ***flexible,*** including "independently floating". A dummy variable is defined for each group.
Source: Annual Reports of Exchange Rate Arrangements and Exchange Rate Restrictions (IMF).

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