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Abstract

We utilize a new firm-level database from six Latin American countries between 1991 and 2004 to study the effect of financial crises on firms' performance. The depreciated currency provides new investment opportunities in the tradeable sector. Yet firms may not exploit these prospects given decreased supply of credit as a result of failing banks and fleeing foreign investors. Firms might also become credit constrained if their reliance on foreign currency denominated debt before the crisis (and the associated currency mismatch on their balance-sheets) reduces their net worth after the depreciation. In contrast to the previous studies, we are able to differentiate between these two main sources of financial constraints. We do so by relying on firm level information not only on the share of debt denominated in foreign currency, but also on the export orientation and the ownership structure of the firm. Using a differences-in-differences methodology, we show that foreign owned firms do better both in terms of sales and investment than the domestic firms in the post-crisis period. This result holds for the foreign owned firms who are exporters and also who hold short-term foreign currency denominated debt. We conclude that limited access to finance plays a critical role in hindering investment during crises.

JEL Classification: E32, F15, F36, O16

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1 Introduction

The emerging-market crises of the 1990s and early 2000s have put firm performance during a credit crunch at the center stage. According to conventional wisdom, large scale depreciations resulting from currency crises should have an expansionary effect on output due to increased competitiveness. The studies that use country-level data produce mixed results ranging from a contraction to an expansion (see Agenor and Montiel (1996), Gupta, Mishra, and Sahay (2000)). Calvo and Reinhart (2002) show that the contractionary effects are more likely to appear in the emerging market countries, since these countries suffer from capital market imperfections.

The theoretical literature proposes two different mechanisms that can aggravate financial constraints during a financial crises. On the one hand, deteriorating access to liquidity can hinder investment and may cause output collapses. Liquidity decreases since domestic banks cannot provide credit, especially when the currency crisis is accompanied with a banking crisis. At the same time capital flows come to a halt and foreigners exit from the crisis economy, the so-called “sudden stop,” leading to a decline in foreign credit. The liquidity constrained firms decrease investment and production either because they cannot re-finance their short-term debt via domestic or foreign sources and/or they cannot import intermediate inputs which are important for their production (e.g. Aghion, Bacchetta, and Banerjee (2001); Chang and Velasco (2001); Caballero and Krishnamurthy (2001); Mendoza and Smith (2006)). On the other hand, foreign currency denominated debt can cause a mismatch on firms’ balance-sheets. The key idea here is that depreciation inflates the domestic currency value of the foreign currency debt, which causes a weakening of firms balance-sheets and decreases net worth. This, in turn, prevents firms from expanding their production, since they cannot borrow. As a result, even the non-constrained firms before the crisis may become credit constrained during depreciations, a mechanism that can lead to decline in investment and an output collapse (e.g. Bernanke and Gertler (1989); Krugman (1999); Cespedes, Chang, and Velasco (2000); Eichengreen and Hausman (1999)).

The empirical literature so far cannot account for these channels simultaneously and hence fails to differentiate among them. The main reason for this is the lack of data on both the currency denomination of debt and good measures of “access to finance.” Hence, the literature evolved in two separate tracks testing for the existence of credit constraints while having an omitted variables problem. The firms who do not have a weak balance sheet can be the ones with better access to capital such as foreign owned firms or the reason that foreign owned firms do better might be because they match the currency denomination of their liabilities and assets.

We use a new panel data set that allow us to overcome this omitted variables problem in the literature, which in turn help us to identify the effect of financial crises on firms performance accounting for both sources of financing constraints. Our database has annual accounting information for over 1,200 listed non-financial companies in six Latin American countries, spanning the period 1991 to 2004. We have data on the currency denomination of both debt and assets and we know if the firms are foreign owned or not. Our data allows us to explicitly investigate the role of balance-sheet mismatch together with access to credit since foreign owned firms have better access to global finance. We can also investigate the role of banking crises since most of our countries experienced a banking crises the year before the currency crisis. As shown by Kaminsky and Reinhart (1999), currency crisis accompanied by banking crisis can be much more devastating than a single exchange rate crisis. In addition, we also have information on the maturity of the debt and amount of exports, the variables that are shown to be important (Chang and Velasco (2001)).

The existing empirical studies try to use different identification strategies.¹ The first group of papers search for financial constraints using measures of “access to finance” to identify the differential impact. Desai, Foley and Forbes (2008) investigates the response of sales, assets, and investment for U.S. multinational affiliates and domestic firms in the aftermath of currency crises from 25 emerging market countries and find that the affiliates perform much better in all these outcomes compared to their local counterparts. Their interpretation is that local firms are constrained due to their limited access to finance. However, as they acknowledge, they are unable to document the exact mechanism by which currency depreciations differentially intensify financing constraints since they lack data on the currency denomination of the debt. The paper by Blalock, Gertler, and Levine (2007) extend the above analysis by focusing solely on exporting plants and investigate the role of foreign ownership for this group of establishments in Indonesia. This strategy allows identification of the local firms who would benefit most from the currency devaluations.² They reinforce the conclusion of Desai, Foley and Forbes (2008) by showing that foreign owned exporters clearly increase investment relative to domestic exporters. Once more this result is consistent with existence of liquidity constraints but the source of the constraint is not clear since it is possible that exporters and foreign owned firms may have more dollar denominated debt but they might also have matching revenue or assets.³

¹See Galindo, Panizza, and Schiantarelli (2003) for a survey of the firm-level literature.

²Note that Desai, Foley, and Forbes (2008) also investigate the differential impact of depreciation on multinationals that are export-oriented by proxying exports with foreign sales. They did not find a stronger effect though. Multinational affiliates do better than local firms, regardless of the fact that they are export-oriented.

³The authors argue that one of the main reason to focus on a sample exporters is that this sample must be least

The second group of papers focus solely on weak balance sheets as the main source of the liquidity constraints again suffering from a similar omitted variables problem. Aguiar (2005) shows that firms with heavy exposure to short term foreign currency debt before the Mexico crisis decreased investment compared to the firms who were not exposed. He shows an increase in sales for both groups but a decrease in investment for the exposed group. Hence his results supports the idea that weak balance sheets can hinder investment. However in a very similar study using more countries instead of only Mexico, Bleakley and Cowan (2008) show the opposite result where firms with dollar debt invest more. Bleakley and Cowan (2008) argue that firms who hold dollar debt will never have a mismatch since holding dollar debt is endogenous to the fact that these firms have matching revenue from their exports or matching assets.⁴

Our empirical methodology is differences-in-differences, where we can investigate the effect of crisis, an exogenous event, *differentially* across type of firms, accounting for the firm-level heterogeneity. The depreciation resulting from the crisis is expected to improve investment opportunities in the exporting sectors, while financial constraints are increasing through various mechanisms. The firms might get affected differentially depending on various facts, such as whether or not there is also a banking crisis; having currency mismatches on liability and asset sides of their balance sheets; and also whether or not their access to foreign finance is limited. Thus, firm performance will differ not only across foreign owned and domestic firms, exporters and non-exporters but also across the firms with dollar debt that have no matching income and/or assets compared to the ones who have matched dollar liabilities and assets.

Our results show that foreign owned firms do better than the domestic firms in the post-crisis period both in terms of sales and investment. This result holds regardless of being an exporter or holding short-term dollar debt. Hence having dollar denominated liabilities (both long or short

affected from holding dollar denominated debt since most likely these firms also have matching revenue in foreign currency. They try to proxy balance-sheet weakness by controlling debt-to-asset ratio which has many limitations. Unfortunately when they use this measure, their result that foreign exporters increase investment becomes fragile.

⁴Both these paper will suffer from the fact that they cannot account for “access to finance” channel since they cannot tell if the firms who hold the dollar debt are also suffering from a credit crunch differentially less than their counterparts. Bleakley and Cowan (2008) attempt to proxy foreign ownership with two variables. First, they construct a dummy for whether the firm has a parent company. However, they do not have information on the nationality of the parent company. Second, they construct a variable that indicates whether the firm’s shares were listed in a foreign stock exchange in the form of American depositary receipts (ADRs). However, issuing shares in a foreign stock market does not necessarily imply that the firm’s operations and finance decisions are controlled by foreigners. In our sample only 40% of the firm/year observations in which the firm cross-listed shares in the foreign exchange market would be classified as foreign owned.

term) stops being a source of financial constraint if you are foreign owned and have access to global capital markets. The reason for this finding seems to be the fact that foreign firms have better access to global finance and not because firms who choose to hold foreign currency debt are happened to be the foreign owned ones. Thus, our results can bridge the studies that evolved separately so far, where one set of papers test the existence of financial constraints using foreign ownership as the key identifier and the other group of studies examine the financial constraints created by the currency mismatch of debt and assets on the firms' balance-sheets. Our findings also provide an explanation for the conflicting results found in the latter set of studies. Failing to control for the ownership structure during the investigation of the balance-sheet effects might deliver a positive effect of dollar debt on firms' performance since the treatment sample of the firms with dollar debt might be the foreign owned ones.

The difference in difference estimation strategy together with firm fixed effects, country-year and sector-year fixed effects should address some of the potential endogeneity concerns. There might still be some other relevant time-varying firm specific factors though it is hard to come up with a consistent story that will explain *all* our findings. One exception is the selection problem and the possibility that foreigners might be buying more productive firms to begin with and the increase their productivity even more, so these firms do well in the aftermath of the financial crisis no matter what. The evidence so far in the literature points more towards the causality running from foreign ownership to productivity (see Arnold and Javorcik (2009)). For the specific case of crisis, Aguiar and Gopinath (2005) show that foreign investors buy inferior firms at fire-sale prices. Hence, our results most likely are not driven by this type of selection issues.

Our paper also relates to the literature on financial constraints, investment and growth. The empirical literature mostly finds a negative effect of financial constraints on investment (e.g. Fazzari, Hubbard, and Peterson (1998, 2000); Kaplan and Zingales (1997, 2000); Lamont (1997)), however this literature suffers from the typical identification problem since the basic approach is to test if there is a relationship between cash flow and investment and interpret this as the evidence of financing constraints. We follow the work by Aguiar (2005), Blalock, Gertler and Levine (2007) and Desai, Foley and Forbes (2008) and use the crisis episodes as an exogenous determinant of financial constraints and document a fall in investment as in those papers. On the other hand, Mendoza (2006) finds that, in Mexico during the sudden stop of 1995, a fall in the imports of intermediate inputs can explain almost half of the decline in TFP.⁵ We argue that whether the

⁵Basu and Fernald (1999) critiques Solow residual as a measure for TFP. Meza and Quintin (2006) show that capacity utilization and labor hoarding can also have a role in explaining declining TFP since during crises productive

effect of financial constraints go through via investment or TFP or both it is important to know why currency depreciations combined with credit crunches aggravate the financial constraints at the first place, a task we undertake in this paper. Without knowing the exact mechanism through which the financial crises affect credit constraints, it is hard to link these crises to output collapses, which has utmost policy priority given the current global crisis.

We proceed as follows. Section 2 presents our identification strategy and discusses our data. Section 3 presents the empirical results. Section 4 concludes.

2 Empirical Analysis

2.1 Identification and Estimation

Our objective is to identify *how* a financial crisis affects firm performance. The main question is what is the channel through which crises aggravate credit constraints. Hence by using a differences-in-differences methodology we test various hypothesis in order to understand what type of firms outperform during the crisis and consequently are not credit constraint. We start by looking at the traditional channels proposed in the balance sheet literature that are thought to mitigate or aggravate financial constraints. In theory, the depreciation rises investment opportunities in the exporting sector and therefore we would expect exporters to increase investment in the aftermath of the exchange rate crisis. In order to test this hypothesis we estimate the following equation:

$$y_{i,c,j,t} = \beta_1(Exports_{i,c,j,t-1} \times Post_{c,t}) + \beta_2 Exports_{i,c,j,t-1} + \phi_{j,t} + \varphi_{c,t} + \tau_t + \alpha_i + \xi_{i,c,j,t} \quad (1)$$

where $y_{i,c,j,t}$ is the outcome of firm i , in country c , in sector j at time t and $Exports$ refers to whether or not the firm is an exporter. We use three variables to classify the firms as an exporter, all of which yield similar results: a) a time-varying exporter dummy, b) export revenue and c) share of exports to sales. $Post$ is the depreciation dummy and equals to one in the year of depreciation and one year after. In order to control for sector, year and country differences we include $\phi_{j,t}$ that controls for sector-year fixed effects, $\varphi_{c,t}$ that captures country-year fixed effects, τ_t are year dummies, α_i are firm-specific effects, and $\xi_{i,c,j,t}$ is the error term. In addition to the firm specific effects, to control for firm size we include the lag of total assets when the outcome variable is sales. The investment variable is already scaled by total assets and therefore in those specifications there is no need to include additional size controls. Finally, all specification include the lag of total debt

resources are used less intensively and firms hoard labor.

to account for firm trends in debt exposure. By using firm fixed effects we will be identifying solely from firm changes over time. Country-year effects will absorb the effects of banking crisis.

The potential benefits from exporting might be mitigated if firms hold a high share of their debt denominated in foreign currency. In order to test for the role of foreign currency denominated debt in the aftermath of exchange rate crises we use the following specification:

$$y_{i,c,j,t} = \beta_1(DDebt_{i,c,j,t-1} \times Post_{c,t}) + \beta_2 DDebt_{i,c,j,t-1} + \phi_{j,t} + \varphi_{c,t} + \tau_t + \alpha_i + \xi_{i,c,j,t} \quad (2)$$

where again $y_{i,c,j,t}$ is the outcome of firm i , in country c , in sector j at time t and $DDebt$ measures dollar denominated liabilities. As in equation 1, $Post$ is the depreciation dummy and equals to one in the year of depreciation and one year after. At the same time, $\phi_{j,t}$ controls for sector-year fixed effects, $\varphi_{c,t}$ captures country-year fixed effects, τ_t are year dummies, α_i are firm-specific effects, and $\xi_{i,c,j,t}$ is the error term. Finally, we follow the same strategy as in equation (1) to control for firm size and debt exposure.

The variable of interest equation (2) is the interaction term between dollar denominated liabilities and the post crisis dummy. A priori the literature on balance sheet effects suggest that we should find a negative coefficient on the interaction term. The debt burden of firms holding dollar denominated liabilities will increase after a depreciation so it will be more difficult for these firms to borrow (due to a lower net worth) and therefore, they will experience a decrease in investment and output. However, as argued in the introduction, the evidence on the sign and significance of the coefficient on the interaction term is mixed. There might be no bad effect of holding dollar denominated debt if the firm also has matching dollar denominated assets or revenue (exports), which will lead to finding an insignificant or even a positive significant interaction coefficient.

We therefore expect the depreciation to have a differential impact both on exports and dollar denominated liabilities. In order to explore the relationship between exports and dollar denominated liabilities, and especially their behavior during crisis we estimate the following equation:

$$y_{i,c,j,t} = \beta_1(Exports_{i,c,j,t-1} \times DDebt_{i,c,j,t-1} \times Post_{c,t}) + \beta_2 Exports_{i,c,j,t-1} + \beta_3 DDebt_{i,c,j,t-1} + \phi_{j,t} + \varphi_{c,t} + \tau_t + \alpha_i + \xi_{i,c,j,t} \quad (3)$$

where again $y_{i,c,j,t}$ is the outcome of firm i , in country c , in sector j at time t and $DDebt$ measures dollar denominated liabilities. As in the previous specifications, $Post$ is the depreciation dummy and equals to one in the year of depreciation and one year after. $\phi_{j,t}$ controls for sector-year fixed effects, $\varphi_{c,t}$ captures country-year fixed effects, τ_t are year dummies, α_i are firm-specific effects, and $\xi_{i,c,j,t}$ is the error term. Size and debt exposure are accounted for following the same strategy as in (1) and (2).

If as it has been suggested in the literature, firms match their dollar debt holdings with export revenue we expect the coefficient on the interaction term to be positive and significant. However, this coefficient might still be upward bias if foreign companies are more likely to hold dollar debt. As we also argued in the introduction, the part of the literature that has been focusing on the access to finance channel instead of the mismatch channel has found that foreign companies outperform domestic companies during depreciation episodes. They interpret this finding as better access to credit. On the other hand, the fact that the firm is foreign owned might proxy other channels. For example, we expect a worse outcome from firms that do not match the currency denomination of their balance sheet. Foreign firms could outperform domestic firms since they mostly operate in tradable sector and have dollar income in addition to dollar assets. The bottomline is that access to finance and balance-sheet mismatch must be accounted for simultaneously since just being foreign owned or just not having a mismatch can proxy for the other variable.

The unique nature of our dataset allows us to disentangle the effect of balance sheet mismatches and access to credit during crises. The final step in our estimation strategy would be to estimate equation (3) separately for domestic and foreign companies. A priori we can expect to see a positive and significant coefficient on the interaction term $Exports_{i,c,j,t-1} \times DDebt_{i,c,j,t-1} \times Post_{c,t}$ for both domestic and foreign companies if firms match export revenue and dollar liabilities. However, if there is an additional effect from being foreign owned, we should see that the coefficient on the interaction term for the subsample of foreign companies is higher than that for the subsample of domestic companies. We interpret this additional effect due to being foreign owned as access to credit. Holding dollar debt is not a constraint for foreign companies since they have access to global credit.⁶

There might be some endogeneity and selection issues, since there can be selection both into being an exporter and being foreign owned. For example, foreign companies are characterized by a set of non-tangible assets that make them more productive irrespective of the depreciation episode. Our identification strategy would be weakened if during the depreciation episode foreign companies acquire the most productive domestic companies. As, we argued in the introduction, the evidence so far seems to be showing the opposite. The recent literature on firm heterogeneity and trade shows that it is most productive firms that enter the export market (Helpman, Melitz and Yeaple (2004)). Therefore, the depreciation episode would only make firms near the threshold productivity cut off level enter the export market. These firms would be more productive than the

⁶Chang and Velasco (2001) argue that their main result of a bank run due short term liabilities exceeding the value of assets can be overturned if they allow FDI in their model.

non exporting ones but less productive than the ones that were already exporting and that due to the depreciation also experience a competitive effect. Consequently in the case of firms changing export status during the depreciation episode we cannot rule out an endogenous selection bias. In order to mitigate this effect we use lagged export values.

One might also worry about the unobserved firm characteristics that drive the balance-sheet matching decision of companies. For example, risk loving managers would have a tendency to avoid balance-sheet matching (due to higher returns on long-term domestic assets and lower cost of short-term foreign debt) and therefore, the correlation between balance sheet mismatch and output might be confounded. In theory, many of the firm unobservable characteristics that would cause a threat to the identification strategy are time invariant. To control for firm specific characteristics that do not vary over time we take advantage of the panel data nature of our dataset and include firm fixed effects. In addition, we attempt to eliminate the bias from common shocks by including year fixed effects. The 90s was an important period for many Latin American countries in terms of deregulation, openness to trade and financial liberalization. To control for those country specific events we include country-year fixed effects. Similarly, the deregulation and openness had a differential impact across sectors and therefore, we control for sector-year specific effects.

2.2 Data

The empirical analysis draws on a unique database with accounting information for over 1,200 non-financial companies in six Latin American countries, spanning the period 1991 to 2004. The countries covered are: Argentina, Brazil, Chile, Colombia, Mexico and Peru. A distinct feature of this dataset is that it contains firm-specific information on the share of assets and liabilities denominated in foreign currency, the breakdown of sales into domestic and export revenues, and the foreign-ownership structure.⁷

The data for this paper was assembled from different sources.⁸ Balance sheet and general company information was obtained from annual financial statements drawn from local stock markets or regulatory agencies in each country. Data on foreign currency liabilities and assets was hand-collected from the financial explanatory notes of firms' balance sheets. These include all assets or

⁷The most widely used firm-level dataset in cross-country studies, *Worldscope*, has no information on the currency denomination of either assets or debt, and very sparse coverage of firm's foreign currency revenues (see, for example, Desai, Foley and Forbes, 2008).

⁸Further details on the data construction and variable definitions are provided in the Data Appendix and in Kamil (2009).

liabilities outstanding which are denominated in-or indexed to-foreign currency, issued domestically or abroad.⁹ Information on firms' export revenues was obtained from countries' customs office records, and matched for each firm in the sample using their fiscal code identifier and/or name. We also have information on firm-level issuance of external bonds, loans and ADRs from *Dealogic Bondware and Loanware*.

We constructed a time-varying measure of domestic/foreign ownership by combining three sources. We use the *Corporations Affiliations* database to identify Latin American firms in our sample that are affiliates, subsidiaries and/or divisions of global firms.¹⁰ We also used information from data provider Economatica on firms' main shareholders, their stockholdings and nationality. Finally, we used SDC Platinum database published by Thomson Reuters to identify those firms that were merged or acquired by a foreign company, and the fraction of shares that were bought. Hence, we have a continuous foreign ownership measure. As a start, we define a firm to be foreign owned if, in a given year, it was a local affiliate of a foreign multinational or had a majority 50% foreign-owned equity or above.

Our main outcome indicators are sales and investment in fixed capital. Sales is defined as gross sales and other operating revenues from main activities. The stock of physical capital, in turn, is defined as the sum of property, plant, equipment, plus technical reappraisal (valuation change), minus cumulated depreciation. An ideal measure of investment, however, should consider the rate of change of the capital stock series at replacement cost: in periods of financial crisis with large swings in exchange rates, the book value and replacement cost of assets can diverge significantly.¹¹ As in Blalock, Gertler and Levine (2008), we try to minimize the effects of reporting bias in the value of capital stock by estimating the models with firm-level fixed effects. The measure of investment used in the estimation analysis is the annual change in the stock of physical capital scaled by lagged total assets. By scaling we want to avoid capturing differences in investment responses after depreciation episodes that are merely due to differences in firm size.

⁹Information on the exact currency composition of foreign-currency denominated debt or assets for all countries is not available. For countries for which we do have a detailed breakdown of currency denomination (Chile and Peru), we find that, on average, 95 percent is denominated in dollars. Thus, we assume throughout that all foreign currency debt is denominated or indexed to the US dollar.

¹⁰Contains US and international public and private business profiles and corporate linkage ("who owns whom") for approximately 184,000 public and private companies worldwide.

¹¹Data on capital stock at replacement costs was not available for most countries, nor did we have a convincing set of assumptions to correct the book value of fixed assets. Cash flow information on capital expenditures was only available for Argentina and Mexico.

Most of the sample consists of publicly-traded companies. Focusing mostly on publicly listed firms has the disadvantage that small firms may be underrepresented in the dataset, yet it has the advantage that financial statistics are typically more reliable and comprehensive. Moreover, relative to other available databases, the coverage of small and medium-sized publicly traded firms is superior, thus providing ample cross-firm variation in sizes.¹²

For our estimates, we use a sample restricted to those firms for which data on our main variables of interest (i.e. foreign-currency liabilities, exports, foreign ownership, investment, sales and total assets) was available on a continuous time basis. The nature of the panel is nonetheless unbalanced since we might have missing data on some of the variables. Although we do not allow firms disappear and then reappear in the sample, we might have new firms starting later, and we might also have some firms going bankrupt before the end of our sample. Table 2 shows the number of observations in the final sample per country and year, distinguishing between the number of firms according to whether data on investment was available or not.

Table 3 reports the percentage of firms holding dollar denominated debt or assets by type of firm. Around 79% of the observations hold dollar denominated debt of which 72% are domestic exporters, foreign companies or foreign exporters. It is worth noting that most of the dollar denominated debt is short-term dollar debt and that only 50% of the observations hold dollar denominated assets. In our estimation we look at two outcome variables: sales and investment. As it was already pointed out due to data availability the sample size is reduced in the case of the investment outcome. For the sample in which investment is available, the percentage of firms holding short term dollar debt is reduced to 43%.¹³

Table 4 reports the descriptive statistics for the variables used in the analysis. Inspection of Table 4 reveals significant cross-country variation in the currency denomination of corporate borrowing. The average share of foreign currency debt during the period ranged from 10 percent in Colombia to above 60 percent in the case of Argentina and Peru. Foreign currency denominated assets are a small share of total assets (between 1 and 10 percent). Regarding foreign ownership, for most countries one third of the observations are considered foreign owned.

¹²The database covers all firms that are listed-or have been listed- in the six countries' stock exchanges, rather than just the most liquid or with the biggest market capitalization, as has been common in other cross-country studies (see, for example, Allayanis, Brown and Klapper, 2003).

¹³Note that this will bias our results downwards working against us.

2.3 The crisis episodes

Finally, we need to define the depreciation episodes. We say a depreciation takes place if the real exchange rate increased by more than 25% compared to the value of the exchange rate the year earlier. Using data on CPI, the real exchange rates were obtained as the deflated end-of period exchange rates. We identify three depreciation episodes in our sample: Mexico (1994), Brazil (1999) and Argentina (2002).¹⁴ Therefore, the identification strategy does not only rely on the before/after effects on the depreciation within the same country but it is enhanced by the comparison of firms in countries that suffered an exchange rate depreciation and firms in countries that did not suffered any depreciation episode.

In addition, following Reinhart and Rogoff (2008) we identify the following banking crises: Argentina (1995), Brazil (1995), Mexico (1994), Colombia (1998) and Peru (1999). The advantage of our dataset is that we can compare countries that suffer simultaneous banking and exchange rate crises, countries with only exchange rate crises and those that underwent only a banking crisis. As we can see from Figures 1 and 2 the aggregate effects on output and investment vary widely. Figure 1 plots the growth rate of GDP as deviation from its average trend 4 years before the banking crisis for Mexico, Argentina, Brazil, and Colombia.¹⁵ The dotted line at the year zero denotes the banking crisis and the solid line at year one denotes the currency crisis. Brazil and Colombia had only a banking crisis in years 1995 and 1998 (years denoted as zero) respectively.¹⁶ Argentina and Mexico on the other hand had a banking crisis in 2001 and in 1994 respectively (years denoted as zero) and then immediately had a currency crisis the next year. In Mexico's case currency crisis was in December 1994. In order to have a better visual demonstration, we put the line for currency crisis for Mexico in the year 1995.¹⁷ The figure shows that output growth rises sharply a year after the currency depreciation, which is consistent with the view that the recovery is driven by the competitiveness effect. On the other hand there is also a clear drop in output growth after the banking crisis and the recovery seems to take 2 years as can be seen from the case of Colombia and Brazil, who only had a banking crisis. Although there is a declining trend

¹⁴Notice Mexico abandoned the peg in December 1994, Brazil in January 1999 and finally, Argentina in January 2002.

¹⁵The average growth rate of GDP in the four years before the banking crisis is 1.9% in Argentina, 2.7% in Brazil, 4.1% in Colombia and 3.7% in Mexico.

¹⁶We dated the banking crisis based on Reinhart and Rogoff (2008).

¹⁷In our regressions we will have country*year dummies which will control for banking crisis and hence will define the Mexico currency crisis as 1994 following the other studies in the literature. We have also run a robustness check, defining it as 1995 and obtaining similar results.

in output in Colombia and Argentina before the crisis, this is not the case for Brazil and Mexico. Figure 2 undertakes the same exercise for the growth of aggregate investment which is measured as the change in gross fixed capital formation. We pretty much get a similar picture, implying the aggregate output and investment responses go together. Although, there is a great deal of country heterogeneity, especially depending on having a twin or a single crisis.

If we look at the numbers behind these changes, we see that output dropped 10 percent, while investment is shrinking 36 percent in Argentina after the 2001 banking crisis, as shown in Table 1. After the exchange rate crisis both seemed to be recovered. In Mexico, on the other hand, the recovery took much longer. The original drop in output was 6 percent and in investment was 29 percent and the year after the currency crisis, although output recovered, investment only increased 16 percent. These aggregate numbers clearly mask a great deal of heterogenous firm responses. In fact a closer look shows, in Mexico the year after the currency crisis, domestic companies reduce their sales by 3 percent while foreign owned companies increasing it 9 percent. In Colombia, sales increased for both domestic firms and the foreign-owned firms but much more for the latter group, 2 percent and 4 percent respectively. In fact, investment shrank 3 percent for the domestic firms the year after the banking crisis in Colombia, and increased 4 for the foreign owned firms. These findings call for an empirical strategy that is centered around firm heterogeneity.

3 Results

3.1 Main Results

The traditional textbook theory on the effect of exchange rate depreciations on output, concludes that the depreciation episode should increase sales and investment of exporting firms due to a competitiveness effect. Table 5 tests this hypothesis by estimating equation (1). Columns (1) to (3) use an export dummy capturing whether the firm exported in the previous period. Columns (4) to (6) use the volume of exports¹⁸. Column (1) shows that exporters increase sales in the aftermath of the depreciation. However, contrary to what the standard theory predicts, column (2) shows that exporters do not increase investment in the depreciation period. Columns (4) and (5) show similar results using the volume of exports. This counterintuitive result has been explained in the literature as the result of financial constraints. The depreciation does not only imply a positive competitiveness effect but a) if it is combined with a banking crisis, which typically is the case,

¹⁸Similar results were obtained using the share of export to sales.

then there will be an associated credit crunch, b) depreciation can also exacerbate the financial constraints of firms holding dollar denominated debt. This increase in the value of the debt would not represent an obstacle to investment in two cases: a) if the firm could access credit through domestic and international capital markets or b) if the firm has an stream of income denominated in foreign currency (i.e. dollar assets or exports).

We start by looking at the balance sheet channel. Columns (3) and (6) in Table 5 control for the share of dollar denominated debt in total short term debt as a first attempt to address the balance sheet mismatch. Different studies use different definitions regarding the variable dollar debt. The theoretical literature stresses the importance of short-term dollar denominated debt¹⁹ and therefore, we focus on this variable in our analysis. The lack of detailed data has prevented previous studies from investigating whether the maturity of the debt matters.²⁰

In theory, we would expect that once we control for dollar liabilities, exporters will increase investment in the aftermath of the crisis. However, as it is shown in columns (3) and (6) this is not the case. So what is the role of dollar liabilities during crises? Table 6 explores this question in greater detail. Columns (1) and (2) show that firms holding dollar denominated debt increased sales and did not decrease investment as we would expect if the value of the dollar denominated debt increased after the depreciation. As we have been arguing this effect might be mitigated by the fact that firms holding dollar liabilities do also export. Column (3) shows that accounting for the other side of the balance sheet does not explain the results in column (2). Exports cannot explain the finding that dollar-indebted firms do not experience a decrease in investment during depreciations.²¹ One might worry that the volume of exports is not the relevant variable but rather the share of exports in total sales. Column (4) repeats the estimation controlling for the share of exports and results are similar to those in column (3) when we control for volume of exports.

The results so far are consistent with the existence of some financial constraint but the exact mechanism is not clear. One possibility is that controlling for exports or dollar liabilities is not enough to rule out the balance sheet channel because the depreciation episode had a differential impact on exporters and firms holding dollar liabilities. Column (5) in Table 6 reports the results from estimating equation (3). The coefficient of interest is the coefficient on the triple interaction between exports, dollar debt and post. The results suggest that exporters holding dollar debt

¹⁹Short-term liabilities refer to outstanding debt that must be satisfied within 12 months. See Appendix for a description of the variables.

²⁰We find similar results using total debt.

²¹Notice the share of non-exporting firms holding dollar denominated debt is relatively high (27%) as suggested by the “original sin” literature on the difficulties that domestic firms face to borrow in local currency.

increased investment in the aftermath of the depreciation and therefore, hints the possibility that firms match export revenue and dollar denominated debt. In fact, column (6) in Table 6 repeats the analysis using an exporter dummy instead of volume of exports. Although the F-test for joint significance of the export coefficients is significant the triple interaction is not and suggests that to increase investment while holding dollar debt it is not enough to export you need to have a considerable volume of exports.

Our main hypothesis is that the coefficient in column (5) of Table 6 is a reduced form effect of two confounded channels: the balance sheet channel and the credit channel. Foreign firms hold on average higher levels of dollar denominated debt are more export oriented. Therefore, failing to control for foreign ownership would bias upwards the coefficient on the triple interaction. By proxying access to credit with foreign ownership we should be able to disentangle the balance sheet and access to credit channels. If firms hold dollar denominated debt and they match this by exports, both domestic and foreign companies experience a balance sheet effect during depreciation episodes. However, foreign companies might mitigate a potential negative balance sheet effect by having access to external financing. Domestic companies that are highly dependent on domestic credit markets would not be able to borrow during depreciations when they are more financially constrained. Therefore, we expect an heterogenous response from firms holding short-term dollar debt and/or exporters, according to ownership. Alternatively if everybody matches and there is no negative effect of holding dollar debt, and if we still find a higher coefficient on foreign ownership, this shows the additional effect of being foreign-owned, which we interpret as access to finance.

Table 7 shows our main results. Columns (1) and (2) repeat the diff-in-diff estimation strategy from column (5) in Table 6 but splitting the sample among domestic and foreign companies. Results in column (1) show that domestic exporters holding dollar debt do not increase investment in the aftermath of the crisis. On the contrary, in column (2) foreign exporters holding dollar debt increase investment in the aftermath of the depreciation. Therefore, if the channel would be a better balance sheet match of exporters we should observe an increase in investment for domestic exporters but we do not. We only observe foreign exporters increasing investment. One can also run a symmetric exercise by distinguishing between exporters and non-exporters. Columns (3) and (4) in Table 7 report these results. As expected we confirm the previous findings. Only foreign exporting companies holding dollar debt increase investment in the years of depreciation. As a result, we conclude that access to credit is the main channel hindering investment in the aftermath of crisis.

3.2 Robustness

In this section we conduct a series of robustness checks for the results found in column (4) of Table 7. We use the subsample of exporters because in this way we have more observations but similar results are found when checking the robustness of results in column (2) of Table 7.

First, we control for the possibility that foreign firms are on a different trend than domestic firms by adding foreign-year fixed effects. In addition, the motivations of foreign investors to set up an exporting plant or a subsidiary that serves the local market might vary according to the host country characteristics. Therefore, in order to control for unobserved characteristics that vary across foreign companies and countries we include foreign-country fixed effects. Results in column (1) of Table 8 show that foreign exporters holding dollar debt are still increasing investment in the aftermath of the depreciation.

Second, our identification strategy relies on the assumption that only foreign companies have access to credit during crises. However, this might not need to be the case if *domestic* companies can access international credit markets. Column (2) in Table 8 adds two variables to the main specification. A dummy variable that takes on a value of one starting the year the firms accessed international equity markets (by cross-listing shares in foreign stock markets) and/or tapped foreign credit markets (by issuing bonds or taking loans abroad). We used Bank of New York data to identify those firms whose shares listed in a foreign stock exchange in the form of American Depositary Receipts (ADRs). Firm-level issuance data on private bonds and syndicated loans was extracted from Dealogic Bondware and Loanware. Although on average access to international capital markets has a positive and significant effect on investment our main interaction effect is not significantly affected by it. These results confirm that the triple interaction coefficient is capturing access to the parent's company credit and not credit from international capital markets. Of course, parent company being foreign is more diversified and have access to international capital markets and hence our interpretation is that the foreign-owned firms do get access to the markets through their foreign owners.

Third, an additional source of dollar denominated income rather than exports can be dollar denominated assets. Column (3) repeats the estimation controlling for the share of dollar denominated assets in total assets with no major impact on the triple interaction coefficient.

Finally, one of the main identifying assumption is that the time effect for firms holding short-term dollar debt and peso indebted firms is the same. A potential concern is that firms that choose to hold dollar denominated debt could be different from the firms that chose not to do so,

irrespective of the depreciation, and these differences might be correlated with output. In practice, most of the firm unobservable characteristics are time invariant and therefore, this concern should be mitigated by the fixed effect estimation. Figure 3 shows the average sales for three different groups of firms: firms not holding dollar debt, firms holding dollar debt above the top quartile of the distribution of firms holding dollar debt and firms holding dollar debt below the 75 percentile. Graphical inspection reveals that in the case of sales there are no major differences in trends between firms holding short-term dollar debt and those that do not in the depreciation episodes of Mexico and Argentina. However, there are significant differences in the case of Brazil (1999). Most importantly in terms of differences in investment trends Figure 3 shows differences between firms holding dollar debt and those not holding before all depreciation episodes. However, the trends are similar for those holding high levels of dollar debt and those holding low levels of dollar debt in the years prior to depreciations²². Given the pre-existing trend differences between firms holding dollar debt and peso indebted firms, column (4) in Table 8 repeats the analysis for the subsample of firms holding short-term dollar debt. Our main result is robust to the new sample composition. Foreign exporting firms holding higher levels of short-term dollar debt increase investment in the year of depreciation. Column (5) controls for all the potential concerns, yielding similar results.

4 Conclusion

The question of what will happen to investment and growth in the aftermath of the recent global financial crisis is at the central stage of policy making. Following the recent work by Reinhart and Rogoff (2008), we argue that we can learn a lot from the past financial crises. We utilize a new firm-level database from six Latin American countries between 1992 and 2004. These countries during this time period have experienced severe financial crises and hence constitute a fertile laboratory. These experiences also underline the role of financial constraints and the heterogenous impact of financial crises on firms' performance.

We have tested the role of two main channels of financial constraints proposed by the theoretical literature. On the one hand there is the balance-sheet mismatch channel. If there is a mismatch between firms' foreign-currency denominated debt and local currency denominated assets, firms might become financial constrained during a depreciation and may not exploit the investment opportunities in the exporting sector. On the other hand, firms might cut off both from domestic and foreign finance and this limited access to credit can aggregate the financial constrains. As

²²Firms with high levels of dollar debt are those in the top quartile of the distribution of firms holding dollar debt.

oppose to the previous studies, we are able to differentiate between these two main sources of financial constraints, by utilizing a new firm-level database. Our database includes information not only on the share of firms' debt, denominated in foreign currency, but also on the export orientation and the foreign-ownership structure of the firm.

Using a differences-in-differences methodology, we show that foreign owned firms do better both in terms of sales and investment than the domestic firms in the post-crisis period, regardless of the fact that the foreign owned firms might also be exporters and might hold short-term foreign currency denominated debt. We conclude that limited access to finance plays an important role in hindering investment during crises.

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A Cleaning Procedure and Data

A.1 Cleaning Procedure

We modify the original data in the following ways:

1. We inflate all data to 2000 values using December-to-December changes in the consumer price index (CPI), and convert them to dollars using the market exchange rate for December 2000²³.
2. We drop all firm year observations in which the accounting data are not self-consistent. In particular, we drop observations if dollar liabilities (assets) exceed total liabilities (assets) or if the ratio of exports to sales is greater than one.
3. We compute the change in total assets, sales and physical capital stock and construct a Z-score using the sample mean and standard deviation for each country/year. We drop firm/year observations that have absolute value of $Z > 5$. These controls for outliers (either because of inadequate accounting, typing errors or extreme values).
4. We drop firm-year observations in the top (low) 1 percent of the distribution of the ratio of sales to total assets and total liabilities to total assets.
5. We drop firm-year observations for which the ratio of investment over assets is greater than one or less than minus one.

A.2 Data Construction and Variable Description

In this appendix, we describe the firm-level data used in more detail, and the sources employed to construct them, drawing on Kamil (2009).

Definition of Variables

Balance sheet information was mostly collected from annual reports and corporate filings obtained from local stock markets, regulatory agencies and/or trade chambers in each country . Where appropriate, we complemented and cross-checked these sources with data obtained from Ecomatica and Bloomberg.

²³Data on CPI and exchange rates are form the International Financial Statistics of the International Monetary Fund

Total assets. Sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property, plant and equipment, and other assets (Balance Sheet).

Total liabilities. Book value of total liabilities. Foreign currency liabilities. Liabilities denominated or indexed to a foreign currency (in dollars or in other non-domestic currencies), issued domestically or abroad. These include bank loans, commercial debt, trade credit and foreign securities (Balance Sheet Notes).

Short-term foreign currency liabilities. Foreign currency liabilities coming due in the upcoming fiscal year. This measure includes foreign currency denominated debt issued at short maturities as well as long term issues whose terminal date falls in the next year (Balance Sheet Notes).

Foreign currency assets. Assets denominated or indexed to a foreign currency. These include cash, government issues indexed to the dollar, bank deposits abroad and overseas client credits. (Balance Sheet Notes).

Exports. Total sales in foreign markets. (Income Statement, when available or Customs data in each country). Dollar export values were converted into domestic currency using the year's average exchange rate. Most financial statements do not report import spending.

Sales. Gross sales and other operating revenues from main activities (Income Statement).

Industry Dummies. Is the industry in which the firm has its main operations, according to the one-digit ISIC rev 2 classification (International Standard Industrial Classification of All Economic Activities). Firms' main sector of operations was identified using Economatica and Lexis Nexis.

ADR. A dummy variable that takes on a value of one starting the year the firms accessed international equity markets (by cross-listing shares in foreign stock markets). We used Bank of New York data to identify those firms whose shares listed in a foreign stock exchange in the form of American Depositary Receipts (ADRs).

Stock or Bond Issuance. A dummy variable that takes on a value of one starting the year the firms tapped foreign credit markets (by issuing bonds or taking loans abroad). Firm-level issuance data on private bonds and syndicated loans was extracted from Dealogic Bondware and Loanware.

Foreign Ownership. A dummy variable that takes on a value of one if the firm is a local

affiliate of a foreign multinational or foreign investors hold more than 50

Investment. Yearly change of the capital stock, defined as net property, plant and equipment, normalized by lagged total assets.

B Figures

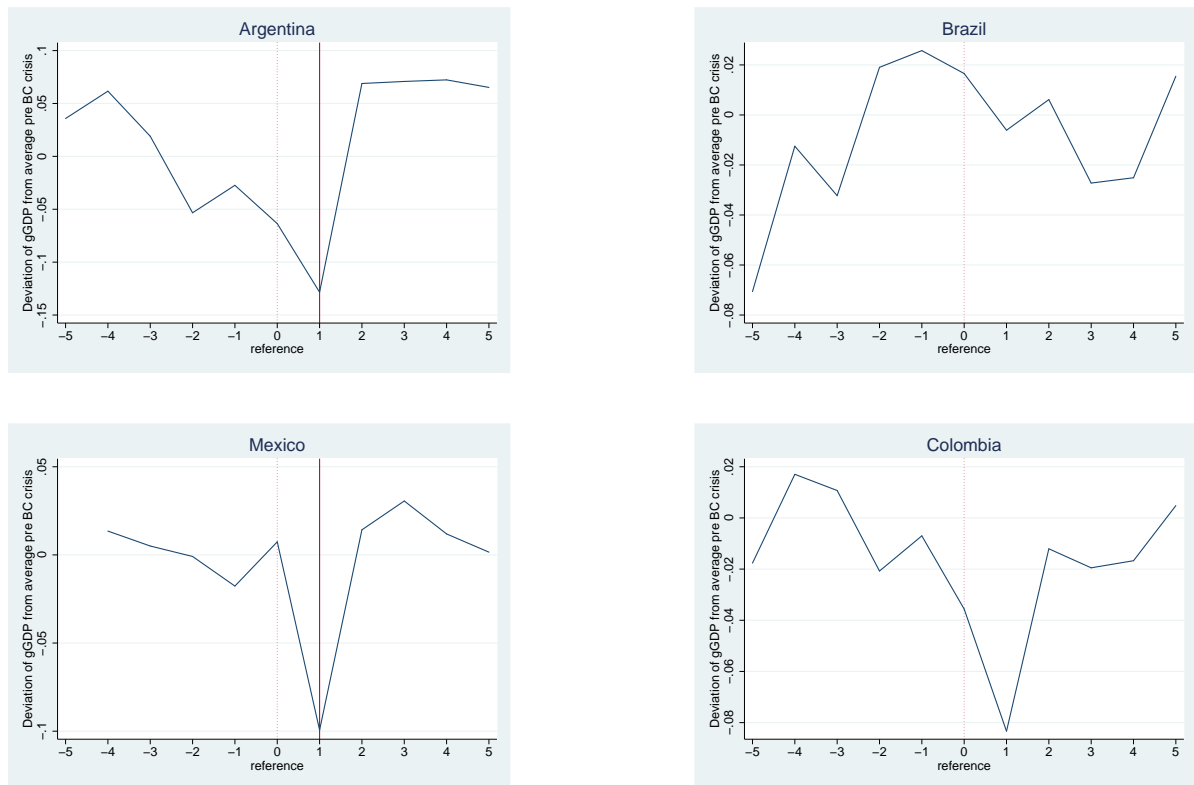


Figure 1: GDP Growth Rate Deviation from the Mean

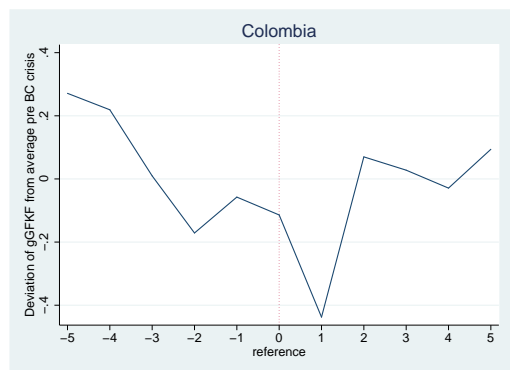
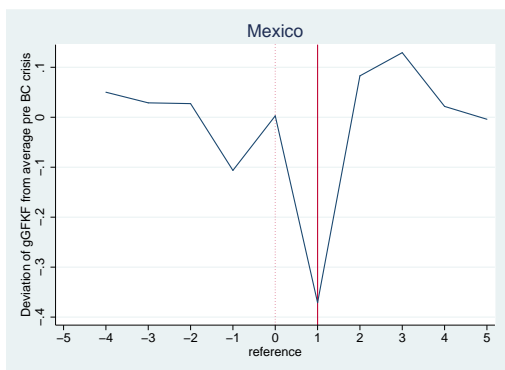
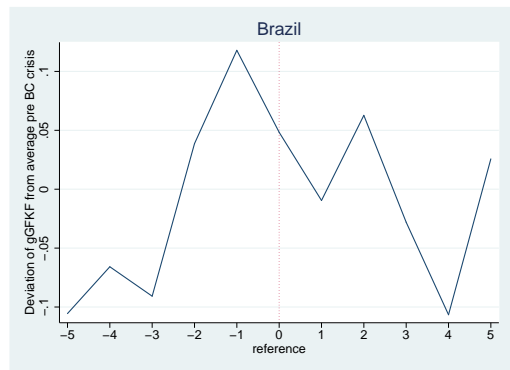
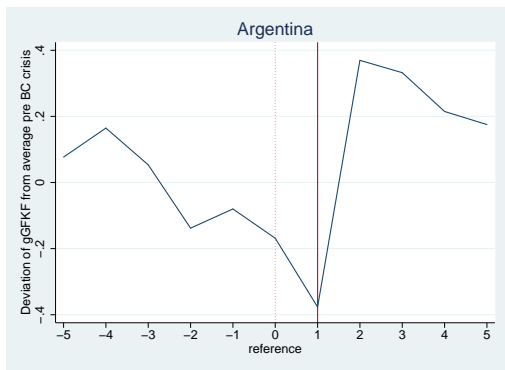


Figure 2: GFKF Growth Rate Deviation from the Mean

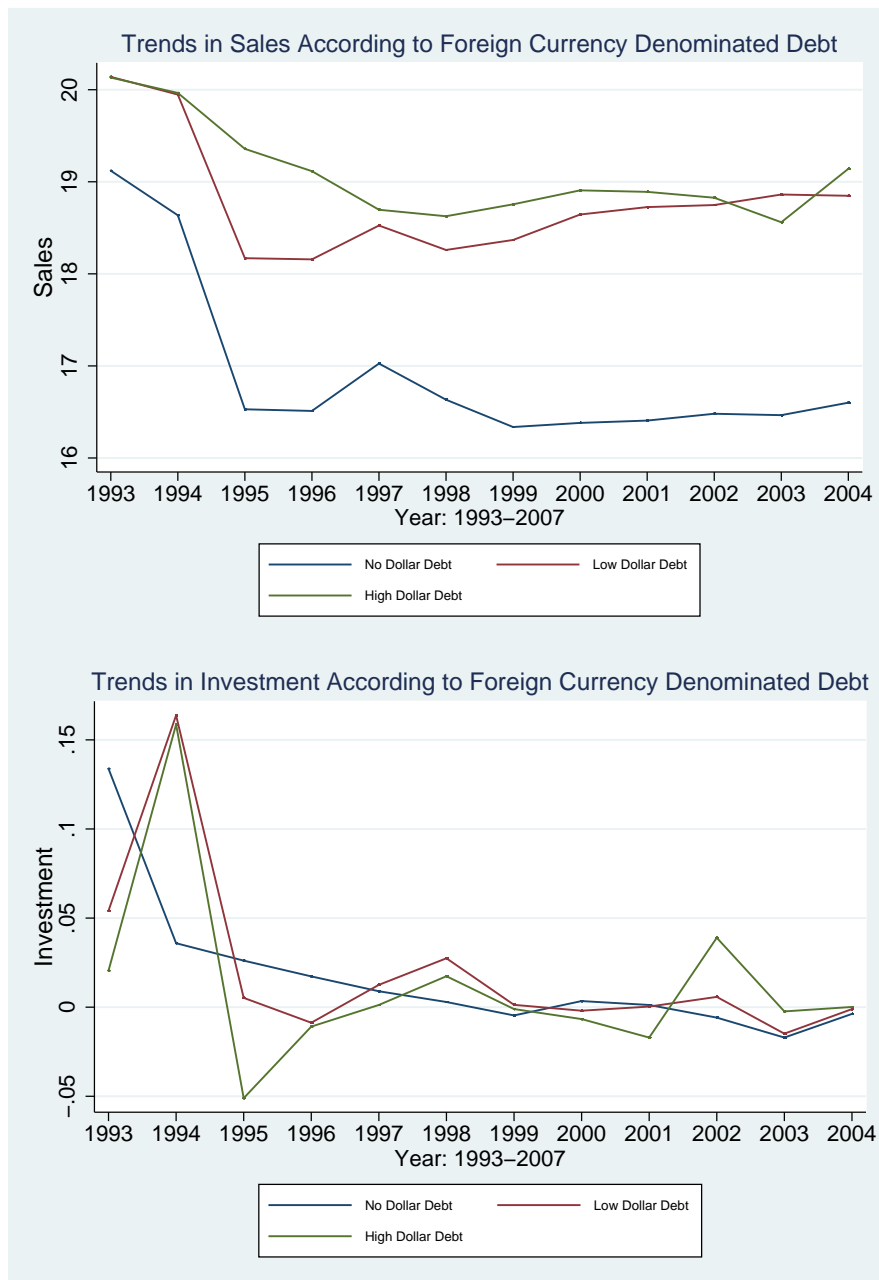


Figure 3: Average sales and investment across 3 different groups. No Debt: Firms not holding dollar debt; Low Debt: Firms holding short-term dollar debt in in the lower 75% of the distribution of firms holding short-term dollar debt; High Debt: Firms holding high short-term dollar debt, ratio of short-term dollar debt to total short-term debt in the top quartile. Depreciation episodes occurred in years 1994, 1999 and 2002.

C Tables

TABLE 1 — GROWTH RATE OF MACROECONOMIC VARIABLES IN THE AFTERMATH OF THE CRISIS

year	Argentina			Brazil		Colombia	Mexico		Peru
	BC	BC	ER	BC	ER	BC	BC	ER	BC
	1995	2001	2002	1995	1999	1998	1994	1995	1999
	Growth Rate of GDP								
One year after	0.055	-0.109	0.088	0.022	0.043	-0.042	-0.062	0.051	0.030
Two years after	0.060	0.089	0.091	0.017	0.020	0.026	0.060	0.058	0.026
	Growth Rate of GFKF								
One year after	0.089	-0.364	0.382	0.015	0.050	-0.387	-0.290	0.164	-0.049
Two years after	0.121	0.363	0.286	0.042	-0.024	0.100	0.187	0.157	-0.047

Notes: GFKF refers to Gross Fixed Capital Formation. GDP refers to Gross Domestic Product. Source: Authors calculation from World Development Indicators Database. BC refers to banking crisis and ER refers to exchange rate crisis based on Reinhart and Rogoff (2008) classification.

TABLE 2 — NUMBER OF FIRMS

Number of Firms in the Sample per Country and Year		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Argentina					99	118	134	143	157	164	162	150	53	48	47	1409
Brazil					20	41	81	157	174	196	205	194	185	166	159	1726
Chile						143	158	164	169	171	168	169	162	158	147	2013
Colombia						100	129	121	86	83	72	76	78	86	83	1088
Mexico		154	163	156	148	126	113	99	94	84	71	70	77	68	67	1650
Peru						86	97	102	98	84	84	80	70	72	64	900
Total		154	163	156	267	614	712	786	778	782	762	739	625	598	567	8786

Number of Firms in the Sample with Data on Investment		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Argentina					33	37	40	42	44	51	50	47	45	44	43	605
Brazil					9	21	44	97	118	141	149	147	142	129	124	1243
Chile						91	94	96	96	94	94	95	96	93	91	1203
Colombia							15	14	78	74	65	69	72	82	74	706
Mexico		32	45	45	45	55	61	61	66	64	63	63	64	64	49	840
Peru						32	42	47	50	50	54	51	47	49	49	522
Total		32	87	87	226	290	357	452	474	474	475	472	466	461	444	5119

TABLE 3 — NUMBER AND PROPORTION OF FIRMS HOLDING FOREIGN DENOMINATED DEBT AND ASSETS

	TOTAL SAMPLE						
	Share					Number	
	Dom	DomExp	For	ForExp	Total	$x > 0$	Total
$\left(\frac{\text{DollarLiabilities}}{\text{TotalLiabilities}}\right)$	28.18	37.05	11.19	23.58	78.93	6935	8786
$\left(\frac{\text{ShortDollarLiabilities}}{\text{ShortLiabilities}}\right)$	27.99	38.66	10.10	23.25	72.41	5125	7078
$\left(\frac{\text{DollarAssets}}{\text{TotalAssets}}\right)$	24.72	41.01	8.69	25.58	51.91	3972	7651
SAMPLE OF FIRMS WITH DATA ON INVESTMENT							
$\left(\frac{\text{DollarLiabilities}}{\text{TotalLiabilities}}\right)$	24.11	37.34	11.30	27.25	82.71	4234	5119
$\left(\frac{\text{ShortDollarLiabilities}}{\text{ShortLiabilities}}\right)$	24.21	39.20	10.34	26.24	43.09	3050	7078
$\left(\frac{\text{DollarAssets}}{\text{TotalAssets}}\right)$	20.89	41.14	8.97	29.00	59.63	2738	4592

Notes: *Share* figures are expressed in percentage. *Number* refers to the actual number of firms. *Total* refers to the number of firms for which data on variable x is available. $x > 0$ refers to the number of firms for which data on variable x is greater than zero. Variable x can be the share of short term dollar liabilities in total dollar liabilities; the share of total dollar liabilities on total liabilities or; the share of dollar assets in total dollar assets. *TotalSample* refers to the sample when investment data is not considered. *SampleofFirmswithDataonInvestment* refers to the smaller sample of firms for which we also have data on investment.

TABLE 4 — DESCRIPTIVE STATISTICS

	Argentina		Brazil		Chile		Colombia		Mexico		Peru	
	Mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
	18.7	1.5	19.3	1.6	16.5	2.5	16.6	2.1	19.2	1.8	17.0	1.4
	1409	N	1409	N	1726	N	1726	N	1088	N	1650	N
$\ln(Sales)_t$	19.1	1.6	19.9	1.7	17.8	2.1	2013	17.4	1.9	1088	17.4	1.5
$\ln(Assets)_t$	7.5	8.1	7.6	8.9	4.7	6.9	2013	7.2	7.4	1088	10.7	6.4
$\ln(1 + Exports_{t-1})$	0.6	0.3	0.2	0.2	0.2	0.3	2013	0.1	0.1	1088	0.6	0.3
$\left(\frac{DollarLiabilities}{TotalLiabilities}\right)_{t-1}$	0.5	0.3	0.2	0.2	0.2	0.2	2009	0.1	0.1	1057	0.5	0.3
$\left(\frac{ShortDollarLiabilities}{ShortLiabilities}\right)_{t-1}$	0.0	0.1	0.0	0.0	0.1	0.1	1995	0.0	0.0	966	0.2	0.1
$\left(\frac{DollarAssets}{TotalAssets}\right)_{t-1}$	0.006	0.1	-0.008	0.1	0.012	0.1	1203	0.0016	0.0	706	0.0012	0.1
$\frac{Investment_t}{Assets_{t-1}}$	0.4	0.5	0.3	0.5	0.2	0.4	1749	0.2	0.4	956	0.4	0.5
Share of Foreign Owned Firms												

Notes: All nominal variables are expressed in constant 2000 US dollars. See the data appendix for a definition of the variables.

TABLE 5 — EXPORTERS AND THE FINANCIAL CRISIS

	Exporter Dummy			Volume of Exports		
	Sales Growth (1)	Investment (2)	Investment (3)	Sales Growth (4)	Investment (5)	Investment (6)
<i>Exporter</i> × <i>Post</i>	0.134* (0.07)	-0.013 (0.01)	-0.008 (0.01)			
<i>Exports</i> × <i>Post</i>				0.006* (0.00)	-0.001 (0.00)	-0.001 (0.00)
<i>Exporter</i>	-0.012 (0.03)	0.010** (0.00)	0.009** (0.00)			
<i>Exports</i>				-0.003* (0.00)	0.001** (0.00)	0.000 (0.00)
<i>Dollar Debt</i>			-0.002 (0.01)			-0.002 (0.01)
Observations	8786	5119	4025	8786	5119	4025
Firms	1203	632	575	1203	632	575
<u>F-test</u>						
<i>Exports</i>	0.170	0.017	0.085	0.068	0.053	0.511
Firm Fixed-Effects	yes	yes	yes	yes	yes	yes
country*year	yes	yes	yes	yes	yes	yes
sector*year	yes	yes	yes	yes	yes	yes
year	yes	yes	yes	yes	yes	yes

Notes: Results are obtained by fixed effects estimation. Sales regressions control for size by including the log of total assets lagged one period. All regressions control for debt exposure by including the log of total debt lagged one period. Standard errors corrected for clustering at the country-year level are reported in parenthesis. *Exporter* is a time varying dummy that takes value of 1 if the firm exported in the previous period. *Exports* is the lagged volume of exports computed as $\ln(1 + Exports_{t-1})$. *Dollar Debt* is the share of short term dollar liabilities over total dollar liabilities lagged one period $\left(\frac{ShortDollarLiabilities}{ShortLiabilities}\right)_{t-1}$. *Post* is a dummy variable that takes the value of one in the year of depreciation an year after.

TABLE 6 — FOREIGN CURRENCY DENOMINATED DEBT, EXPORTS AND THE FINANCIAL CRISIS

	Sales Growth (1)	Investment (2)	Investment (3)	Investment (4)	Investment (5)	Investment (6)
<i>Dollar Debt</i> × <i>Post</i>	0.244** (0.10)	-0.010 (0.03)	-0.011 (0.03)	-0.010 (0.03)	-0.055* (0.03)	-0.032 (0.03)
<i>Exports</i> × <i>Dollar Debt</i> × <i>Post</i>					0.005*** (0.00)	0.038 (0.02)
<i>Exports</i>			0.0002 (0.00)		0.0001 (0.00)	0.008* (0.00)
$\frac{Exports}{Sales}$				0.027* (0.01)		
<i>Exports</i> × <i>Post</i>					-0.002** (0.00)	-0.017* (0.01)
<i>Exports</i> × <i>Dollar Debt</i>					0.0004 (0.00)	0.001 (0.00)
<i>Dollar Debt</i>	-0.024 (0.04)	-0.001 (0.01)	-0.002 (0.01)	-0.003 (0.01)	-0.006 (0.01)	-0.007 (0.01)
Observations	7078	4025	4025	4025	4025	4025
Firms	1111	575	575	575	575	575
F-test						
Dollar Debt	0.061	0.912	0.903	0.877	0.000	0.280
Exporters					0.000	0.031
Firm Fixed-Effects	yes	yes	yes		yes	yes
country*year	yes	yes	yes		yes	yes
sector*year	yes	yes	yes		yes	yes
year	yes	yes	yes		yes	yes

Notes: Results are obtained by fixed effects estimation. Sales regressions control for size by including the log of total assets lagged one period. All regressions control for debt exposure by including the log of total debt lagged one period. Standard errors corrected for clustering at the country-year level are reported in parenthesis. *Exporter* is a time varying dummy that takes value of 1 if the firm exported in the previous period. *Exports* is the lagged volume of exports computed as $\ln(1 + Exports_{t-1})$. $\frac{Exports}{Sales}$ refers to the share of exports in total sales lagged one period. *Dollar Debt* is the share of short term dollar liabilities over total dollar liabilities lagged one period $\left(\frac{ShortDollarLiabilities}{ShortLiabilities}\right)_{t-1}$. *Post* is a dummy variable that takes the value of one in the year of depreciation an year after. The difference between columns (5) and (6) is that column (5) uses the volume of exports while column (6) uses a dummy variable that it is one if the firm exported in the previous year and zero otherwise.

TABLE 7 — FOREIGN OWNERSHIP, FOREIGN CURRENCY DENOMINATED DEBT, EXPORTS AND THE FINANCIAL CRISIS
(Dependent variable: Investment)

	Sample Split by Firm Type			
	Foreign Ownership		Export	
	Domestic (1)	Foreign (2)	NonExporter (3)	Exporter (4)
<i>Exports</i> × <i>Dollar Debt</i> × <i>Post</i>	0.001 (0.00)	0.009** (0.00)		
<i>Foreign</i> × <i>Dollar Debt</i> × <i>Post</i>			-0.048 (0.05)	0.059* (0.03)
Observations	2478	1122	1699	1901
Firms	394	171	271	294
F-test				
Dollar Debt	0.5136	0.1022	0.156	0.3166
Exports	0.5551	0.0566		
Foreign			0.0318	0.1354
Firm Fixed-Effects	yes	yes	yes	yes
country*year	yes	yes	yes	yes
sector*year	yes	yes	yes	yes
year	yes	yes	yes	yes

Notes: Results are obtained by fixed effects estimation. All regressions control for debt exposure by including the log of total debt lagged one period. Standard errors corrected for clustering at the country-year level are reported in parenthesis. *Exports* is the lagged volume of exports computed as $\ln(1 + Exports_{t-1})$. *Dollar Debt* is the share of short term dollar liabilities over total dollar liabilities lagged one period $\left(\frac{ShortDollarLiabilities}{ShortLiabilities}\right)_{t-1}$. *Foreign* is a time varying dummy that takes the value of one if the firm is a foreign affiliate or more than 50% of her shares are foreign owned. *Post* is a dummy variable that takes the value of one in the year of depreciation an year after. We differentiate between domestic and foreign firms and define a foreign company as one which has been foreign owned at least fifty percent of the observed time. Similarly we differentiate between exporters and non exporters by defining a exporter as a firm that exports at least fifty percent of the observed time.

TABLE 8 — ROBUSTNESS CHECKS (SUBSAMPLE OF EXPORTERS)
(Dependent variable: Investment)

	(1)	(2)	(3)	(4)	(5)
<i>Foreign</i> × <i>Dollar Debt</i> × <i>Post</i>	0.059* (0.03)	0.063* (0.03)	0.058* (0.03)	0.075* (0.04)	0.070* (0.04)
ADR		0.016* (0.01)			0.027** (0.01)
<i>Stock or Bond Issuance</i>		-0.016 (0.01)			-0.016 (0.01)
<i>Dollar Asets</i>			0.019 (0.02)		0.019 (0.02)
Observations	1901	1901	1625	1787	1515
Firms	294	294	290	275	271
Firm Fixed-Effects	yes	yes	yes	yes	yes
country*year	yes	yes	yes	yes	yes
sector*year	yes	yes	yes	yes	yes
year	yes	yes	yes	yes	yes
Foreign*Year	yes	yes	yes	yes	yes
Foreign*Country	yes	yes	yes	yes	yes

Notes: Results are obtained by fixed effects estimation. All regressions control for debt exposure by including the log of total debt lagged one period. Standard errors corrected for clustering at the country-year level are reported in parenthesis. Results are obtained for the subsample of exporters defined as those firms that exported at least fifty percent of the observed time. *Dollar Debt* is the share of short term dollar liabilities over total dollar liabilities lagged one period $\left(\frac{Short\ Dollar\ Liabilities}{Short\ Liabilities}\right)_{t-1}$. *Foreign* is a time varying dummy that takes the value of one if the firm is a foreign affiliate or more than 50% of her shares are foreign owned. *Post* is a dummy variable that takes the value of one in the year of depreciation an year after. *ADR* is a dummy variable that takes the value of one the first year the firm issued American Depositary Receipts and thereafter (the variable is included in the estimation lagged one period). *Stock or Bond Issuance* is a dummy variable that takes the value of one starting the year the firm issued bonds or took loans abroad. *Dollar Asets* refer to the share of dollar denominated assets over total assets lagged one period $\left(\frac{Dollar\ Asets}{Total\ Assets}\right)_{t-1}$