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Real Exchange Rates, Dollarization and Industrial Employment in Latin America

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Abstract[*]

We use a panel dataset on industrial employment and trade for 9 Latin American countries for which liability dollarization data at the industrial level is available. We test whether real exchange rate fluctuations have a significant impact on employment, and analyze whether the impact varies with the degree of trade openness and liability dollarization. Econometric evidence supports the view that real exchange rate depreciations can impact employment growth positively, but this effect is reversed as liability dollarization increases. In industries with high liability dollarization, the overall impact of a real exchange rate depreciation can be negative.

Keywords: Manufacturing employment, Real exchange rates, Debt composition, Balance sheet effects
JEL Classification: E24, F31, F34, G32

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1. Introduction

Increased openness in financial markets implies that emerging market economies are heavily exposed to big swings in capital flows, as was the case throughout the 1990s. These swings are usually accompanied by large fluctuations in real exchange rates (RER), which have important micro and macroeconomic implications. Some lines of research have focused on the impact of RER movements on the economy, analyzing whether a devaluation has a contractionary impact, especially when the economy presents heavy liability dollarization.[†] Traditionally, the prevailing view has been that exchange rate depreciation has an expansionary impact on output. However, in the last two decades, this view has been challenged, given the succession of financial crises in which liability dollarization reduced, or even reversed, the positive effects of depreciation on economic activity. On the microeconomic side, there has been an eruption of studies focusing on the impact of RER fluctuations on firm's investment decisions in emerging market economies and, in particular, in Latin America.[‡] However, so far little attention has been paid to its impact on firms' employment decisions. This paper fills this gap by analyzing the impact of RER changes on industrial employment in Latin America, emphasizing the role of debt dollarization.

Early work on the impact of RER fluctuations on industrial employment has focused on developed economies. Pioneer studies were those of Branson and Love (1988) and Revenga (1992). Branson and Love (1988) study the effects of real exchange rate movements on manufacturing employment in the period 1970 to 1986 in the United States and Japan, and they find significant effects of both dollar appreciation and depreciation on employment and output of US manufacturing industries, particularly the durable goods sector. Similarly, they find significant effects of movements in the yen on output and employment in the Japanese durable goods sector. Revenga (1992) investigates the impact of increased import competition on employment and wages in US manufacturing industries over 1977-1987. Her estimates suggest that the misalignment of the dollar (over-appreciation) between 1980 and 1985 reduced employment on average by 4.5-7.5 percent and wages by 1-2 percent. Also, Burgess and Knetter (1998) find that employment is significantly related to real exchange rate movements in G-7

[†] For a theoretical exposition see, among others, Krugman (1999), Aghion et al. (2001, 2003), Céspedes et al. (2002), and Calvo et al. (2003). For an empirical approximation, see Bleakley and Cowan (2002), Calvo et al. (2004) and Galindo et al. (2003a).

[‡] See Bleakley and Cowan (2002) and the December issue of Emerging Markets Review (2003) for an extensive discussion of six case studies in Latin America. See also Harvey and Roper (1999) for a discussion of Asia.

countries. According to their estimates, real appreciations are associated with declines in manufacturing employment in most cases.

Another related avenue of research focuses on gross employment flows. Klein, Shuh and Triest (2003) test whether there is a relevant effect of the real exchange rate on job creation and job destruction in US manufacturing industries over the period 1973 to 1993, and find that the responsiveness of job flows to movements in the RER varies positively with industry openness to international trade, being increasing with openness. They also show also asymmetry in this responsiveness, since appreciations play a significant role in job destruction, but job flows, either job creation or job destruction, do not respond significantly to dollar depreciation. Gourinchas (1998) finds that exchange rates have a significant effect on gross and net job flows in the US traded goods sector, and also, that appreciation is associated with increased turbulence in the labor market, i.e., job creation and job destruction increase. Conversely, during depreciation phases, the tradable sector chills as creation and destruction rates fall.

A key contribution is that of Campa and Goldberg (2001) who, using two decades of annual industry-level data for two-digit SIC US manufacturing industries, find that exchange rates have statistically significant effects on industry wages, with a positive elasticity when interacted with industry export orientation and a negative elasticity when interacted with the imported input use of each industry. The impact of exchange rates on jobs and hours worked are smaller and less precisely estimated, although they find a much higher response of overtime wages and overtime hours to transitory exchange rate fluctuations.

As far as we know, there are no previous attempts to study the impact of exchange rates on employment in the presence of liability dollarization. There is, however, an increasing number of papers dwelling on the impact of exchange rate fluctuations on industrial employment turnover in Emerging Markets. An early contribution is that of Márquez and Pagés (1997), who test whether trade reform affects employment. Although their main purpose is not to test the effects of real exchange rate fluctuations on manufacturing employment, they also find that exchange rates have a significant effect on employment for a sample of 18 Latin American countries. Real appreciation is found to contribute to a reduction in employment.

Moreover, there are an increasing number of studies analysing factors impinging on job flows at an industrial level in developing countries along the lines of the literature mentioned above. In the case of Latin America, several studies undertaken under the support of the Inter-

American Development Bank[§] have analyzed how trade liberalization have affected job reallocation in some economies. A good summary and source of references is provided by Haltiwanger et al. (2004). Besides summarizing some recent results concerning the impact of openness to international competition on resource allocation, the authors study the effects of the removal of protectionism on net employment and gross job reallocation in the region. They find that a real appreciation increases job reallocation, while, on the other hand, it increases net employment growth, though this latter effect is only marginally significant and relatively small in magnitude.

Therefore, this paper is a first step towards filling this gap by exploring the impact of RER movements on industrial employment in a context of liability dollarization, a very common feature of the current Latin American landscape. To this end, we base our analysis on the theoretical model derived in Campa and Goldberg (2001), who present a dynamic model of the labor market in which exchange rate shocks influence labour demand by affecting the marginal revenue product of labor. We extend this setup to include the additional channel of balance sheet effects induced by debt dollarization following devaluation. The key issue of the balance sheet channel is that a shock to the debt service may imply a reduction on firms' net worth, impairing their solvency which, in a context of imperfect financial markets, results in increases in the cost of external funds. This, in turn, can have a negative effect on firms' employment and investment decisions. This mechanism is related to the financial accelerator literature (Bernanke and Gertler, 1989).

This channel is particularly relevant for Latin American industries, given their low degree of financial market development. Under perfect, frictionless markets, firms' real decisions would be independent of financial considerations. However, the underdevelopment of financial markets makes it very difficult to hedge contingencies, in particular those related to exchange rate fluctuations. Given these imperfections, the adjustment following exchange rate movements weighs heavily on investment and employment decisions. One might be tempted to think that this problem is restricted to emerging market economies, which are fraught with multiple market imperfections, but as Nickell and Nicolitsas (1999)[**] show, financial pressure variables also have

[§] See the background papers for the seminar "Market Institutions, Labor Market Dynamics, growth and productivity" at www.iadb.org.

[**] See also, inter alia, Benito and Young (2002) and Benito and Hernando (2002). Benito and Young (2002) find evidence for financial pressure effects of debt servicing costs on investment and dividends but not on new equity

a negative impact on firm's real decisions in developed economies. These authors show that an increase in their measure of financial pressure (the ratio of interest payments to cash flow) has a negative effect on employment controlling for other determinants. It also has a negative impact on wage growth and a small positive effect on productivity.

These results underpin the inclusion of financial pressure variables when estimating the impact of RER fluctuations on industrial employment. In Latin American countries, the combination of low development of financial markets with a relatively high degree of liability dollarization (an average ratio of 32 percent, as shown in Table 1) and a reduced degree of openness (an average ratio of 16 percent, as measured by the export share to total revenues) is a dangerous mix for the typical firm, since in such circumstances they are more likely to react to RER fluctuations.

Recent research on investment decisions in the presence of liability dollarization in Latin America stress the importance of taking into account balance sheet effects. Studies carried out for 6 Latin American countries[††] suggest that although Latin American firms tend to partially match their debt composition with the currency composition of their income stream, the degree of liability dollarization can reduce, or possibly reverse, the typical expansionary competitiveness effect of currency devaluations on investment. In fact, most of the studies find a negative balance sheet effect on investment.[‡‡]

Taking this framework as our starting point, we use a panel of data on industrial employment for nine Latin American countries[§§] for which liability dollarization data at the industrial level are available. We test whether real exchange rate fluctuations have a significant impact on employment, and analyse whether the impact varies with the degree of liability dollarization and trade openness. Our econometric evidence supports the view that industrial employment reacts positively to RER depreciations, in particular in those industries with a higher

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issuance in UK firms. Benito and Hernando (2002) estimate quantitatively large effects of financial pressure on investment and employment in Spanish companies. They also find significant effects on inventory investment and dividend payments.

[††] See Galindo, Panizza and Schiantarelli (2003b) who summarize most of the findings of a series of studies carried on for Argentina, Brazil, Chile, Colombia, Mexico and Peru, who follow the pioneering work of Bleakley and Cowan (2002).

[‡‡] This effect is statistically significant in the cases of Mexico and Argentina, while for Colombia and Peru the evidence is more mixed and the significance varies across specifications. In the case of Brazil, the coefficient is mostly negative but insignificant in the more general specification, while for Chile it is highly unstable, being positive in some specifications and negative in others.

[§§] These countries are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay.

export orientation, but the degree of liability dollarization works against this positive force. Hence, for industries with a significant amount of foreign currency denominated liabilities, the overall impact of a real exchange rate depreciation can be negative. A by-product of this analysis is that, confirming previous findings for the US, we find strong empirical evidence on the role of trade channels in promoting employment growth following real exchange rate depreciations for Latin American countries (after controlling for balance-sheet effects).

The rest of the paper is organized as follows: the next section contains the theoretical framework in which we base our empirical exercise; Section 3 describes the dataset used, as well as the econometric issues involved in the analysis; Section 4 presents the set of estimation results, including robustness exercises; and Section 5 concludes.

2. Theoretical Background

We base our estimation exercise on the theoretical model derived in Campa and Golberg (2001), where in each period some combination of employment and wage adjustments clear labor markets in response to shocks. Exchange rate shocks influence labour demand by affecting the marginal revenue product of labor. These effects arise through changes in a producer's domestic and foreign sales and in his or her costs of imported inputs. Equilibrium employment response to shocks, i.e., the employment effects of exchange rate movements, is increasing in industry export orientation and home market import penetration, and ambiguous with industry use of imported productive inputs, because domestic labor and imported inputs may be either substitutes or complements in the production function. Besides, the role of exchange rates in labor demand is strengthened in industries in which firms have pricing power and when production is less labor intensive.

It is worth emphasising that the elasticity of employment with respect to the real exchange rate is not constant in the Campa and Goldberg setup. It depends on the share of revenues from export markets, import penetration and the intensity of imported inputs in the production process. This decomposition is relevant because the exclusion of these channels induces estimation biases that can under/overstate the true extent of the impact of RER movements on industrial employment. These components reflect three issues that are crucial when analyzing the impact of RER fluctuations on firms' decisions: first, the degree of output tradability, which provides a natural hedge against exchange rate volatility and determines the

responsiveness of firm's revenues to exchange rate fluctuations; second, the structure of the market where the firm operates, since if a firm has to compete with foreign firms in its domestic market, a given depreciation would improve its competitiveness and allow it to gain market share, enhancing its profitability; and third, industries that rely more heavily on imported inputs are subject to a contractionary shock in labor demand when the exchange rate depreciates, as the latter increases the cost of imported factors of production.

In sum, it is important to account for all likely channels through which exchange rate fluctuations can affect firms' decisions in order to avoid biases. But besides real effects covered in several recent studies, financial channels may be quite relevant as well for emerging markets. Therefore, we extend the Campa and Goldberg setup to include an additional channel: namely, the balance sheet effect induced by liability dollarization. As mentioned above, when a significant portion of debt is denominated in foreign currency, a depreciation can lead to a larger financial burden. This has two effects: first, a liquidity effect through increased debt service, which can create liquidity constraints that might affect firm's real decisions; and second, a depreciation forces a balance sheet adjustment with a net worth reduction in case of a currency mismatch.

Under frictionless markets, net worth effects should have no impact on firms' decisions. But barring this extreme assumption, according to the financial accelerator literature, the cost of external funds is positively related to the ratio of loans to net worth, because the probability of bankruptcy rises when the ratio of debt over net worth increases. Since bankruptcy is costly even if assets are sold, this raises the costs of borrowing. In other words, when borrowers have little wealth to contribute to project financing, the potential divergence of interests between borrower and creditor is greater, implying increased agency costs. In equilibrium lenders must be compensated for higher agency costs by a larger premium. Moreover, and more importantly for our study, in a context of a small open economy, Gertler, Gilchrist and Natalucci (2001) show that with foreign currency debt, a decline in the exchange rate reduces entrepreneurial net worth, thus enhancing the financial accelerator mechanism.

3. Empirical Specification and Data

3.1 Empirical Specification

In line with the previous discussion, we estimate the following general specification:

$$\Delta n_{ijt} = \beta_1 \Delta y_{ijt-1} + \beta_2 \Delta Y_{it-1} + \beta_3 X_{ijt-1} + \beta_4 IMP_{ijt-1} + \beta_5 Lev_{ijt-1} + \beta_6 B^*_{ijt-1} + (\lambda_0 + \lambda_1 X_{ijt-1} + \lambda_2 IMP_{ijt-1} + \lambda_3 Lev_{ijt-1} + \lambda_4 B^*_{ijt-1}) \Delta e_{it} + \eta_{ij} + D_t + D_{it} + u_{ijt} \quad (1)$$

where *i* denotes country, *j* industry and *t* year; *n* is the log of employment, *y* is the log of industrial value added, included to capture sectoral dynamics, *Y* is the log of the country's GDP included to control for aggregate demand fluctuations, and *e* is the log of the bilateral real exchange rate; *X* and *IMP* capture trade related factors, namely, the share of exports to output of each industry and import penetration in each industry; and *Lev* and *B** capture debt related factors, namely, the leverage ratio (total debt over total assets) and a measure of liability dollarization reflecting the currency composition of debt at the industry level (dollar debt over total debt, or dollar debt over total assets, depending on the specification).***

Given the high level of heterogeneity of the panel dataset used for estimation, it is advisable to include controls to account for this heterogeneity. In our case, we use industry-specific value added growth, country-time and time dummies. Industry value added captures industry demand shocks (while country GDP growth will proxy for aggregate demand shocks). Aggregate external fluctuations are captured through the use of time dummies and, in some specifications, country-time dummies are included to avoid the possibility that the RER may behave as a summary statistic of macroeconomic conditions (see below).

The leverage ratio is introduced to prevent the dollar debt ratio from capturing a total indebtedness effect, instead of a balance sheet effect, which is our main motivation. In other words, we want to show that what we are identifying is a debt composition problem, rather than an indebtedness problem. The dollar debt ratio is included separately in order to account for differences in behavior related to dollar indebtedness that are independent of RER movements. For example, firms in one sector may have a higher propensity to issue dollar-denominated debt for operational reasons, and labor demand in these sectors may be conditioned by firms' ability to issue this kind of debt, irrespectively of RER fluctuations. As in Campa and Goldberg, we

*** See the data section for more details.

include trade-related variables; however, we cannot account for the imported inputs use channel because we do not have data to build this variable.

In an initial set of specifications macroeconomic effects are controlled for with domestic GDP growth, and regional systemic effects are captured by time dummies. In further specifications, and in order to control in a cleaner way for country-wide time-varying characteristics, we replace macroeconomic controls and year dummies with country-year dummies (D_{it}). This discussion is important because we also opted not to account specifically for the price of two other potentially relevant inputs, capital and energy, as Campa and Goldberg do. On the one hand, time dummies absorb all factors common to all countries and industries, such as would be the case for the real price of oil. On the other hand, the impact of the cost of capital would be controlled for with country-year dummies. Moreover, one could think of using as proxy for this a measure of the real interest rate. But these measures are highly correlated with the real exchange rate, hampering the identification of the impacts of both the RER and the cost of capital.[†††] Therefore, this set of dummy variables controls for all possible aggregate and time-specific country shocks that may affect industry performance, thereby avoiding the usual difficulties in choosing an appropriate set of control variables. This gets around typical omitted variable bias problems, but with the potential cost of some overfitting biases.

Coefficients ηij absorb fixed industry-country effects. They may reflect productivity differences, measurement errors, and other unobservable heterogeneity due to country and/or industry characteristics. These fixed effects are expected to be correlated with measures of liability dollarization, export share, and import penetration, as well as with the industry value added, which will require an estimation method that removes them (see below). Besides, we assume that disturbances u_{ijt} are independent across industries, but arbitrary forms of heteroskedasticity across industries and time are allowed. The set of regressors used here could potentially include endogenous variables (correlated with the error term), since trade shares and industry value added are functions of variables jointly determined with employment. For this reason, all explanatory variables, with the exception of the exchange rate, are lagged one period to address (at least partially) potential endogeneity issues. Under these circumstances we will

[†††] Another reason to prefer the use of dummies to a proxy of the cost of capital based on some measure of the real interest rate is the lack of homogenous and reliable series for all the countries considered here. This is more worrying since some of the countries still suffered from some hyperinflationary episodes in the beginning of the 90s.

employ the within group estimator, since it is consistent when assuming that lagged explanatory variables are weakly exogenous.

This notwithstanding, and in order to allow for the possibility that employment growth exhibits state dependence, we also estimate a dynamic panel data model with autoregressive dynamics (including lagged employment growth). Following Arellano and Bover (1995) and Blundell and Bond (1998), we use the system GMM estimator. This estimator relies on equation differencing to address the problem of possible omitted variable bias induced by the presence of industry-country fixed effects. To address the problem of joint endogeneity, suitably lagged values of the original independent variables, including the lagged value of the dependent variable, are used as instruments for the right hand-side variables. The system estimator improves on the standard first-differenced GMM estimator by exploiting instruments available for the equations in levels, under a mild assumption of mean stationarity of the initial condition. This way it can both greatly improve the precision and reduce the finite sample bias when these additional moment conditions are valid. We also restrict the instrument matrix in order to avoid biases resulting from overfitting and weak instruments.[###]

3.2. Data

Regressions are run using annual industry-level data for nine Latin American countries' labor market variables and trade shares for the 1990s. The sample selection is determined by the availability of data on dollar-denominated debt, which varies across countries. We work with an unbalanced and incomplete panel for the period 1990-99 (Bolivia, Colombia and Mexico), 1993-99 (Argentina and Costa Rica), and 1994-99 (Brazil, Chile, Peru and Uruguay). This panel can be regarded as representative of the region, since it covers a wide variation in geographical areas, exchange rate regimes, trade openness, liability dollarization and institutional features.

The sector disaggregation in the database follows the International Standard Industrial Classification (ISIC) and is provided at the three-digit level for 28 manufacturing industries (see Appendix Table 1). The source of the employment data, the dependent variable of this study, is the United Nations Industrial Development Organization (UNIDO) Industrial Statistics Database.

[###] GMM estimators based on too many moment conditions can be subject to potentially severe overfitting biases in small samples (Bond, 2002), and to a problem of weak instruments, since deep lags of the variables might be poor instruments. In addition, asymptotic standard errors tend to be much too small for the GMM two-step estimator, so we shall use for inference the two-step estimator with the finite-sample correction for the asymptotic variance provided by Windmeijer (2000).

This is also the source data for our variable of industrial economic activity which is the lagged real growth rate of the industry value added.

Our leverage and liability dollarization data comes from a firm-level dataset compiled by the Research Department of the Inter-American Development Bank. This database has been assembled trying to ensure that variable definitions are uniform across countries, comparable across economies and consistent across time.[§§§] Appendix Table 2 roughly describes the original sources of the data.

The source of the trade data is the United Nations Statistics Department Comtrade database, which includes sectoral imports and exports. Although the theoretical exposition includes three trade channels (export share, import competition and imported input use), we only use two interacted channels, the export to production share and import penetration, because we do not have data to construct a measure of imported input use. The first is measured as the ratio of industry export revenues in current US$ to industry output converted into US$ and captures the portion of a producer's revenues that is generated in foreign markets. The second, is the ratio of sectoral import revenue in US$ to total sectoral consumption, also in US$, that is, the sum of total output and imports, less the amount exported, and it captures foreign penetration in each particular industry.

We have undertaken all of our empirical analyses using the real bilateral exchange rate of the country's currency against the US dollar built from the IMF's International Financial Statistics (IFS). From a financial perspective, the bilateral real exchange rate is the appropriate measure to use, given that liabilities in foreign currency are mostly denominated in US dollars. But because of the additional trade channels that are tested in our estimations, we also run alternative specifications using a multilateral exchange rate index defined as the foreign currency per domestic currency weighted by foreign trade provided by JP Morgan. Our regressions include the change in the log of GDP (from IFS) as an additional control.

3.3. Description of the Data

Overall statistics for our key variables are presented in Table 1. It can be observed that, given the period and the sample of countries under consideration, all variables present a high degree of volatility, particularly when compared with their averages. It is remarkable that the average

[§§§] See Kamil (2004) for a more comprehensive description of the compilation of this database.

growth rate of our dependent variable, manufacturing employment, is negative in most cases and that the aggregate standard deviation is strikingly large. Besides, the average level of industry export revenues to industry output for all countries and industries is of 16.4 percent, while the same average for the ratio of imports to total consumption is of 30.7 percent. Both variables vary widely for the whole sample, taking values that range from nearly 0 percent to almost 100 percent.

At the country level, those economies where their industries earn the greatest revenues from exports are Bolivia (22.3 percent), Chile (23.8 percent), Mexico (30.5 percent) and Uruguay (34.1 percent), while those less naturally hedged against exchange rate movements are Peru (14 percent) and Argentina (12.4 percent). On the other hand, the economies with the highest degree of import penetration are Uruguay, Mexico, Costa Rica, and Bolivia, all around 40 percent, while Brazil and Costa Rica have the lowest ratios (around 20 percent).

Regarding liability dollarization, a rough analysis by country (see Table 1) shows that the usual suspects are the ones that are more dollarized, i.e., Argentina, Bolivia, Peru and Uruguay (all with a ratio of US$ debt over total debt well above 50 percent), but Costa Rica and Mexico also present a heavy degree of dollarization (near 50 percent). Looking at aggregate figures, these nine countries present an unweighted average degree of liability dollarization of about 32.4 percent of total debt, which is quite notable. However, these figures have to be contrasted with those of the ratios of export revenues over total output. As shown in Table 1, the unweighted average export share is of 16.4 percent, which seems small relative to the average liability dollarization ratio.

As can be seen in Table 2 the manufacturing sectors that are less dollarized are rubber products, tobacco, and printing and other manufactured products,[****] with ratios of debt dollarization in the neighborhood of 15 percent. On the other hand, those sectors most exposed to liability dollarization are industrial chemicals, plastic products and professional and scientific equipment, with percentages around 50 percent on average for the ratio over total debt.

It can also be seen that the industries with a larger degree of export revenues are leather products (54.7 percent), non-ferrous metals (48.8 percent) and footwear, except rubber or plastic (36.3 percent). Regarding import penetration of these industries, the most exposed to foreign

[****] This includes manufacture of jewellery, musical instruments, sporting and athletic goods and manufacturing industries not elsewhere classified.

competition are professional and scientific equipment (82.8 percent), machinery except electrical (68.7 percent), and industrial chemicals (60.9 percent). The industries most protected from foreign competition are tobacco and beverages industries and petroleum refineries, both around 5 percent.

4. Empirical Results

In this section we present the results of several estimation exercises. The first set of regressions attempts to assess the role of the different channels through which the exchange rate affects employment decisions in a baseline specification that includes the bilateral real exchange rate vis-à-vis the US dollar as the relevant measure for the exchange rate. The dollarization variables are constructed using the median ratio of US dollar debt to total assets. All regressions are estimated by the within groups method to account for the presence of country-industry heterogeneity of each unit. Additional regressors are domestic GDP, industry value added, export share and import penetration of each industry-country interacted with the real exchange rate. All variables other than debt ratios and export and import shares are expressed in log differences. Finally, we introduce time dummies in most specifications, and country-year dummies in others.

In addition to the set of baseline regressions, we check for robustness of our basic results in three directions. First, we use alternative measures of liability dollarization: the median ratio of dollar denominated debt to total debt, and the average ratio of US dollar debt over assets across firms in each industry. Second, to check whether the results are sensitive to the exchange rate measure used, we consider the effective multilateral real exchange rate instead. Third, we employ the GMM system estimator to address the possibility of being in a context of a dynamic panel data model with some endogenous variables. All in all, the robustness checks do not significantly alter the main thrust of our baseline specification, which is the importance of both the competitiveness channel and the balance sheet effects channel for the impact of exchange rate fluctuations on firms' employment decisions.

We first begin by estimating a simple regression of employment growth on the RER (see Table 3), adding as additional controls lagged industry value added growth and time dummies (see column 1). In this preliminary regression the exchange rate has a negative sign, but it is not significant. This should be no surprise given the previous discussion of Section 2, which

suggested that we should account for several channels through which the RER impacts employment decisions.

Since our primary focus is on the balance sheet effect channel, we proceed to add the dollar debt ratio, with and without interactions with the exchange rate (although the dollar debt ratio does not strictly capture currency mismatches, data for Latin American countries suggest that high levels of dollarization are positively correlated with currency mismatches, thus justifying the use of this proxy to account for balance-sheet effects). In this case (see column 2), the RER has a positive coefficient, but again it remains statistically insignificant. The specific balance sheet effect variable (the interaction between the bilateral RER against the US dollar and the dollar debt ratio) has the expected negative sign, which is statistically significant, while the parameter for the lagged ratio of dollar debt is negative and not significant.

However, as mentioned above, the negative and significant coefficient attached to the balance sheet effect variable might be driven by the fact that it is accounting for a total indebtedness effect instead of a debt dollarization effect. To avoid this pitfall, we add the lagged total leverage ratio in column 3. When doing so, the balance sheet effect impact retains both its significance and its negative sign. In addition, the leverage coefficient is positive and statistically significant. This suggests that in more leveraged firms employment growth tends to be faster. Finally, the RER coefficient turns out to be negative and not significant.

In the next set of regressions (columns 4 through 7) we report the estimated coefficients for the more general model in which we also account for the trade-related channels, as suggested by Campa and Goldberg. The variable measuring the competitiveness effect, which relates the positive impact of RER depreciations to the share of exports in total revenues, is always positive and statistically significant across specifications, suggesting that sectors that increase their export shares may have higher employment growth following depreciation. As regards the import penetration channel, its coefficient turns out to be negative, though insignificant. One potential drawback of this exercise stems from the fact that export share and import penetration are measured using noisy exchange rate data to convert output into dollars. We tried several methods to account for this problem. First, we built the export share variable as a 3 or 5-year moving average, but qualitative results did not change. Moreover, we smoothed[††††] the bilateral exchange

[††††] We applied a Hodrick-Prescott filter to the exchange rate series.

rate against the dollar in order to temper the short-run volatility of this variable. Again, our results were not affected in a meaningful way.[‡‡‡‡]

The coefficient accompanying the RER is not significant either in several specifications, and, in all of them, it comes up with a negative sign. It is important to note in this respect that the coefficient of RER itself may not be capturing the true effect of the real exchange rate, since it may also be a summary statistic of macroeconomic conditions. To prevent this issue from biasing our results, we first include GDP growth (column 6) and then drop this direct effect and replace all country varying variables with country time dummies (column 7). This does not alter the main thrust of our results. Moreover, since we can not account for the imported inputs use channel, the RER may be capturing part of it. The reliance of Latin American countries on imported capital and other intermediate inputs render this channel an important one that may be playing a role in the estimated coefficient for the RER.

In addition to being statistically significant, our estimates are also economically relevant. Our estimates suggest that for the average country-sector in our sample, with values for the debt to assets ratio close to 15 percent, export share of 16 percent, import penetration of 30 percent and total leverage of 44%, a one-standard deviation increase (depreciation) of the real exchange rate (14 percent in our sample) would roughly imply a 2 percentage point reduction in employment growth in most specifications (see table).[§§§§]

Table 4 reports the estimated coefficients for the first robustness exercise using as an alternative measure of dollarization the median ratio of US$ debt to total debt instead of the ratio to total assets. Results are qualitatively and quantitatively similar for all regressions, except that now the balance-sheet term is reduced in magnitude. The estimated coefficient changes from a range between –1.27 and –0.87 in table 3 to a range between –0.65 and –0.42 in table 4. However, since the median ratio of US$ debt to total debt is approximately double that of the median ratio of US$ debt to total assets (0.315 against 0.146), the average effect of both estimates is nearly the same.

[‡‡‡‡] These regressions are available from the authors upon request.

[§§§§] However, results change when using estimates in column 7 of Table 3, where the RER is replaced by country-year dummies. In this case, the impact for the average unit would imply an employment expansion. Since we can not control for the imported inputs channel, and the RER may be behaving as a summary statistic, these rough estimates should not be taken at face value. However, they emphasize the importance of accounting for all relevant channels, including liability dollarization and openness when assessing the impact of real depreciation.

Table 5 reports results using the average ratio of dollar-denominated debt to total assets instead of the median ratio. Again, results are both qualitative and quantitatively similar across specifications. We then re-estimated all regressions using an alternative measure of the RER as a further robustness check to our results. We used an economy-wide trade-weighted exchange rate index as the relevant exchange rate, rather than the real bilateral exchange rate against the US dollar. The advantage of this index is that it takes into account more information on exchange rates that may be relevant for firms' trade decisions. The results for this specification (see Table 6) are similar to those detailed earlier. The balance sheet parameters, along with the competitiveness and total leverage ones, are the most robust variables across specifications.

Finally, we repeated the whole estimation exercise using the GMM system estimator instead of the within group estimator, although we only report results for the specifications equivalent to those in Table 3 (see Table 7). The lagged employment growth is negative, but statistically insignificant across specifications, which favours our choice of the estimation method, since the specifications tests do not show evidence of correlated residuals. Moreover, the RER coefficient is negative in most specifications, although it loses some significance when compared with the results in Table 3. Something similar occurs with the balance sheet effect and competitiveness effect variables, which also lose some significance. Another interesting point is that the interaction between total leverage and the change in the RER is not significant, contrary to previous results. All in all, it can be argued that our results are not affected in a meaningful way by the estimation method employed.

5. Conclusions

This paper studies the effects of exchange rate fluctuations on manufacturing employment flows in Latin America. Exchange rate movements alter firms' decisions through two types of channels: real and financial. The empirical analysis carried out here estimates the effects of exchange rate fluctuations on industrial employment flows accounting for these aforementioned channels, in particular, export orientation, import penetration and liability dollarization. We find that of all these channels the balance sheet effect and the competitiveness effect are both particularly important. In addition, these results are robust across alternative specifications and definitions.

It is important to note that our study focuses on the manufacturing sector, which is arguably one of the most tradable sectors in the economy. Therefore, the significance of the balance sheet effects channel, as well as its estimated quantitative importance, reflect the potentially disturbing effects that sharp depreciations may have on the economy, which underpins the importance of tackling financial dollarization in Latin America.

All in all, our results suggest that in industries with high liability dollarization the overall impact of a real exchange rate depreciation can be negative, thus confirming previous results on firms' investment decisions. This outcome represents a first step to cast some light on the relative importance of liability dollarization and trade channels on employment decisions in Latin America, which should be taken into account when considering policy options.

References

Aghion, P., P. Bacchetta and A. Banerjee. 2001. "Currency Crises and Monetary Policy in a Credit-Constrained Economy." *European Economic Review* 45: 1121-1150.

----. 2003. "A Corporate Balance-Sheet Approach to Currency Crises." Cambridge, United States: Harvard University. Mimeographed document.

Arellano, M., and O. Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics* 68(1): 29-51.

Benavente J., C. Johnson and F. Morandé. 2003. "Debt Composition and Balance-Sheet Effects of Exchange Rates: A Firm-Level Analysis for Chile." *Emerging Markets Review* 4(4): 397-416.

Benito, A., and I. Hernando. 2002. "Extricate: Financial Pressure and Firm Behaviour in Spain." Working Paper 0227. Madrid, Spain: Banco de España.

Benito A., and G. Young. 2002. "Financial Pressure and Balance Sheet Adjustment." Working Paper 0209. Madrid, Spain: Banco de España.

Bernanke, B., and M. Gertler. 1989. "Agency Costs, Net Worth and Economic Fluctuations." *American Economic Review* 79: 14-31.

Bleakley, H., and K. Cowan. 2002. "Corporate Dollar Debt and Devaluations: Much Ado About Nothing." Cambridge, United States: Massachusetts Institute of Technology. Mimeographed document.

Blundell, R., and S. Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87: 115-143.

Bond, S. 2002. "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice." CEMMAP Working Paper CWP09/02. London, United Kingdom: Institute for Fiscal Studies, Centre for Microdata Methods and Practice.

Bonomo, M., B. Martins and R. Pinto. 2003. "Debt Composition and Balance Sheet Effects of Exchange and Interest Rate Volatility in Brazil: A Firm Level Analysis." *Emerging Markets Review* 4(4): 368-396.

Branson, W., and J. Love. 1988. "United States Manufacturing and the Real Exchange Rate." In: R. Marston, ed., *Misalignment of Exchange Rates: Effects on Trade and Industry* Chicago, United States: University of Chicago Press.

Burgess, S., and M. Knetter. 1998. “An International Comparison of Employment Adjustment to Exchange Rate Fluctuations.” *Review of International Economics* 6: 151-163.

Calvo G.A., A. Izquierdo and L. F. Mejía. 2004. “On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects.” NBER Working Paper 10520. Cambridge, United States: National Bureau of Economic Research.

Calvo G.A., A. Izquierdo and E. Talvi. 2003. “Sudden Stops, the Real Exchange Rate and Fiscal Sustainability: Argentina’s Lessons.” In: V. Alexander, J. Mélitz and G. M. von Furstenberg, editors. *Monetary Unions and Hard Pegs*. Oxford, United Kingdom: Oxford University Press.

Campa, J.M., and L. Goldberg. 1997. “The Evolving External Orientation of Manufacturing: A Profile of Four Countries.” *Economic Policy Review* (July): 53-81.

----. 2001. “Employment versus Wage Adjustment and the US Dollar.” *Review of Economics and Statistics* 83(3): 477-489.

Carranza, L., J. Cayo and J. Galdón-Sánchez. 2003. “Exchange Rate Volatility and Economic Performance in Peru: From Aggregate Evidence to Firm Level Analysis.” *Emerging Markets Review* 4.

Céspedes, L., R. Chang and A. Velasco. 2002. “IS-LM-BP in the Pampas.” NBER Working Paper 9337. Cambridge, United States: National Bureau of Economic Research.

Galiani S., E. Levy-Yeyati and E. Schargrodsky. 2003. “Financial Dollarization and Debt Deflation under a Currency Board.” *Emerging Markets Review* 4(4): 340-367.

Galindo, A., U. Panizza and F. Schiantarelli. 2003a. Currency Depreciations: Do They Boost or do they Bust?, *mimeo*, Inter-American Development Bank.

Galindo A., U. Panizza and F. Schiantarelli. 2003b. “Debt Composition and Balance Sheet Effects of Currency Depreciation: A Summary of the Micro Evidence.” *Emerging Markets Review* 4(4): 330-339.

Gertler, M., S. Gilchrist and F. Natalucci. 2003. “External Constraints on Monetary Policy and the Financial Accelerator.” NBER Working Paper 10128. Cambridge, United States: National Bureau of Economic Research.

Gourinchas, P-O. 1998. “Exchange Rates and Jobs: What Do We Learn from Job Flows?” In: B. Bernanke and J. Rotemberg, editors. *NBER Macroeconomics Annual 1998*. Cambridge, United States: National Bureau of Economic Research and MIT Press.

Haltiwanger J., A. Kugler, M. Kugler, A. Micco and C. Pagés. 2004. "Effects of Tariffs and Real Exchange Rates on Job Reallocation: Evidence from Latin America." *Journal of Policy Reform* 7(4): 189-208.

Harvey, C. and A. Roper. 1999. "The Asian Bet." In: A. Harwood, R. Litan and M. Pomerleano, editors. *The Crisis in Emerging Financial Markets*. Washington, DC, United States: Brookings Institution Press.

Kamil, H. 2004. "A New Database on the Currency Composition and Maturity Structure of Firms' Balance Sheets in Latin America, 1990-2002." Washington, DC, United States: Inter-American Development Bank.

Klein, M. W., S. Schuh and R. Triest. 2003. "Job Creation, Job Destruction, and the Real Exchange Rate." *Journal of International Economics* 59(2): 239-265.

Krugman P. 1999. "Balance Sheet Effects, the Transfer Problem and Financial Crises." In: P. Isard, A. Razin and A. Rose, editors. *International Finance and Financial Crises*. Amsterdam, The Netherlands: Kluwer Academic Publisher.

Márquez, G., and C. Pagés. 1997. "Trade and Employment: Evidence from Latin America and the Caribbean." Washington, DC, United States: Inter-American Development Bank.

Nickell, S., and D. Nicolitsas. 1999. "How Does Financial Pressure Affect Firms?" *European Economic Review* 43: 1435–1456.

Pratab, S., I. Lobato and A. Somuano. 2003. "Debt Composition and Balance Sheet Effects of Exchange Rate Volatility in Mexico: A Firm Level Analysis. *Emerging Markets Review* 4(4): 450-471.

Revenga, A. 1992. "Exporting Jobs? The Impact of Import Competition on Employment and Wages in US Manufacturing." *Quarterly Journal of Economics* 107(1): 255-84.

Windmeijer, F. 2000. "A Finite Sample Correction for the Variance of Linear Two-Step GMM Estimators." Institute for Fiscal Studies Working Paper Series W00/19. London, United Kingdom: Institute for Fiscal Studies.

Appendix

Appendix Table 1.

ISIC 3 digit	description
311	Food products
313	Beverages
314	Tobacco
321	Textiles
322	Wearing apparel except footwear
323	Leather products
324	Footwear except rubber or plastic
331	Wood products except furniture
332	Furniture except metal
341	Paper and products
342	Printing and publishing
351	Industrial chemicals
352	Other chemicals
353	Petroleum refineries
354	Miscellaneous petroleum and coal products
355	Rubber products
356	Plastic products
361	Pottery china earthenware
362	Glass and products
369	Other non-metallic mineral products
371	Iron and steel
372	Non-ferrous metals
381	Fabricated metal products
382	Machinery except electrical
383	Machinery electric
384	Transport equipment
385	Professional and scientific equipment
390	Other manufactured products

Appendix Table 2.

Country	Source article Emerging Markets Review 4 (2003)	Source of data
Argentina	Galiani S., Levy-Yeyati E. and Schargrodsky E.	Buenos Aires Stock Exchange and Inspección General de Justicia
Bolivia	---	Superintendencia de Valores y Seguros, Bolsa de Valores
Brazil	Bonomo M., Martins B. and Pinto R.	Economática and CVM
Chile	Benavente J., Johnson C. and Morandé F.	FECU and ENIA
Colombia	Echeverry J.C., Fergusson L., Steiner R. and Aguilar C.	Superintendencia de Sociedades
Costa Rica	---	Superintendencia General de Valores
Mexico	Lobato I., Pratab S. and Somuano A.	Mexican Stock Exchange
Peru	Carranza L., Cayo J. and Galdón-Sánchez J	CONASEV
Uruguay	---	Montevideo Stock Exchange and Auditoría General de la Nación

Tables

Table 1. Descriptive Statistics

	D(Log(Employment))	D(Log(Bilateral RER))	D(Log(Multilateral RER))	Dollar Debt/Assets1	Dollar Debt/Assets2	Dollar Debt/Total Debt 1	Dollar Debt/Total Debt 2	Leverage (total debt/assets)	Export Share	Import Penetration	D(log(Value Added))	D(log(GDP))
Country Averages												
ARGENTINA	-0.026	-0.008	0.054	0.261	0.252	0.530	0.552	0.450	0.124	0.250	-0.008	0.012
BOLIVIA	0.035	0.020	-0.039	0.321	0.321	0.543	0.543	0.553	0.223	0.395	0.070	0.029
BRAZIL	-0.103	0.008	0.035	0.049	0.037	0.100	0.076	0.474	0.158	0.190	0.023	0.024
CHILE	-0.017	-0.005	-0.023	0.126	0.113	0.381	0.360	0.295	0.238	0.301	0.038	0.053
COLOMBIA	-0.054	-0.038	-0.032	0.022	0.011	0.057	0.026	0.391	0.167	0.270	0.037	0.023
COSTA RICA	0.059	-0.003	-0.009	0.242	0.233	0.441	0.437	0.522	0.207	0.205	0.027	0.050
MEXICO	0.027	-0.023	-0.028	0.214	0.194	0.431	0.440	0.450	0.305	0.414	0.077	0.034
PERU	0.051	0.005	-0.012	0.342	0.357	0.621	0.648	0.523	0.140	0.325	0.159	0.025
URUGUAY	-0.069	-0.011	-0.035	0.431	0.430	0.760	0.761	0.536	0.341	0.358	-0.063	0.028
Sample Statistics												
Mean	-0.028	-0.011	-0.007	0.158	0.146	0.324	0.315	0.436	0.164	0.307	0.040	0.031
Std. Dev	0.176	0.135	0.125	0.162	0.163	0.267	0.292	0.168	0.148	0.256	0.213	0.032
Min	-1.358	-0.687	-0.318	0.000	0.000	0.000	0.000	0.026	0.000	0.007	-1.082	-0.064
Max	1.569	0.415	0.406	0.828	0.754	0.977	0.977	0.979	0.854	0.997	1.984	0.101

Notes: Dollar Debt / Total Debt 1 is the sectoral average of dollar debt/total debt across firms in each sector. Dollar Debt / Total Debt2 refers to the median across firms.Dollar Debt / Assets 1 is the sectoral average of dollar debt/total assets across firms in each sector. Dollar Debt / Assets2 refers to the median across firms.

Table 2. Summary Statistics on Dollarization and Openness

Industry	Dollar Debt/Total Debt 1	Dollar Debt/Total Debt 2	Dollar Debt/Assets1	Dollar Debt/Assets2	Export Share	Import Penetration
311	0.352	0.324	0.176	0.153	0.196	0.146
313	0.307	0.280	0.143	0.128	0.078	0.055
314	0.152	0.152	0.069	0.069	0.091	0.080
321	0.360	0.338	0.208	0.154	0.246	0.425
322	0.258	0.278	0.150	0.155	0.137	0.248
323	0.192	0.192	0.123	0.123	0.547	0.317
324	0.195	0.197	0.095	0.099	0.363	0.267
331	0.210	0.191	0.068	0.066	0.246	0.122
332	0.186	0.186	0.098	0.098	0.154	0.286
341	0.418	0.423	0.171	0.161	0.216	0.460
342	0.196	0.184	0.079	0.076	0.134	0.277
351	0.502	0.480	0.259	0.244	0.234	0.609
352	0.341	0.328	0.175	0.164	0.099	0.369
353	0.271	0.271	0.155	0.155	0.015	0.037
354	0.263	0.210	0.118	0.069	0.050	0.372
355	0.153	0.145	0.071	0.060	0.115	0.483
356	0.484	0.486	0.221	0.222	0.064	0.281
361	0.340	0.322	0.128	0.110	0.186	0.447
362	0.358	0.359	0.178	0.172	0.200	0.442
369	0.325	0.320	0.120	0.105	0.077	0.131
371	0.397	0.400	0.197	0.188	0.176	0.437
372	0.334	0.339	0.130	0.130	0.488	0.379
381	0.352	0.344	0.162	0.148	0.104	0.481
382	0.253	0.240	0.140	0.137	0.154	0.687
383	0.363	0.355	0.209	0.204	0.069	0.287
384	0.369	0.395	0.209	0.186	0.274	0.559
385	0.531	0.531	0.347	0.347	0.123	0.828
390	0.149	0.142	0.066	0.057	0.192	0.335

Notes: Dollar Debt / Total Debt 1 is the sectoral average of dollar debt/total debt across firms in each sector. Dollar Debt / Total Debt2 refers to the median across firms.Dollar Debt / Assets 1 is the sectoral average of dollar debt/total assets across firms in each sector. Dollar Debt / Assets2 refers to the median across firms.

Table 3. Baseline Econometric Results

Employment and Balance Sheet Effects

Estimation Method: Within Groups

Using Bilateral Real Exchange Rate and Sectoral Median of Dollar Debt/Assets

Dependent variable: D(log(Employment(ijt)))

	1	2	3	4	5	6	7
D(Log(Value Added(ijt-1)))	-0.082	-0.076	-0.074	-0.026	-0.024	-0.030	-0.010
	[0.030]***	[0.033]**	[0.033]**	[0.036]	[0.037]	[0.039]	[0.042]
D(RER(jt))	-0.069	0.045	-0.231	-0.582	-0.569	-0.559	
	[0.049]	[0.071]	[0.148]	[0.181]***	[0.181]***	[0.183]***	
D(RER(jt))*USdebt_assets(ijt-1)		-0.914	-1.106	-0.873	-0.928	-0.936	-1.270
		[0.400]**	[0.409]***	[0.487]*	[0.489]*	[0.489]*	[0.578]**
USdebt_assets(ijt-1)		-0.032	-0.022	-0.059	-0.044	-0.042	-0.023
		[0.063]	[0.069]	[0.078]	[0.078]	[0.078]	[0.079]
D(RER(jt))*Total Leverage(ijt-1)			0.629	0.995	0.958	0.952	1.023
			[0.293]**	[0.335]***	[0.336]***	[0.336]***	[0.356]***
Total Leverage(ijt-1)			-0.018	0.035	0.036	0.035	0.041
			[0.050]	[0.060]	[0.060]	[0.060]	[0.061]
D(RER(jt))*Export Share(ijt-1)				0.533	0.667	0.666	0.647
				[0.284]*	[0.326]**	[0.326]**	[0.327]**
Export Share(ijt-1)				0.182	0.158	0.158	0.162
				[0.042]***	[0.044]***	[0.044]***	[0.045]***
D(RER(jt))*Import Penetration(ijt-1)					-0.018	-0.018	-0.018
					[0.023]	[0.023]	[0.023]
Import Penetration(ijt-1)					0.003	0.003	0.003
					[0.001]*	[0.001]*	[0.001]*
D(log(GDP(jt-1)))						0.137	
						[0.325]	
Implied effect of a 1 sd rise in RER (a)	-0.01	-0.01	-0.02	-0.03	-0.02	-0.02	0.05
Observations	799	697	697	512	512	512	512
Number of Country-Industries	154	153	153	151	151	151	151
R-squared	0.24	0.30	0.30	0.47	0.47	0.47	0.50
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No
Country-Year Dummies	No	No	No	No	No	No	Yes

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

(a) Computed for average values of the ratios of dollar-debt, total leverage, export share and import penetration

Table 4. Robustness 1: Alternative Definition of Dollarization

Employment and Balance Sheet Effects
Estimation Method: Within Groups
Using Bilateral Real Exchange Rate and Sectoral Median of Dollar Debt/Total Debt
Dependent variable: D(log(Employment(ijt)))

	1	2	3	4	5	6	7
D(Log(Value Added(ijt-1)))	-0.082	-0.073	-0.074	-0.024	-0.022	-0.028	-0.009
	[0.030]***	[0.033]**	[0.033]**	[0.036]	[0.037]	[0.039]	[0.042]
D(RER(jt))	-0.069	0.052	-0.174	-0.520	-0.503	-0.493	
	[0.049]	[0.074]	[0.155]	[0.192]***	[0.192]***	[0.194]**	
D(RER(jt))*USdebt_Tot.Debt(ijt-1)		-0.449	-0.454	-0.419	-0.439	-0.444	-0.650
		[0.197]**	[0.197]**	[0.242]*	[0.243]*	[0.243]*	[0.305]**
USdebt_Total Debt(ijt-1)		-0.040	-0.041	-0.051	-0.045	-0.045	-0.036
		[0.036]	[0.037]	[0.041]	[0.041]	[0.041]	[0.042]
D(RER(jt))*Total Leverage(ijt-1)			0.477	0.883	0.835	0.828	0.875
			[0.287]*	[0.328]***	[0.329]**	[0.330]**	[0.345]**
Total Leverage(ijt-1)			-0.016	0.028	0.033	0.033	0.045
			[0.046]	[0.055]	[0.055]	[0.055]	[0.056]
D(RER(jt))*Export Share(ijt-1)				0.556	0.697	0.696	0.687
				[0.286]*	[0.329]**	[0.329]**	[0.329]**
Export Share(ijt-1)				0.180	0.157	0.157	0.163
				[0.042]***	[0.044]***	[0.044]***	[0.044]***
D(RER(jt))*Import Penetration(ijt-1)					-0.019	-0.019	-0.020
					[0.023]	[0.023]	[0.023]
Import Penetration(ijt-1)					0.002	0.002	0.002
					[0.001]*	[0.001]*	[0.001]*
D(log(GDP(jt-1)))						0.135	
						[0.325]	
Implied effect of a 1 sd rise in RER (a)	-0.01	0.00	0.00	-0.01	-0.01	-0.01	0.05
Observations	799	697	697	512	512	512	512
Number of Country-Industries	154	153	153	151	151	151	151
R-squared	0.24	0.30	0.30	0.47	0.47	0.47	0.50
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No
Country-Year Dummies	No	No	No	No	No	No	Yes

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) Computed for average values of the ratios of dollar-debt, total leverage, export share and import penetration

Table 5. Robustness 2: Alternative Definition 2

Employment and Balance Sheet Effects
Estimation Method: Within Groups
Using Bilateral Real Exchange Rate and Sectoral Mean of Dollar Debt/Assets
Dependent variable: D(log(Employment(ijt)))

	1	2	3	4	5	6	7
D(Log(Value Added(ijt-1)))	-0.082	-0.081	-0.080	-0.031	-0.029	-0.037	-0.025
	[0.030]***	[0.032]**	[0.032]**	[0.036]	[0.036]	[0.039]	[0.042]
D(RER(jt))	-0.069	0.071	-0.220	-0.565	-0.553	-0.540	
	[0.049]	[0.076]	[0.148]	[0.182]***	[0.181]***	[0.183]***	
D(RER(jt))*USdebt_assets(ijt-1)		-0.978	-1.216	-1.098	-1.118	-1.138	-1.661
		[0.401]**	[0.414]***	[0.498]**	[0.499]**	[0.501]**	[0.624]***
USdebt_assets(ijt-1)		-0.027	-0.023	-0.046	-0.035	-0.033	-0.018
		[0.063]	[0.068]	[0.077]	[0.077]	[0.078]	[0.078]
D(RER(jt))*Total Leverage(ijt-1)			0.679	1.058	1.015	1.010	1.138
			[0.296]**	[0.337]***	[0.338]***	[0.338]***	[0.362]***
Total Leverage(ijt-1)			-0.017	0.034	0.036	0.036	0.043
			[0.050]	[0.060]	[0.060]	[0.060]	[0.061]
D(RER(jt))*Export Share(ijt-1)				0.588	0.722	0.722	0.713
				[0.287]**	[0.329]**	[0.329]**	[0.329]**
Export Share(ijt-1)				0.179	0.156	0.155	0.159
				[0.042]***	[0.044]***	[0.044]***	[0.045]***
D(RER(jt))*Import Penetration(ijt-1)					-0.018	-0.019	-0.018
					[0.023]	[0.023]	[0.023]
Import Penetration(ijt-1)					0.003	0.003	0.002
					[0.001]*	[0.001]*	[0.001]*
D(log(GDP(jt-1)))						0.176	
						[0.325]	
Implied effect of a 1 sd rise in RER (a)	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	0.05
Observations	799	697	697	512	512	512	512
Number of Country-Industries	154	153	153	151	151	151	151
R-squared	0.24	0.30	0.30	0.47	0.47	0.47	0.50
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No
Country-Year Dummies	No	No	No	No	No	No	Yes

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) Computed for average values of the ratios of dollar-debt, total leverage, export share and import penetration

Table 6. Robustness 3: Alternative Definition of the Real Exchange Rate

Employment and Balance Sheet Effects

Estimation Method: Within Groups

Using Multilateral Real Effective Exchange Rate and Sectoral Median of Dollar Debt/Assets

Dependent variable: D(log(Employment(ijt)))

	1	2	3	4	5	6	7
D(Log(Value Added(ijt-1)))	-0.080	-0.074	-0.072	-0.024	-0.024	-0.032	-0.008
	[0.030]***	[0.033]**	[0.033]**	[0.036]	[0.036]	[0.039]	[0.042]
D(RER(jt))	-0.097	0.032	-0.244	-0.583	-0.575	-0.562	
	[0.053]*	[0.076]	[0.151]	[0.186]***	[0.186]***	[0.187]***	
D(RER(jt))*USdebt_assets(ijt-1)		-1.033	-1.266	-1.128	-1.141	-1.157	-1.329
		[0.417]**	[0.430]***	[0.501]**	[0.503]**	[0.505]**	[0.564]**
USdebt_assets(ijt-1)		-0.039	-0.032	-0.073	-0.059	-0.057	-0.044
		[0.063]	[0.068]	[0.077]	[0.078]	[0.078]	[0.078]
D(RER(jt))*Total Leverage(ijt-1)			0.634	0.967	0.952	0.944	1.029
			[0.299]**	[0.336]***	[0.336]***	[0.337]***	[0.353]***
Total Leverage(ijt-1)			-0.013	0.044	0.045	0.044	0.052
			[0.050]	[0.060]	[0.060]	[0.060]	[0.060]
D(RER(jt))*Export Share(ijt-1)				0.715	0.781	0.786	0.760
				[0.282]**	[0.327]**	[0.328]**	[0.329]**
Export Share(ijt-1)				0.194	0.172	0.172	0.176
				[0.042]***	[0.044]***	[0.044]***	[0.044]***
D(RER(jt))*Import Penetration(ijt-1)					-0.013	-0.014	-0.016
					[0.030]	[0.030]	[0.030]
Import Penetration(ijt-1)					0.002	0.002	0.002
					[0.001]	[0.001]*	[0.001]
D(log(GDP(jt-1)))						0.173	
						[0.325]	
Implied effect of a 1 sd rise in RER (a)	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	0.05
Observations	799	697	697	512	512	512	512
Number of Country-Industries	154	153	153	151	151	151	151
R-squared	0.24	0.30	0.30	0.47	0.48	0.48	0.50
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No
Country-Year Dummies	No	No	No	No	No	No	Yes

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

(a) Computed for average values of the ratios of dollar-debt, total leverage, export share and import penetration

Table 7. Robustness 4: Alternative Estimation Method (GMM system estimator)

Employment and Balance Sheet Effects
Estimation Method: GMM-System Estimator
Using Bilateral Real Exchange Rate and Sectoral Median of Dollar Debt/Assets
Dependent variable: D(log(Employment(ijt)))

	1	2	3	4	5	6	7
D(log(employment(ijt-1)))	-0.069	-0.053	-0.167	-0.024	-0.037	-0.031	0.041
	[0.078]	[0.099]	[0.091]*	[0.124]	[0.123]	[0.126]	[0.105]
D(Log(Value Added(ijt-1)))	0.054	-0.003	-0.014	-0.009	-0.029	-0.039	-0.012
	[0.046]	[0.054]	[0.053]	[0.050]	[0.048]	[0.056]	[0.063]
D(RER(jt))	-0.217	0.179	0.691	-0.432	-0.388	-0.377	
	[0.066]***	[0.102]*	[0.376]*	[0.384]	[0.369]	[0.352]	
D(RER(jt))*USdebt_assets(ijt-1)		-1.724	-1.857	-0.812	-0.935	-0.941	-1.541
		[0.588]***	[0.524]***	[0.552]	[0.546]*	[0.535]*	[0.896]*
USdebt_assets(ijt-1)		0.312	0.456	0.002	0.016	0.008	-0.185
		[0.095]***	[0.083]***	[0.082]	[0.079]	[0.078]	[0.105]*
D(RER(jt))*Total Leverage(ijt-1)			-0.795	0.630	0.608	0.586	1.006
			[0.721]	[0.681]	[0.638]	[0.597]	[0.755]
Total Leverage(ijt-1)			-0.331	0.005	-0.135	-0.117	0.100
			[0.127]***	[0.092]	[0.097]	[0.094]	[0.113]
D(RER(jt))*Export Share(ijt-1)				0.130	0.127	0.125	0.105
				[0.073]*	[0.070]*	[0.069]*	[0.076]
Export Share(ijt-1)				0.031	0.032	0.032	0.022
				[0.011]***	[0.010]***	[0.010]***	[0.008]***
D(RER(jt))*Import Penetration(ijt-1)					0.017	0.017	0.016
					[0.017]	[0.017]	[0.012]
Import Penetration(ijt-1)					0.002	0.002	0.002
					[0.002]	[0.002]	[0.001]
D(log(GDP(jt-1)))						0.140	
						[0.218]	
Implied effect of a 1 sd rise in RER (a)	-0.03	-0.01	0.01	-0.03	-0.03	-0.03	0.03
Observations	773	675	675	548	548	548	548
Number of Country-Industries	154	151	151	151	151	151	151
P-Value AR(1)	0.00	0.00	0.00	0.01	0.02	0.02	0.01
P-Value AR(2)	0.83	0.81	0.65	0.54	0.45	0.43	0.76
P-Value of Hansen Test	0.00	0.19	0.38	0.55	0.87	0.88	0.99
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No
Country-Year Dummies	No	No	No	No	No	No	Yes

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) Computed for average values of the ratios of dollar-debt, total leverage, export share and import penetration