

NBER WORKING PAPER SERIES

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Working Paper 16528  
<http://www.nber.org/papers/w16528>

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
November 2010

We thank Hoyt Bleakley, Roberto Chang, Fritz Foley, Mario Crucini, Aimee Chin, and Bent Sorensen for valuable suggestions and the participants of the seminar at Dartmouth College, at the 10th Jacques Polak IMF Annual Research Conference, 2010 NBER-IFM Spring Meeting, 2010 LACEA Meetings and the 2009 COST Workshop on Firm-Level Data Analysis in Transition and Developing Economies for their comments. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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What Hinders Investment in the Aftermath of Financial Crises: Insolvent Firms or Illiquid Banks?

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NBER Working Paper No. 16528

November 2010

JEL No. E32,F15,F23,F36,O16

**ABSTRACT**

There are two leading views on how financial crises turn into recessions. The first view highlights the importance of a troubled banking sector that cannot provide credit to domestic firms. The second view stresses the relevance of short-term borrowing in foreign currency and the associated decline in net worth through a weak balance sheet. Both views underline the role of financial constraints as mechanisms that can lead to an aggregate investment collapse. By utilizing a new firm-level database from six Latin American countries between 1990-2005 and using a differences-in-differences methodology, we empirically test the importance of each view. We find that foreign exporters that hold short-term foreign currency denominated debt, increase investment by 13 percentage points compared to domestic exporters with foreign currency denominated debt. This result only holds when the currency crisis is combined with a banking crisis, implying that the key factor that hinders investment and growth is the decline in the supply of credit.

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# 1 Introduction

How do financial crises turn into real recessions? Based on a plethora of crises in emerging markets since the 1980s, two leading views have developed. The first view underlines the role of banks. As argued by Kaminsky and Reinhart (1999), most of these crises were twin crises: prior to the currency crash the local banking system collapsed. Chang and Velasco (2001) develop a model of such crises, where deteriorating access to international liquidity is at the center of the problem, hindering investment and growth. Liquidity decreases because domestic banks cannot provide credit. At the same time capital flows come to a halt and foreigners exit from the crisis economy, so-called “sudden stops,” leading to a decline in foreign credit. As a result, the liquidity constrained firms cannot undertake new investment and hence contract production.

The second view centers around weak balance-sheets. During a classical balance-of-payments crises, the depreciated currency should have an expansionary effect on output due to increased competitiveness.<sup>1</sup> But if the economy has a large stock of short-term debt denominated in foreign currency, then a weak domestic currency can jeopardize the balance sheets of domestic banks and firms. This could make the depreciation episodes contractionary. Bernanke and Gertler (1989) and Cespedes, Chang and Velasco (2004) formalize this amplification mechanism, where insolvent firms cannot borrow and contract production during depreciations. The main reason for the decline in investment and production is the inflated foreign currency debt, which in turn decreases their net worth.<sup>2</sup>

We provide systematic evidence on why financial crises turn into recessions by disentangling these two main sources of financing constraints. Caballero and Krishnamurty (2001) show that capital market imperfections can amplify the severity of financial crises. We argue that it is also important to know *how* financial crises aggravate credit constraints since the policy responses in each case will differ. To do so we have hand-collected a unique panel database with annual accounting information for the whole universe of listed non-financial companies in six Latin American countries, spanning the period 1990 to 2005. For these 1300 listed firms, we observe time-varying measures of the currency denomination and maturity structure of both debt and assets, firm’s export orientation and export revenue, and a continuous measure of foreign ownership. Our indicator of foreign

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<sup>1</sup>This result is originally established in Mundell-Fleming model but also holds in the sticky-price open economy models.

<sup>2</sup>See also Krugman (1999) and Eichengreen and Hausman (1999). Given the possibility of such balance sheet effects, central banks have been reluctant to let currencies devalue in response to foreign shocks, as shown by Calvo and Reinhart (2002).

ownership is based on precise dates of ownership changes, foreigner's share in the firm and the nationality of the parent and global ultimate parent.

We define an insolvent firm as a firm with high leverage and short-term foreign currency denominated debt. To measure liquidity we consider several different measures. Most of these measures proxy the ease of access to finance. For example we use dummy variables when the firm issues a corporate bond abroad, the firm issues a syndicated loan abroad, and/or the firm issues stock abroad. We believe that although these measures might be good proxies for access to international markets during tranquil times, they are not good measures for access to finance and liquidity during the times of crisis. During these times markets shy away from the emerging countries.<sup>3</sup> We argue that foreign ownership is a better measure of liquidity during times of crisis since it is the main arms' length source of financing for the emerging market firms. As a result our preferred measure for liquidity is foreign ownership, which will capture FDI and portfolio equity investment into the firm.

The identification strategy is differences-in-differences, where we investigate the differential response of foreign and domestic firms with and without short-term dollar debt at the onset of a crisis. Our main hypothesis is that foreign owned firms should perform better compared to domestic firms during a twin crises and not during a currency crisis given the fact that only the former is associated with an illiquidity problem. To pin down the main reason behind the better performance we compare the foreign owned firms with dollar debt to domestic firms with dollar debt. If short-term dollar debt and the associated maturity and currency mismatch on the balance-sheet is the main source of financial constraint, then firms should be constrained under both type of crises (i.e. twin and currency crises) since both involve a currency depreciation, inflating the domestic currency value of short-term dollar debt. To sharpen the identification, we focus on the sample of exporters since these are the firms that will benefit from devaluations and these are also the firms that can avoid a currency mismatch on their balance sheets given their export revenue. We account for unobserved firm-level heterogeneity via firm fixed effects. We also use sector-year fixed effects to address the first-order potential endogeneity concerns. The panel dimension of our data allows us to condition on many country specific policy changes and other shocks through the use of country-year effects. These effects will also allow us to account for the different nature of each crisis and the prior trends in different countries.

Our main results are summarized as follows. Foreign owned exporters with dollar debt perform

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<sup>3</sup>See Reinhart and Reinhart (2010).

better than domestic exporters with dollar debt *only* during twin crises, where domestic firms access to finance is limited given the troubled banking sector. There is no difference in performance between these firms during currency crises. This implies that exporters match their short-term dollar debt with export revenue to avoid insolvency. During twin crises, however, domestic exporters suffer from illiquidity. If we compare foreign and domestic exporters holding short-term dollar debt during a twin crisis, foreign exporters increase investment by 13 percentage points, whereas domestic exporters do not increase investment at all. If we look at domestic exporters with the highest level of short-term dollar debt, we find that they decrease investment by 9 percentage points during a twin crisis. Overall our results point to the key role of illiquidity rather than insolvency as the main source of financial constraint that hinders investment and growth in the aftermath of financial crises.

A critical assumption for our study is that banks are illiquid only during twin crises and not during currency crises. Notice that our results do not rest on the very strict form of this assumption. We only need banks to be *relatively* more illiquid during a twin crisis compared to a currency crisis. There has been extensive evidence in the literature for this argument since the seminal work of Kaminsky and Reinhart (1999). Why is this important? Banks are the main financial institutions in emerging markets compared to developed economies and bank illiquidity means a halt in domestic credit provision.<sup>4</sup> Banks can also be insolvent if they have a balance-sheet mismatch of their own. For our purposes, since the investment decision is taken by the firm, the key factor is whether or not banks can provide liquidity to firms, regardless of whether they are themselves illiquid or insolvent.<sup>5</sup>

Figure 1 demonstrates the case in point and shows that in our sample banks are illiquid only during a twin crisis. The top left panel is domestic credit to the private sector (as a percent of GDP) in Chile, a country that had no crises during our sample period. The top right panel shows the case of Colombia, who had a banking crisis in 1998. The 15 percentage point decline in domestic

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<sup>4</sup>The choice of firms and banks to rely on short term foreign debt might be a result of financial constraints themselves as argued by Diamond and Rajan (2001). Illiquidity of the banking system, where the value of the short-term obligations exceed the liquidation value of its assets, may also emerge as an optimal response of the banking system to the institutional environment. Our triple difference-in-differences strategy will be able to deal with this issue since we compare the performance of foreign owned exporters with dollar debt to that of domestic exporters during the same crisis and within the same banking system.

<sup>5</sup>Notice that if banks become insolvent under a currency crisis and halt domestic credit provision as much as in the case of a twin crisis, then our access to finance measure—foreign ownership— should not have explanatory power that differs among the type of crisis, i.e., domestic firms should do worse than foreign firms under both type of crisis.

credit is clearly visible. The bottom left panel shows the case of Mexico where the banking crisis of 1994 is followed by the currency crisis in 1995. Again domestic credit as percent of GDP dropped sharply, corresponding to a 50 percent decline in credit provision to the private sector. Finally, the bottom right panel represents Brazil who did not suffer from a credit collapse during the currency crises of 1999 and 2002.<sup>6</sup>

Our paper is closely related to the work of Desai, Foley and Forbes (2008) who investigate the response of sales, assets, and capital expenditure of U.S. multinational affiliates and domestic firms in the aftermath of a variety of financial 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) extends the analysis of Desai, Foley and Forbes (2008) by focusing solely on exporting plants and investigate the role of foreign ownership for this group of establishments in Indonesia. Their strategy allows identification of the local firms who would benefit most from the currency devaluation.<sup>7</sup> 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 the results of Blalock, Gertler, and Levine (2007) are consistent with the existence of liquidity constraints but the source of the constraint is not clear. It is possible that exporters, foreign owned firms, and foreign exporters have less dollar denominated debt. Alternatively they may have more dollar denominated debt but at the same time they may have matching dollar revenues from their exports. In any of these cases foreign exporters will have higher net worth and will not be facing insolvency issues. This creates a selection problem, where

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<sup>6</sup>Notice the beginning of the 90s was a very turbulent period in Brazil. Inflation was rampant with a peak of 82.4% in March 1990. A new government designed a stabilization program, Plano Real, aimed to reduced fiscal deficit and introduced a new currency. During the 1980s, banks acted as intermediaries of the public sector debt and benefited from high inflation and indexation. To avoid reducing their profits once inflation was brought down, banks initially expanded credit (mostly through consumer and commercial loans). Although the new currency brought down inflation, it could not prevent the banking crisis in 1995. The sharp decline in domestic credit to the private sector is clear from figure 1. The scale of the figure does not show the 15 percentage point decline in credit from 1995 to 1998 and the subsequent slightly increase from 1998 to 1999. Similarly, prior to the currency crisis of 2002, domestic credit to GDP slightly increased.

<sup>7</sup>Note 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. In their analysis, multinational affiliates do better than local firms, regardless of the fact that they are export-oriented.

certain firms with no solvency issues are in the foreign exporter sample. Solving this selection bias caused by omitting the balance-sheet weakness is at the heart of our paper.

Our paper is also related to the work by Aguiar (2005), who shows that firms with heavy exposure to short-term foreign currency debt before the Mexican crisis decreased investment compared to 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 support the idea that weak balance sheets can hinder investment. However, in a very similar study using more countries during 1991–1999, instead of only Mexico, Bleakley and Cowan (2008) show the opposite result focusing on total debt: firms holding dollar debt invest more. They argue that that firms match the currency composition of their liabilities with that of their income streams or assets, avoiding insolvency. It is not entirely clear why these firms should invest more though. We argue that these firms will only increase investment and not be burdened by dollar debt if they have access to credit. As a result, our findings can bridge these two set of studies and provide an explanation for seemingly conflicting results.

We proceed as follows. Section 2 presents our data. Section 3 discusses the identification strategy. Section 4 presents the empirical results. Section 5 concludes.

## 2 Data and Construction of Regression Variables

The empirical analysis draws on a unique database with accounting information for over 1300 companies in six Latin American countries, spanning the period 1990 to 2005. The countries covered are: Argentina, Brazil, Chile, Colombia, Mexico and Peru. The data was assembled from different sources.<sup>8</sup> A distinct feature of this dataset is that it contains detailed information on the currency and maturity composition of firms' balance sheets, the breakdown of sales into domestic and export revenues, firms' foreign-ownership structure and other measures of access to international markets, such as issuing corporate bonds abroad. This issuance data is at transaction-level and obtained from Dealogic database and includes firms' bond and syndicated loan issuance.

Financial statement data was obtained from annual balance sheet reports drawn from local stock markets or regulatory agencies in each country. Data on foreign currency liabilities and assets (and their maturity structure) was hand-collected from the financial explanatory notes of firms' balance sheets.<sup>9</sup> These are all assets or liabilities outstanding which are denominated in-or

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<sup>8</sup>Details of the data are provided in Kamil (2009).

<sup>9</sup>Information 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),

indexed to-foreign currency, issued domestically or abroad. In the case of liabilities, these include bank loans, commercial debt, trade credit and foreign securities.<sup>10</sup> Short-term foreign currency liabilities are those coming due in the upcoming year. This measure includes foreign currency denominated debt issued at short maturities as well as long term issues whose terminal date falls over the next 12-months.

While firms in many cases report both consolidated and unconsolidated financial statements, we use unconsolidated figures, to reduce variations arising from changes in subsidiaries' ownership and to avoid double counting. Information on firms' export revenues was obtained from income statement data. When this was not available, we used countries' customs office records or Central Bank's Balance of Payments trade registries. In the latter case, we merged balance sheet information with firms' export sales using their tax code identifier and/or name.

## **2.1 Sales and Investment**

Our main indicators of firm performance are sales and investment in fixed capital. Sales is defined as gross sales from main operating activities. The measure of investment used in the empirical analysis is the annual change in the stock of physical capital scaled by total assets to control for the firm size. This investment to asset ratio is winsorized at the lower and upper 1% level at the country level to control for outliers before used in the regression. The stock of physical capital, in turn, is defined as the sum of property, plant, equipment, plus technical reappraisal (valuation change), minus cumulated depreciation. We attempt to minimize any exchange rate and valuation effect by normalizing investment by total assets and including country-year fixed effects, that will absorb common exchange rate fluctuations and valuation effects. In addition, we try to minimize the effects of reporting bias in the value of capital stock by estimating the models with firm-level fixed effects.

## **2.2 Dollar Liabilities, Export Revenue and Tradable Sector**

We measure dollar liabilities as the ratio of total dollar liabilities to total liabilities and short term dollar liabilities as the ratio of short term dollar liabilities to total short term liabilities. Short-term

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we find that, on average, 95 percent is denominated in dollars. Thus, we assumed throughout that all foreign currency debt is denominated or indexed to the U.S. dollar.

<sup>10</sup>Foreign currency assets include cash, government securities indexed to the dollar, bank deposits abroad and overseas client credits.



liabilities refer to outstanding debt that must be payed within 12 months.

Although companies in our five countries can borrow in dollars from their domestic banks, most of Colombian and Brazilian companies' foreign currency borrowing is obtained abroad (whether bond issuances or bank loans).<sup>11</sup> This is because, in these countries, financial dollarization is severely restricted: on-shore foreign currency deposits are banned and private banks cannot lend in dollars. In Colombia, firms cannot borrow in foreign currency from any type of bank (commercial or state-owned). Therefore, firms located in Colombia can only raise foreign currency by issuing bonds, loans and equity abroad. In Brazil, firms that want to borrow in foreign currency domestically can only do so through the state development bank (BNDES) under stringent conditions. In fact, only exporters can borrow easily from BNDES by pledging foreign currency revenue as collateral against dollar debt. Given the fact that we will focus on exporters throughout our analysis, we do not worry about firms in Brazil holding significantly less foreign currency denominated debt than firms in the rest of our five Latin American countries. As we show later, exporters hold more dollar debt than non-exporters across all our countries.

The firm's export to sales ratio captures the degree to which a company has some buffer to hedge dollar debt risk. We also define two exporter dummy variables, one that takes the value of one if the firm reported export revenue in a given year and zero otherwise. The second one aims to identify exporters with a high exports to sales ratio, so that it takes the value of one if the firm export revenue represents more than 10% of the sales value and zero otherwise. This is a substantial improvement over previous studies in the literature that typically used aggregate variables to proxy for firms' access to foreign currency (either a binary tradable/non-tradable classification or sectoral export shares).

We also define exporting firms based on a predetermined dummy variable. A firm is classified as exporter if she reported export revenues at any time during the three years *prior* to the first currency crisis.<sup>12</sup> In addition, given the severity of the banking crisis in Colombia, exporters in this country are defined based on whether the firm reported export revenues in 1995, 1996, or 1997 (three years prior to the banking crisis). Finally, in Peru and Chile where no substantial banking crisis and/or currency crisis took place, predetermined exporters are defined based on whether firms reported export revenue at any time during the period of analysis.<sup>13</sup>

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<sup>11</sup>We thank Laura Alfaro for pointing this out.

<sup>12</sup>In the case of Argentina, we refer to years 1999, 2000 and 2001; Brazil 1996, 1997 and 1998; Mexico 1992, 1993 and 1994.

<sup>13</sup>Reinhart and Rogoff (2008) identify a banking crisis in Peru 1999 however the decline in credit to the private sector as a percentage of GDP was only of 3 percentage points between 1999 and 2000 and 5 percentage points

## 2.3 Foreign Ownership

One of the contributions of our paper is to construct a continuous measure of foreign ownership for each firm in our sample. The continuous measure will allow us to explore the role of majority foreign owned companies by defining a dummy variable that takes the value of one if foreigners own more than 50% of the firm's capital structure and zero otherwise. To check whether or not the results are driven by firms becoming foreign owned during crisis, we also define a predetermined foreign dummy variable as in the case of exporters.

To identify the ownership structure of each firm in our sample and track their changes over time, we proceed in two steps. We first gathered data on all cross-border Mergers and Acquisitions (M&A) of Latin-American firms between 1981 to 2005 using the SDC Platinum database from Thompson (for the period 1981 to 2001) and Zephyr from Bureau Van Dijk (from 1997 to 2005). We then identified all transactions where the target involved a firm in our sample.<sup>14</sup> Examining M&As from the 1980s onwards ensures that we capture any change in ownership relationship that predates the firm's first appearance in our sample. For each deal, we obtained the date on which the transaction became effective and characteristics of the target and acquiring firms, in particular, the nationality of the target and acquiring firm, and that of the acquirer's ultimate parent.<sup>15</sup> The database also includes transaction-specific information on percent of shares acquired and the percent of shares owned before and after the transaction was completed. In total, we consider 4,406 completed deals that resulted in a change in majority control in the target firm as well as acquisitions of minority stakes (some of which involve multiple acquisitions of the same target). Of the firms in our sample, 28 percent were involved in at least one M&A during the period. For each firm involved in an M&A, we constructed a continuous, time-varying measure of foreign ownership based on the percentage fraction of shares held by foreign and domestic investors in each year.<sup>16</sup>

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between 1999 and 2001.

<sup>14</sup>Given that there was no common firm-identifier across databases, we used a search algorithm based on firms' names and economic sectors to match M&A transactions to firms in our sample. We took into account possible changes in firms' names drawing on a list of company name changes from the Economatica database. In addition, we double checked with various internet resources, including the information provided by the company on its own web page and that of the Funding Universe website ([www.fundinguniverse.com/company-histories/](http://www.fundinguniverse.com/company-histories/)) that provides information on companies' history.

<sup>15</sup>Note that the foreign acquirer can in principle belong to another Latin American country included in the sample.

<sup>16</sup>For example, the M&A databases would identify an M&A transaction where a foreign company that already owned 50 percent of a company in a target country, buys 10 percent more of that company. Our foreign ownership variable would be 50 until the time of the transaction and 60 thereafter. In the case where we had more than one foreign investor in the same year we faced the problem of not knowing if the foreign companies were buying from

We then merged this information with annual balance sheet data.<sup>17</sup>

Of course there might be ways other than M&As for foreign investors to invest in firms. First, foreign ownership acquisitions can arise by means of IPOs, venture capital activity, or private equity deals, which are not covered in M&As hence in our procedure. Second, several foreign-owned firms could have been established before 1980, and not involved in a M&A since then. To remedy this, we used the *Corporations Affiliations* database to identify Latin American firms in our sample that are affiliates, subsidiaries and/or divisions of global multinational firms.<sup>18</sup> Notice, in addition to the “formal” sources of foreign ownership data we checked firm by firm company’s history.

As a result, the foreign ownership measure can take any value between 0 and 100 and represents the percentage of capital owned by foreign investors. Figure 2 shows the evolution of *average* foreign ownership over time in our sample, in a balanced panel. Many Latin American countries underwent massive privatization processes during the 90s. Therefore, as expected, foreign ownership has steadily grown over time. Most of our sampled firms are domestic and hence the distribution of foreign ownership has a high concentration of firms around zero, where 70% of the firms are domestic, as shown in Figure 3.<sup>19</sup> Figure 4 shows that among those firms with positive foreign ownership, 40% of the observations are between 85% and 100% foreign owned. Hence foreign investors prefer to have a controlling stake in general. These distributions look similar if we do them by country.

## 2.4 Depreciation Episodes

Table 1 summarizes the currency crises and banking crises episodes for our sample of countries as well as provides information on the exact dates used for the *Post* dummy variables according to type of crises and dates used in the definition of predetermined variables.

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 previous year. Using data on CPI, the real exchange rates were each other or rather directly from the target company. In those cases we checked the company history profile, the Funding Universe website and other specialized newspaper information. In the rare case that information was not available, we decided on a conservative measure of foreign ownership and assumed that the foreign companies bought from each other.

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<sup>17</sup>In the few cases of target firms being renamed after the acquisition, we kept the old id number rather than creating a new company after the M&A.

<sup>18</sup>This database contains international public and private business profiles and corporate linkage (“who owns whom”) for approximately 184,000 public and private companies worldwide.

<sup>19</sup>We choose 2000 for being an intermediate year but similar figures are obtained using any other year.

obtained as the deflated end-of period exchange rates. We identify four depreciation episodes in our sample: Mexico (1995), Brazil (1999), Brazil (2002), and Argentina (2002). Note that Mexico abandoned the peg in December 1994, Brazil in January 1999 and finally, Argentina in January 2002. Brazil 2002 is an episode of exchange rate depreciation over 25%. In addition, following Reinhart and Rogoff (2008) we identify the following banking crises: Argentina (1995) and (2001), Brazil (1995), Mexico (1994) and Colombia (1998).

## 2.5 Sample Selection

All firms in the sample are publicly-traded companies. Following previous research, we excluded financial firms. Focusing solely on publicly listed firms was dictated by data availability, and has the disadvantage that the patterns observed for publicly traded firms might not be representative of the corporate sector as a whole. Yet it has the advantage that financial statistics are typically more accurate and comprehensive. Moreover, relative to other available databases, such as Worldscope, the coverage of small and medium-sized publicly traded firms is better since we have the whole universe of listed firms.<sup>20</sup>

Most of our variables are expressed as ratios; where this is not the case, we deflate the nominal magnitudes with 2000 values using December-to-December changes in the consumer price index and converting them to U.S. dollars using December 2000 market exchange rates.<sup>21</sup> Since we identify off time variation we exclude all firms with non-consecutive yearly observations (i.e, which appear disappear and reappear in the sample), which constitute 10% of the sampled firms. The size of the sample changes as new firms enter and exit the sample. Only less than 10% of the firms delisted and hence we do not believe we have a survivorship bias.<sup>22</sup>

Finally, we drop all firm/year observations in which the accounting data are not self-consistent.<sup>23</sup>

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<sup>20</sup>The 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.

<sup>21</sup>Data on CPI and exchange rates are from the International Financial Statistics of the International Monetary Fund.

<sup>22</sup>In order to explore sample bias due to delisting/bankruptcy we look at the original sample that included all firms that were listed at some point in any of these Latin American countries. In Mexico 1995 and Brazil 1999 none of the firms delisted due to a change in ownership. In Argentina 2002 and Brazil 2002 only one of the delisting firms actually changed ownership status the first year of the crisis.

<sup>23</sup>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. We drop firm-year observations with zero or missing sales. Finally, 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. These adjustments led to dropping 16% of the remaining firm-year observations.

To ensure that results are not driven by outliers, we then dropped all firm/year observations for explanatory variables that exceeded the sample mean by more than five standard deviations.<sup>24</sup> These exclusions leave us with complete information for an unbalanced panel of 6,175 firm-year observations, which consist of 931 firms with an average of around 7 years each.<sup>25</sup> Finally, data on additional controls included later on in the estimation leaves us with a sample of 5,063 observations or 864 firms.

## 2.6 Descriptive Statistics

Although our sample is restricted to listed companies there is nevertheless great heterogeneity across firms regarding whether a firm exports or not, their foreign debt holdings and the degree of foreign ownership. Table 2 reports the percentage of observations by type of firm, averaged over our sample period. *Foreign* is a dummy that takes the value of one if the company is majority owned (more than 50%) by a foreign investor and zero otherwise. In Argentina 53% of the sampled firms are foreign owned while in Colombia only 16% would be considered foreign. Another important variable in our analysis is export status. Around 56% of the observations report some export revenue and half of those observations report a ratio of export revenue to sales greater than 10%. Regarding dollar assets and liabilities, 81% of the sample reports some positive debt holding denominated in foreign currency while only 59% of the sample reports positive dollar assets. Again these figures vary by country and in this case it is in Argentina, Brazil, Mexico and Peru where we have a greater number of observations with positive values of dollar debt and Argentina, Mexico and Peru where more firms report dollar assets.

There is also extensive variation in the main variables used in the analysis. Table 3 reports summary statistics for these variables. On average firms hold 26% of their short-term debt denominated in foreign currency while exporters hold on average higher values of their debt denominated in foreign currency (35%). Similarly, 20% of total liabilities correspond to short-term bank debt and exporters again seem to exhibit a slightly higher dependence on short-term bank debt. Finally, around 2% of the observations issue bonds and equity abroad and 5% issue loans abroad. Appendix

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<sup>24</sup>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  $Z > 5$ . We drop firm/year observations for which the ratio of investment over assets is greater than one or less than minus one. These controls for outliers (either because of inadequate accounting, typing errors or extreme values). These adjustments led to dropping 19% of the remaining firm-year observations.

<sup>25</sup>Notice investment is constructed as the difference between physical capital stock today and lagged physical capital and therefore, we lose one year.

table A1 shows some basic correlations.

There is also great heterogeneity in dollar debt holdings across different types of firms. This is the crucial variation that we exploit in the paper. Table 4 shows that on average exporters hold more dollar debt than non-exporting firms. Moreover, foreign and domestic exporters hold similar average ratios of short-term debt denominated in foreign currency. However, there is great variation across countries. While in Argentina, Brazil and Colombia, foreign exporters hold a higher share of their short-term debt denominated in dollars than domestic exporters, in Mexico and Peru domestic exporters show a higher tendency to acquire short-term dollar denominated debt.

### 3 Identification Strategy

Our objective is to identify the channel through which crises aggravate credit constraints. Is the key problem illiquidity or insolvency or both? By using a differences-in-differences methodology we try to understand what type of firms outperform during the crisis and consequently are not credit constrained. The key to the identification is the fact that we have more than one depreciation episode and some of these episodes are combined with banking crises. Hence in *some* of the depreciation episodes there is also an economy-wide illiquidity problem. But in *all* of the depreciation episodes there is a potential insolvency problem given the dollarized debt of firms. The depreciated currency provides new investment opportunities in the tradable sector and at the same time creates balance sheet weakness since now there is an increase in the value of dollar denominated debt. During a twin crisis there is an additional illiquidity problem coming from the troubled domestic banking sector. Thus, even firms that do not face insolvency issues via a negative balance sheet effect might have difficulty in getting funds, and therefore invest less.

We measure the differential access to finance by the ownership structure of the firms. As discussed before, several recent papers have shown that foreign companies outperform domestic companies during financial crises. This evidence is consistent with an access to finance story where foreign firms outperform the domestic counterparts during a crisis given their connections to international financial markets and/or deeper internal capital markets. However, another plausible story is that foreign firms may not suffer from weak balance sheets and outperform because they are solvent. Our identification strategy will allow us to disentangle these two sources of liquidity constraints, insolvency versus illiquidity, since we compare the performance of foreign firms with dollar debt to that of domestic ones. This will allow us to identify the exact mechanism for the financial constraint. Conditional on the assumption that during a currency crisis domestic banks

still provide credit, we should observe no significant difference between foreign and domestic firms, where both have dollar debt holdings. During a twin crisis, on the other hand, foreign firms should outperform domestic firms since domestic firms that are heavily reliant on the domestic banking system will witness a sharp decline in the availability of credit. Foreign firms would still have access to international financial markets either directly or through the parent company.

We focus on a sample of exporters since these are the firms that face the new investment opportunity and therefore, are the ones in which we expect to see a change in investment. These are also the firms who can avoid a currency mismatch on their balance-sheet given their revenue in foreign currency. We run the following specification:

$$\begin{aligned}
y_{i,c,j,t} = & \beta_1 Foreign_{i,c,j,t-1} \times SDDebt_{i,c,j,t-1} \times Post_{c,t} \\
& + \beta_2 Foreign_{i,c,j,t-1} \times SDDebt_{i,c,j,t-1} \\
& + \beta_3 Foreign_{i,c,j,t-1} \times Post_{c,t} \\
& + \beta_4 SDDebt_{i,c,j,t-1} \times Post_{c,t} \\
& + \beta_5 Foreign_{i,c,j,t-1} \\
& + \beta_6 SDDebt_{i,c,j,t-1} \\
& + \phi_{j,t} + \varphi_{c,t} + \alpha_i + \xi_{i,c,j,t}
\end{aligned} \tag{1}$$

where  $y_{i,c,j,t}$  is the outcome of firm  $i$ , in country  $c$ , in sector  $j$  at time  $t$ . For the outcome variables, we use sales and investment. The investment variable is scaled by total assets. When the outcome variables is sales, we control for firm size by including lag of total assets.

*Foreign* is a dummy that takes the value of one if the company is foreign owned and zero otherwise. *SDDebt* measures lagged short-term dollar denominated liabilities, which are liabilities with residual maturity of twelve months. We focus on short-term debt since the literature argues that this is the variable that is important for a balance-sheet mismatch vulnerability (See Setser et al. 2005).<sup>26</sup> *Post* is the depreciation dummy and equals to one in the year of crisis and one year after. We include  $\phi_{j,t}$  that controls for sector-year fixed effects,  $\varphi_{c,t}$  that captures country-year fixed effects,  $\alpha_i$  are firm-specific effects, and  $\xi_{i,c,j,t}$  is the error term.<sup>27</sup> By using firm fixed effects we

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<sup>26</sup>We have also experimented with the ratio of short term dollar debt in total debt obtaining similar results. The correlation between the two is 0.87.

<sup>27</sup>Notice that the Post dummy it is captured in the country-year fixed effects. Time dummies are also absorbed by

will be identifying solely from firm changes over time. Country-year effects will absorb the effects of any other macroeconomic shock.

The triple interaction turns out to be crucial in correctly identifying the groups of firms that will benefit or those that will be hurt by the crisis. To see why we compare the interpretation of the coefficients in equation (1) to those that would result from estimating the following equation:

$$\begin{aligned}
y_{i,c,j,t} = & \beta_3 Foreign_{i,c,j,t-1} \times Post_{c,t} \\
& + \beta_4 SDDebt_{i,c,j,t-1} \times Post_{c,t} \\
& + \beta_5 Foreign_{i,c,j,t-1} \\
& + \beta_6 SDDebt_{i,c,j,t-1} \\
& + \phi_{j,t} + \varphi_{c,t} + \alpha_i + \xi_{i,c,j,t}
\end{aligned} \tag{2}$$

In equation (1),  $\beta_4$  is the effect of holding dollar debt after the crisis *only* for the sample of domestic exporters. This is not the case for  $\beta_4$  in equation (2) since now this coefficient will reflect a combined effect of foreign and domestic exporters. Similarly,  $\beta_3$  in equation (1) captures the investment behavior of foreign companies with no dollar debt relative to those foreign companies with dollar debt at the time of the crisis  $\beta_1$ . Compared to equation (2) the advantage is that the coefficient  $\beta_3$  in equation (1) does not confound the effect of foreign companies holding and not holding dollar debt as it would be the case of coefficient  $\beta_3$  in equation (2).

If exporting firms match their dollar holdings with export revenue, we expect  $\beta_4$  in equation (1) to be insignificant since domestic exporters who hold dollar debt should not perform different than foreign exporters with dollar debt if they both have strong balance sheets as a result of matching their dollar debt to their export revenue. Hence,  $\beta_1$  compared to  $\beta_4$  is the incremental effect of being a foreign company among exporters holding dollar debt. If  $\beta_1 > \beta_4$  (i.e. foreign exporters holding dollar debt outperform domestic exporters holding dollar debt) we interpret this as the “access to finance” channel. Both foreign and domestic exporters experience a similar change in their net worth but foreign exporters still manage to increase investment relative to domestic exporters. This means that there is something different about foreign exporters with dollar debt at the time of the crisis. Our interpretation of this difference is access to external funds. The potential finding  $\beta_1 < \beta_3$  (i.e. foreign exporters with dollar debt do worse than foreign exporters without dollar debt) 

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 this fixed effect.



holdings) would highlight the importance of insolvency since comparing firms that have the best access to credit (i.e. foreign companies), those with a deterioration in their balance sheet would perform worse.

Therefore, to summarize, if both foreign and domestic exporters with dollar debt can avoid a mismatch on their balance-sheet and hence insolvency, then the differential response between the two captures access to finance. Of course, this result will make sense only if the domestic companies suffer from an illiquidity problem. Hence, we should see foreign owned exporters with dollar debt doing better under a twin crisis but not under a currency crisis where foreign and domestic firms both have access to credit assuming domestic financial markets are intact. The identification strategy also relies on the fact that there are no prior differential trends in outcomes of foreign versus domestic exporters with dollar debt, especially during a twin crisis. Our robustness section will present figures that show this is indeed the case. Next, we turn to our regression analysis.

## 4 Results

### 4.1 Exporters and Balance Sheet Mismatch

First, we would like to establish whether or not exporters are financially constrained in the aftermath of a crisis. We do this by estimating the following equation:

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

*ExportShare* refers to the lagged ratio of export revenue to sales. Instead of lagged ratio we also use a predetermined export dummy, where exporter is defined according to whether the firm reported export revenue at any time during the three years *prior* to the crises, obtaining similar results. The rest of the notation is same as in equation (1).

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. The estimated coefficient,  $\beta_1$  captures the incremental effect on firm-outcomes of an increase in the export to sales ratio in the years after the depreciation. A priori we expect  $\beta_1$  to be positive both for firm-level sales and investment. Table 5 shows the main results from estimating equation (3). Column (1) shows that, in general, if all financial crises were to be considered irrespective of their type, export propensity predicts a significant increase in sales growth after the crises. In particular, a one standard deviation (0.18) increase in the export to

sales ratio at the time of the crisis translates into a 0.04 increase in sales growth.<sup>28</sup> In other words, firms with average sales growth rates of 1 percent would experience a 4 percentage point increase in sales growth over the mean for every standard deviation increase in the sales to export ratio.

However, this is not the case when we look at investment as the outcome variable. According to column (2), exporters do not significantly increase investment during financial crises. The increase in sales without a similar increase in investment can be the result of an increase in capacity utilization or a composition effect by which after the devaluation exporters increase the percentage of sales abroad. There might also be other explanations why exporters do not increase investment in the aftermath of currency crises mainly related to adjustment costs and the role of inventories. The literature has suggested financial constraints as a major reason for exporters not undertaking new investment during financial crises.<sup>29</sup> Exporters might hold a relatively large percentage of their debt denominated in foreign currency which would in turn translate into a deterioration of their net worth and question their solvency. Therefore, firms who hold a high share of their debt denominated in foreign currency might be credit constrained in the sense that they might be insolvent and cannot access external funds. If the exacerbation of financial constraints is due to firm insolvency, an important control in equation (3) is the share of short-term debt denominated in foreign currency. Columns (3) and (4) in table 5 include the short-term foreign currency denominated debt as an additional control. Export propensity is no longer a significant determinant of sales growth while short term dollar debt holdings are associated with higher sales growth. These results point to the high correlation between export propensity and short-term dollar debt (correlation coefficient is 0.35). Most importantly, in the case of investment, nothing changes. Even after controlling for dollar debt holdings, exporters do not increase investment. Instead now higher levels of short-term foreign currency denominated debt are associated with a decline in investment.<sup>30</sup>

Kaminsky (2006) argues that not all currency crises are the same. Twin and currency crises are different treatment events. This suggest that in order to better understand whether the lack of increasing investment on the part of exporters is due to solvency or illiquidity reasons, we can

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<sup>28</sup>To ease the economic interpretation, we demean all continuous variables, where we remove country-year and sector-year averages from firm-level values.

<sup>29</sup>An alternative explanation for the lack of changing investment patterns might be due to imported materials. Although the depreciation makes exported goods relatively cheaper, firms importing materials from abroad would now witness an increase in the relative price of imports. Unfortunately, we could not obtain data on imports but we defined tradable sectors with a dummy variable that is equal to one if the firm operates in a SIC sector classified as tradable (see Forbes, 2002), and obtain similar results.

<sup>30</sup>The results are the same if we use the predetermined value for the exporter dummy as shown in appendix table A2.

exploit the difference between twin and currency crises. On the one hand, both crises share the depreciation of the currency that leads to an investment opportunity in the exporting sector as well as a countervailing balance sheet effect through the inflation of the foreign currency denominated debt. On the other hand, twin crises are characterized by a shortage of funding available to firms. In both crises firms with dollar debt face an insolvency issue and should perform worse than firms who do not hold dollar debt (assuming these firms have a mismatch associated with dollar debt holdings). But in addition, during twin crises even firms with no associated balance sheet mismatch (i.e. exporters) might decrease investment as a result of the decline in credit supply. Put it differently, conditioning on dollar debt holdings exporters should take the advantage of a depreciated currency and should increase investment under a currency crisis. This can only happen under a twin crisis if exporters do not experience a liquidity constraint. In column (5) we explore the effect of export share and short-term dollar debt on investment during twin crises. Argentina (2002) and Mexico (1995) are the twin crises episodes, where both countries had a banking crises in the year before the currency crisis, and in column (6) we use Brazil (1999, 2002), where both episodes involve depreciation of the currency of more than 25% but there was not a decline in the supply of credit on the financial sector part (see Figure 1).<sup>31</sup>

The results on export share are as we expected: under currency crises, where there are no liquidity constraints, exporters do increase investment however, under twin crises exporters do not do better than non exporters (conditional on dollar debt). Now we have two new puzzles: first, why do exporters behave differently during twin and currency crises and second, why firms holding higher levels of short term dollar denominated debt decrease investment in the aftermath of twin crises, but not in the aftermath of currency crises as shown in column (6). If holding dollar debt is associated with insolvency a decline in investment is expected under both type of crises since both type of crises will lead to a weak balance sheet as a result of holding dollar debt via a depreciated currency. These regressions control for country-year fixed effects and hence this result cannot be driven by the country-year specific events that could be correlated with firm holdings of short-term dollar liabilities.

The problem with this specification is that it does not correctly identify the groups of interest. The coefficient on  $ExportShare_{i,c,j,t-1} \times Post_{c,t}$  in equation (1) includes both exporters holding dollar debt and those not holding dollar debt. Instead we would be interested in the differential response to the crises of exporters holding dollar debt versus those exporters not holding dollar debt. There might be no negative effect of holding dollar denominated debt if the firm also has

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<sup>31</sup>Notice the post dummy always refers to the year of depreciation and year after.

matching dollar denominated liquid assets or revenue from exports or cash holdings. Controlling for the share of short term foreign currency denominated debt, as we did in columns (3) to (6) in table 5 would not be enough. The coefficient on  $ShortDollarDebt_{i,c,j,t-1} \times Post_{c,t}$  includes both exporters and non-exporters holding dollar debt. Therefore, to correctly identify the groups of interest, we run a triple differences-in-differences in a similar vein to equation (1).<sup>32</sup> This is our preferred strategy since this regression not only accounts for potential balance sheet mismatches, but it also specifically accounts for the fact that exporters who hold dollar debt might behave differently than the ones who do not.

Table 6 reports the results.<sup>33</sup> Following Aguiar (2005), an exporter is defined as a firm whose export revenue to sales ratio is more than 10 percent. The 10 percent cut off level corresponds to the 75 percentile of the distribution of exports to sales ratio. The idea is to consider firms with enough export revenue to compensate any potential mismatch derived from dollar debt holdings. As before, columns (1) and (2) of table 6 use Argentina (2002) and Mexico (1995) for the post dummy, where both countries had a banking crises in the year before the currency crisis, and columns (3) and (4) use Brazil (1999, 2002), where both episodes involve depreciation of the currency of more than 25% but there was not a decline in the supply of credit on the financial sector part.

The coefficient on the triple interaction in column (1) in table 6 (-0.110) indicates that in the case of twin crises not even high exporters are able to increase investment if they hold dollar debt. In fact, they decrease investment both relative to exporters with no dollar debt holdings (-0.038) and non-exporters with dollar debt (-0.042). The F-test shows that the total effect from holding dollar debt is negative and highly significant and export revenue is not enough to compensate for the inflated debt. Firms holding dollar debt significantly decrease investment during twin crises regardless of their export status. Results in column (3) of table 6 shows the exact opposite pattern between these two type of firms during currency crises. Exporters do increase investment, even those with higher short-term dollar debt holdings. It seems like matching dollar liabilities and export revenue improve

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<sup>32</sup>The equation we estimate in Table 6 is given by:

$$\begin{aligned}
y_{i,c,j,t} = & \beta_1 Exports_{i,c,j,t-1} \times SDDebt_{i,c,j,t-1} \times Post_{c,t} + \beta_2 Exporter_{i,c,j,t-1} \times SDDebt_{i,c,j,t-1} \\
& + \beta_3 Exporter_{i,c,j,t-1} \times Post_{c,t} + \beta_4 SDDebt_{i,c,j,t-1} \times Post_{c,t} + \beta_5 Exporter_{i,c,j,t-1} \\
& + \beta_6 SDDebt_{i,c,j,t-1} + \phi_{j,t} + \varphi_{c,t} + \alpha_i + \xi_{i,c,j,t}
\end{aligned} \tag{4}$$

<sup>33</sup>Given the difficulty in interpreting the interaction of two continuous variables we replace the share of exports with an exporter dummy in this triple interaction specification. Statistical significance does not change if we use the *ExportShare* variable.

solvency and alleviate the credit constraints of exporters during crises, since exporters with dollar liabilities do not behave differently than exporters with no dollar liabilities. But this is happening only under the currency crises. If the issue is an insolvency one then the coefficient on the triple interaction should be negative significant under both type of crises and must be smaller than the coefficient on the term  $Exporter \times Post$ . If exporters match the dollarized liability with export earnings then the coefficient on the triple interaction should be positive under both type of crises and should not be statistically different from the coefficient on the term  $Exporter \times Post$ . Again if the issue is insolvency and only exporters can get around this problem thanks to their foreign currency earnings, then the coefficient on the term  $ShortDollarDebt \times Post$  should be negative, under both type of crises.

Why do we have a differential response under different crises? We argue that the real problem is illiquidity and hence exporters perform worse regardless of dollar debt under a twin crisis.<sup>34</sup> This is consistent with Chang and Velasco (2001) result that the bank run in their model can be overturned if they allow FDI. Hence we attribute this difference in our results to the drop in the supply of credit. We assume that firms in countries that experienced a twin crisis cannot finance investment and/or working capital at the time of the crisis through banks. Several studies have highlighted the dependence of firms on the local banking system in Latin America.<sup>35</sup> We also assume firms rely on the local financial system and are not able to borrow in international markets at the time of the crisis. This is a typical characteristic of emerging market crises where foreign investors are dissuaded by the bad economic conditions of any lending to these firms in the eve of or during the crises. Finally, dollar debt holding might not be an issue if the firm is not leveraged, i.e, the short-term debt might not be a big fraction of total debt, then it would not be a concern even if

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<sup>34</sup>These results shed some light on the opposite results previously found in the literature. Our results are consistent with Aguiar (2005) who studies the investment behavior of firms holding dollar debt in the aftermath of the Mexican crisis, which is a twin crisis, and finds a negative effect. Our currency crises results are also consistent with Bleakley and Cowan (2008) finding that firms with higher dollar debt holdings increase investment during depreciations. It is worth noting that our study differs from that of Bleakley and Cowan (2008) in several dimensions. First, they use the change in real exchange rate rather than a post dummy identifying an exchange rate crisis. Second, Bleakley and Cowan use data for 5 Latin American countries, Argentina, Brazil, Chile, Colombia and Mexico; while we also have data on an additional country, Peru. Finally, Bleakley and Cowan use data from 1991 to 1999. We use data from 1990 to 2005 and therefore are able to study two major twin crisis episodes: Argentina (2002) and Mexico (1995); as well as two additional currency crisis episodes: Brazil (1999, 2002). Nevertheless, if we were to follow Bleakley and Cowan (2008) approach and use the change in the exchange rate rather than a crisis dummy we would find similar results to the ones shown in Table 6 for the case of currency crises. Firms holding short term dollar debt would only increase investment when having a significant stream of export revenue.

<sup>35</sup>See Demirg-Kunt and Levine (2001)

most of the short-term debt is in dollars. This type of firm may not face an insolvency problem.

To explore these issues further, we add the following *firm* specific controls. The ratio of short-term bank debt to total liabilities to proxy for bank dependence and leverage together with measures of access to international markets. To proxy access to international markets we use the variables “bond abroad” a dummy that takes the value of one in the year the firm issues a corporate bond abroad, “international loan” a dummy that takes the value of one in the year the firm issues a syndicated loan abroad, and “equity abroad” a dummy that takes the value of one on the year the firm issues stock abroad (either as ADR or GDR, whether in the US or other stock market).<sup>36</sup>

Results are shown in columns (2) and (4) and confirm that the puzzling result stays upon these controls. Exporters holding dollar debt behave differently during twin and currency crises. In addition, according to columns (2) and (4) firms who issue a bond abroad increase investment, hinting that the problem of illiquidity can be serious. We obtain similar results when we add the interactions of these variables with the post dummy. Short-term bank dependence, is not a significant predictor of investment.

The results in table 6 are consistent with the interpretation that the real problem is illiquidity. However, they do not provide a direct comparison of firms with better access to finance (liquid) to firms that have illiquidity issues. Although we try to condition on some measures of international access to finance, we believe these measures are not good proxies. The sudden stop literature argues these are not the first-order sources of access to finance especially in the times of crisis since markets shy away from the emerging countries in such times.<sup>37</sup> Some researchers focused on foreign ownership as the main arms’ length source of financing for the emerging market firms. Thus in order to disentangle illiquidity from insolvency, we will use foreign ownership as a measure of liquidity. As detailed in section 3, our key identification strategy lies in comparing foreign exporters with dollar debt to domestic exporters with dollar debt. Next section presents these results.

## 4.2 Illiquidity versus Insolvency

As we argued in the introduction, previous research shows that foreign companies outperform domestic companies in terms of investment during currency crises. Before turning to our main results we would like to explore whether foreign companies do invest more than domestic firms during crises in our sample of firms, results are shown in table 7. In columns (1) to (3), (5) and (6),

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<sup>36</sup>These data is from from Dealogic Bondware and Loanware.

<sup>37</sup>See Reinhart and Reinhart (2010).

foreign is a dummy that takes the value of one if foreign investors own more than 50% of the firm and zero otherwise. Columns (4) and (7) consider the case of defining foreign as one if the firm was more than 50% owned at any time during the three years prior to the crisis and zero otherwise. All specifications include the ratio of short-term bank debt to total liabilities to control for leverage. Column (1) shows, as in Desai, Foley and Forbes (2008), that foreign companies invest more than domestic firms during crises. Columns (2) and (5) show that this result is robust regardless of the type of crises considered. However, columns (3) and (6) show that the type of crises matters in the sample of exporters. As in Blalock, Gertler, and Levine (2007), who explored the case of Indonesia only, foreign exporters increase investment during twin crises compared to domestic exporters (see column (3)) but there are no significant differences in investment patterns during a single currency crises between foreign and domestic exporters (see column (6)).

It is reassuring that results are robust to the use of a predetermined variable that classifies firms into foreign and domestic according to their ownership status three years *before* the crises (see columns (4) and (7)). Our identification strategy would be weakened if during the depreciation episode foreign companies acquire the most productive domestic companies although the evidence so far seems to be showing the opposite. Aguiar and Gopinath (2005) show that foreign investors buy inferior firms at fire-sale prices. As shown in columns (4) and (7) these issues do not drive our results. This is expected since although, there are 17 cases in which a domestic firms changed ownership status to majority foreign owned at the time of the devaluation in the total sample, in the exporter subsample there are only 7 of such cases.

Using a sample of predetermined exporters also helps in terms of another potential selection issue. 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 make firms near the threshold productivity cut off level enter the export market. These firms would be more productive than the non exporting ones but less productive than the ones that were already exporting and that due to the depreciation also experience a competitiveness effect. Changes in export status from non-exporter to exporter at the time of the crisis were relatively limited in our sample and accounted for 5% of the exporting observations at the time of the crisis. Nevertheless, we define the exporter sample according to the firms' export revenues three years before the crises took place in columns (3), (4), (6), (7). Consequently, results in columns (4) and (7) show that foreign exporters outperform domestic exporters during twin crises but not during currency crises defining both foreign an exporter status three year prior to the crises. In addition, these columns show that results are robust to controlling for international market access

measures. It seems to be a case in which parent companies inject liquidity into foreign owned firms during crises.<sup>38</sup>

We argue that the results in table 7 are driven by the easy access to international finance of foreign owned exporter firms. But it could also be the case that foreign owned exporters in Mexico and Argentina hold less dollar debt relative to domestic firms or foreign exporters in Brazil or they know how to better manage their dollar debt holdings. Table 5 shows that the median foreign exporter held a similar percentage of short-term debt denominated in foreign currency than the median domestic exporter. However, there were significant differences across countries. In Argentina and Brazil the median foreign exporter held a higher percentage of short-term debt denominated in foreign currency than the median domestic exporter while in Mexico, the median foreign exporter reported lower short-term dollar debt holdings. Given the differences across countries in the types of firms holding dollar debt we have to focus on the sample of exporting firms that are clearly the ones holding significant percentages of their short-term debt denominated in foreign currency. In order to directly compare foreign and domestic exporters with and without dollar debt holdings, we estimate our key identification equation (1) in this sample.

Table 8 shows the results. We are interested in the differential response of foreign exporters holding dollar debt after the devaluation. As we argued before, the advantage of focusing on the subsample of exporters is that these firms are the ones with both the investment opportunity due to the devaluation episode and export revenue to compensate any negative effect derived from holding short term dollar debt. In addition, as already mentioned, focusing on the sample of exporters mitigates concerns about the extent of the short-term dollar debt practice for some firms. Table 5 showed that the median exporter holds on average 35% of short-term debt denominated in foreign currency while the average non exporter holds less than 1% of the short-term debt denominated in dollars (notice the high variation across countries). If firms match their dollar denominated debt by export revenue both domestic and foreign companies should perform similarly during currency crises episodes. However, foreign exporters holding dollar debt might outperform domestic exporters holding dollar debt in the event of twin crises by having access to external financing *relative* to domestic firms. Domestic companies that are highly dependent on domestic credit markets would not be able to borrow during twin crises when they are financially constrained.

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<sup>38</sup>The Argentina Renault is a case in point. In 2001, the parent firm contributed \$300 million to assure the survival of its affiliate. In January 2003 it received an additional \$160 million from parent Renault to accommodate its bank creditors. The company lost \$71 million in 2003 and ended the year with debt of about \$276 million. However, during the first half of 2004, the company made a small profit.



Column (1) in table 8 shows that foreign exporters holding dollar debt increase investment (0.211) relative to domestic exporter holding dollar debt (-0.150) and foreign exporters with no dollar debt (0.127) during twin crises. On the contrary, column (5) shows that foreign exporters holding dollar debt (-0.068) do not behave differently than domestic exporters with dollar debt (0.053) or foreign exporters without dollar debt (-0.033) during currency crises. Notice that according to the F-test in column (5) the total effect from dollar debt or foreign ownership is not significant even during the crises years. Columns (2) and (6) show similar results when the exporting sample is defined according to whether the firm reported export revenue that accounted for more than 10% of sales during the three years prior to the crises.

Can these results be driven by foreigners being on a different trend? To shed some light on this possibility columns (3) and (7) add foreign-year effects. The results stay the same. A similar threat to a proper identification arises from the possibility that productive firms are bought out by foreigners during the crisis. So, we define foreign status as a dummy based on the ownership status of the firm three years prior to the crisis in columns (4) and (8). Clearly, the results are not sensitive to the way foreign and export status are defined. If insolvency through a worsening of the balance sheet was the dominant channel hindering investment we should observe no difference between foreign and domestic exporters that hold dollar debt and use their export income to offset the increase in debt burden (as results in columns (5)-(8) show). Clearly, foreign owned firms do not suffer an illiquidity problem during a twin crisis and do better than the domestic exporters, regardless of their insolvency issues.<sup>39</sup> The results are also economically significant. Assuming the mean level of short term dollar debt for both foreign and domestic exporters, foreigner exporters experience a 13 percentage point increase in investment, compared to none for the domestic exporter.<sup>40</sup> The domestic firms with the highest dollar debt experience a decrease in investment of 9 percentage points.

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<sup>39</sup>Another possibility is that foreign companies crowd out domestic companies when competing for the limited banking resources during twin crises. However, Antras, Desai and Foley (2009) present evidence that suggest foreign companies tend to borrow from their home country when local financial market conditions are weak in the country of operation.

<sup>40</sup>Recall that the continuous variables in the triple interaction terms are all demeaned.

## 5 Robustness and Threats to Identification

### 5.1 Robustness

We conduct a series of robustness checks for our main results obtained in column (4) of table 8 and present the results in table 9. First, although we have emphasized the role of hard currency denominated income as the main channel to avoid balance sheet mismatches, there are other factors that can contribute to improve firms' solvency. The potential negative effect of foreign denominated short-term liabilities on the firm balance sheet during crises could be mitigated if the firm holds a considerable amount of assets denominated in foreign currency. Column (1) shows that results are robust to controlling for dollar assets as a share of total assets during crises. Notice ideally we would like to control for the share of short term dollar assets denominated in foreign currency however, this will severely limit the sample. Thus, we control for cash holdings instead since the increase in debt service via the inflated dollar denominated debt would not translate into a balance sheet worsening if firms hold enough cash. Column (2) shows that firms holding higher cash to asset ratios invested less during the crises but our main results are not affected.

Columns (3) and (4) look at other measures of leverage. Although all the regressions control for the ratio of short term bank debt to total liabilities, column (3) adds the ratio of total liabilities to total assets and column (4) the ratio of long term bank debt to total liabilities, with no significant effect on our main results.

Another possible explanation for the better performance of foreign exporters with dollar debt relative to domestic exporters holding dollar debt is that foreign exporters had better access to export markets. As already mentioned we do not find many companies starting to export as a result of the devaluation (only 5% of the exporting observations at the time of the crises). However, it might be that foreign exporters have better connections or information about international markets and are better able to increase their sales abroad. If that was the case we should see an increase in the share of exports for foreign exporters at the time of the crisis.

We estimate the share of exports as a function of *foreign* and *foreign*  $\times$  *post* in the sample of high exporters and find no significant differences.<sup>41</sup> Similarly to Blalock, Gertler and Levine (2008) we also worry that due to contagion effects or instability in the area exporters in the crisis country do

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<sup>41</sup>

$$ExportShare_{i,c,j,t} = \beta_1 Foreign_{i,c,j,t} + \beta_2 Foreign_{i,c,j,t} \times Post_{c,t} + \phi_{j,t} + \varphi_{c,t} + \alpha_i + \xi_{i,c,j,t} \quad (5)$$

not face a *relative* improvement in their investment prospects if exporters in neighboring countries undergo a parallel depreciation (relevant for Argentina and Brazil (2002)) or if the instability in the area reduces the demand for imports from the crisis country. However, there is no reason to believe that foreign and domestic exporters serve different markets (we do not have data on the destination of exports).

Finally, results are based on the assumption that firms across countries freely choose the percentage of their short-term debt that is denominated in foreign currency. We do not want our results to be driven by differences across countries in dollar debt practices. As we explained in detail in the data section most of Brazilian companies foreign currency borrowing is obtained abroad (whether bond issuances or bank loans). Exporters can borrow from the BNDES in dollar though. In fact, table 5 shows that although lower than the Argentinean and Mexican levels, short-term dollar debt in Brazil represents on average 20% of short-term debt. Most importantly, most of the variation in short-term dollar debt takes place within the sample of exporters (i.e. non-exporting companies do not hold significant amounts of dollar debt) which is our sample of interest given that they are the ones faced with the investment opportunity. Table 5 shows that foreign and domestic exporters hold similar levels of short-term debt denominated in dollars. Although the median domestic exporter in Brazil holds lower levels of dollar debt than the foreign counterpart, so do Argentinean domestic exporters and it does not seem to be something specific to Brazil.

## 5.2 Threats to Identification

Given our differences-in-differences strategy we might have several threats to identification. Foreign exporters that choose to hold dollar denominated debt could be different from domestic exporters that chose to do so, irrespective of the depreciation, and these differences might be correlated with investment rates. In practice, most of the firm unobservable characteristics are time invariant and therefore, this concern should be lessened by the fixed effect estimation. As shown before our results are robust to controlling for foreign-year fixed effects to account for different trends between foreign and domestic companies. In addition, the triple interaction regression control for the term  $ShortDollarDebt \times Post$  which accounts for the different trends in investment between exporters holding dollar debt and those not holding dollar debt. Nevertheless, figure 5 shows the average investment rates for two types of firms: foreign exporters holding above median dollar debt and domestic exporters holding above median dollar debt in Mexico. Graphical inspection reveals that there are no major differences in trends between foreign and domestic firms holding high levels

short-term dollar debt prior to the depreciation episode in Mexico.

As argued before, in general we control for first order concerns regarding endogeneity through firm, country-year and sector-year effects. In addition, we include foreign-year fixed effects to control for differential trends between foreign and domestic exporters. Foreign-year effects will also account for the possibility that foreign firms might reduce their dollar liabilities or currency and maturity mismatches on their balance-sheets relatively more than domestic firms in anticipation of the crisis. It is also possible that both foreign and domestic firms reduce their liabilities in the anticipation. This can explain the no-difference result between them in the case of currency crisis. Thus, we show in Figure 6, that there was no systematic decrease in dollarization for foreign firms and domestic firms in the eve of crisis. Kamil (2009) also finds no significant change in firms' dollar debt holdings prior to the move to a flexible exchange rate regime.

Finally, a related issue is whether we can directly compare twin and currency crises. According to Kaminsky (2006) crises are the result of different factors that might question the suitability of comparing crises that were not originated from the same economic failure. Kaminsky (2006) identifies 6 different types of currency crises according to the way in which they were generated. Four of the categories are associated with domestic economic fragility, with vulnerabilities related to current account deterioration, fiscal imbalances, financial excesses, or foreign debt unsustainability. But crises can also be provoked by just adverse world market conditions, such as the reversal of international capital flows. The so-called sudden-stop phenomenon identifies the fifth variety of crises. As emphasized by the second generation models, crises also happen in economies with immaculate fundamentals. Thus, the last variety of crises is labeled self-fulfilling crises. She classifies both Brazil 1999 and Mexico 1995 as being the result of the same cause: financial excesses.

Table 10 repeats the main specification in table 9 by country and episode. Column (1) shows that foreign exporters holding dollar debt in Mexico are the ones increasing investment relative to domestic exporters with dollar debt (although the total effects are not significant in this case notice that we are dealing with a small sample size). Column (2) examines the case of Brazil 1999 and as expected there are no significant differences between domestic and foreign exporters holding dollar debt. In this case the F-tests are significant and it shows that dollar debt is again not an issue, both foreign and domestic exporters holding dollar debt increase investment. Therefore, comparing columns (1) and (2) we can say that results are robust to focusing of crises that share the same origin and are not driven by the different nature of the depreciation but rather by the existence of a banking crisis in the preceding year. For completeness column (3) shows the case of Brazil 2002 where as expected there are no differences across foreign and domestic exporters with dollar debt

and the total effects are not significant.

## 6 Conclusion

This paper provides systematic evidence on the key channel behind the contractionary nature of financial crises. The main reason why firms are constrained and hence investment and growth are hindered in the aftermath of a financial crisis is international and domestic illiquidity. By using a unique hand-collected data set for 1300 listed firms from six Latin American countries between 1990–2005, we disentangle the illiquidity channel from the insolvency channel. Our measure of liquidity is foreign ownership. We proxy insolvency by balance-sheet mismatch caused by short-term foreign currency debt conditional on leverage.

Our main result is that foreign owned exporters with dollar debt perform better than domestic exporters with dollar debt *only* during twin crises, where domestic firms access to finance is limited given the troubled banking sector. There is no difference in performance between these firms during currency crises. This implies that exporters match their short-term dollar debt with export revenue to avoid insolvency. During a twin crises, however, domestic exporters suffer from the problem of illiquidity and hence contract investment and production.

Our results have important policy implications. Short-term foreign currency borrowing may not be detrimental to firms' balance-sheets as long as their access to finance is not limited. Hence it is important to provide liquidity to the banking sector during financial crises especially if the domestic banking sector is the main source of financing for the firms.

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TABLE 1 — TIMING OF THE TWIN AND CURRENCY CRISES

Country	Currency Crisis	Banking Crisis	Post Dummy equals one in years:	Predetermined Variables based on information in years:
Argentina	January 2002	1995 2001	2002, 2003	1999, 2000, 2001
Brazil	January 1999 January 2002	1995	1999, 2000 2002, 2003	1996, 1997, 1998
Chile	-	-	-	any
Colombia	-	1998	-	1995, 1996, 1997
Mexico	December 1994	1994	1995, 1996	1992, 1993, 1994
Peru	-	-	-	any

Notes: 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 previous year. Using data on CPI, the real exchange rates were obtained as the deflated end-of period exchange rates. We identify four depreciation episodes in our sample: Argentina (2002), Mexico (1995), Brazil (1999) and Brazil (2002). Note that Mexico abandoned the peg in December 1994, Brazil in January 1999 and finally, Argentina in January 2002. In addition, following Reinhart and Rogoff (2008) we identify the following banking crises: Argentina (1995) and (2001), Brazil (1995), Mexico (1994) and Colombia (1998). “-” indicates that no crisis took place. To determine the predetermined exporter or foreign owned status we use information on these variables for the years shown in the last column.

TABLE 2 — PERCENTAGE OF OBSERVATIONS BY COUNTRY

	<u>Argentina</u>	<u>Brazil</u>	<u>Chile</u>	<u>Colombia</u>	<u>Mexico</u>	<u>Peru</u>	<u>Total</u>
<i>Foreign</i>	0.53	0.29	0.21	0.16	0.18	0.32	0.25
<i>Exporter</i>	0.57	0.48	0.40	0.53	0.68	0.84	0.56
<i>HighExporter</i>	0.29	0.34	0.18	0.31	0.36	0.34	0.30
<i>DumTotalDollarDebt</i>	0.98	0.86	0.66	0.60	0.90	1.00	0.81
<i>DumShortDollarDebt</i>	0.94	0.67	0.65	0.59	0.89	1.00	0.76
<i>DumDollarAssets</i>	0.88	0.21	0.57	0.44	0.95	0.99	0.59
Number of Observations	539	1292	1552	639	1634	519	6175

Notes: The number of observations and percentages refer to the sample of firms left after the cleaning procedure. Notice the number of observations does not coincide with the final number of observations in the estimation due to missing data. *Foreign* is a dummy that takes the value of one if foreigners own more than 50% of the company's capital. *Exporter* is a dummy that takes the value of one if the firm reports export revenue and zero otherwise. *HighExporter* is a dummy that takes the value of one if the firm reports export revenue greater than 10% of sales. *DumTotalDollarDebt* is a dummy that takes the value of one if the firm reports positive total dollar denominated liabilities. *DumShortDollarDebt* is a dummy that takes the value of one if the firm reports positive short-term dollar denominated liabilities. *DumDollarAssets* is a dummy that takes the value of one if the firm reports positive total dollar denominated assets.

TABLE 3 — SUMMARY STATISTICS

	Total Sample			Exporter Sample		
	Mean	sd	Obs	Mean	sd	Obs
<i>SalesGrowth</i>	0.01	0.33	5063	0.01	0.32	2988
<i>Investment</i>	0.001	0.07	5063	0.001	0.10	2988
<i>TotalAssets</i>	18.72	2.00	5063	19.00	1.79	2988
<i>ShortDollarDebt</i>	0.26	0.28	5063	0.35	0.29	2988
<i>ExportShare</i>	0.11	0.21	5063	0.17	0.24	2988
<i>HighExporter</i>	0.28	0.45	5063	0.42	0.49	2988
<i>Foreign</i>	0.15	0.36	5063	0.17	0.38	2988
<i>ShortBankDebt</i>	0.20	0.19	5063	0.22	0.20	2988
<i>BondAbroad</i>	0.02	0.14	5063	0.02	0.16	2988
<i>LoanAbroad</i>	0.05	0.21	5063	0.06	0.24	2988
<i>EquityAbroad</i>	0.02	0.15	5063	0.02	0.15	2988

Notes: Summary statistics refer to the final sample of firms used in the estimation. The exporter sample is based on a predetermined export dummy that equals one if the firm reported export revenue during the three years prior to the crises and zero otherwise (see table1 for a full definition). *SalesGrowth* is the change in log sales. *Investment* is physical stock of capital at time  $t$  minus physical stock of capital at time  $t - 1$  normalized by total assets. *TotalAssets* is the log of lagged total assets. *Foreign* is the percentage of capital owned by foreign investors (lagged). *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to short term debt (lagged). *ExportShare* is the ratio of export revenue to total sales (lagged). *HighExporter* is a dummy that takes value of one if the ratio of exports to sales is higher than 10% (based on lagged *ExportShare*). *ShortBankDebt* is the ratio of short-term bank debt to total liabilities (lagged). *BondAbroad* dummy that equals one if the firms issued bonds abroad (lagged). *LoanAbroad* dummy that equals one if the firms issued syndicated loans abroad (lagged). *EquityAbroad* dummy that equals one if the firms issued equity abroad (lagged).

TABLE 4 —DOLLAR DEBT BY FIRM TYPE: SUMMARY STATISTICS

	Exporter			Non-Exporter		
	<u>Mean</u>	<u>Median</u>	<u>Observations</u>	<u>Mean</u>	<u>Median</u>	<u>Observations</u>
Argentina	0.52	0.58	106	0.44	0.41	58
Brazil	0.28	0.24	331	0.13	0.02	458
Chile	0.28	0.21	936	0.07	0.00	608
Colombia	0.10	0.04	328	0.07	0.00	293
Mexico	0.44	0.43	974	0.24	0.15	644
Peru	0.53	0.54	313	0.52	0.55	14
Total	0.35	0.31	2988	0.15	0.02	2075

	Foreign			Domestic		
	<u>Mean</u>	<u>Median</u>	<u>Observations</u>	<u>Mean</u>	<u>Median</u>	<u>Observations</u>
Argentina	0.56	0.60	74	0.43	0.42	90
Brazil	0.17	0.08	105	0.19	0.11	684
Chile	0.17	0.04	362	0.21	0.07	1182
Colombia	0.09	0.08	37	0.09	0.01	584
Mexico	0.31	0.32	130	0.36	0.32	1488
Peru	0.48	0.46	109	0.56	0.57	218
Total	0.26	0.17	817	0.26	0.16	4246

	Foreign Exporter			Domestic Exporter		
	<u>Mean</u>	<u>Median</u>	<u>Observations</u>	<u>Mean</u>	<u>Median</u>	<u>Observations</u>
Argentina	0.58	0.61	47	0.47	0.52	59
Brazil	0.30	0.34	42	0.28	0.23	289
Chile	0.21	0.11	224	0.30	0.23	712
Colombia	0.09	0.08	37	0.10	0.03	291
Mexico	0.33	0.33	119	0.45	0.45	855
Peru	0.47	0.44	105	0.56	0.57	208
Total	0.31	0.27	574	0.35	0.31	2414

	Foreign High Exporter			Domestic High Exporter		
	<u>Mean</u>	<u>Median</u>	<u>Observations</u>	<u>Mean</u>	<u>Median</u>	<u>Observations</u>
Argentina	0.61	0.69	25	0.47	0.51	27
Brazil	0.35	0.41	19	0.29	0.25	238
Chile	0.21	0.11	62	0.40	0.37	352
Colombia	0.13	0.15	8	0.16	0.07	107
Mexico	0.33	0.31	42	0.55	0.58	445
Peru	0.53	0.54	46	0.65	0.70	108
Total	0.37	0.35	202	0.43	0.43	1277

Notes: *Exporter* is a dummy variable that takes the value of 1 if the firm reports any export revenue at any time during the three years prior to the crisis and 0 otherwise. *Foreign* is a dummy variable that takes the value of 1 if the firm is more than 50% owned at any time during the three years prior to the crisis and 0 otherwise. *HighExporter* is a dummy variable that takes the value of 1 if the firm reports export revenue higher than 10% of sales at any time during the three years prior to the crisis and 0 otherwise. See table 1 for a full year correspondence of variables defined based on predetermined values.

TABLE 5 — PERFORMANCE OF EXPORTERS DURING CRISES

	All Crises				Twin Crises	Currency Crises
	Sales Growth (1)	Investment (2)	Sales Growth (3)	Investment (4)	Investment (5)	Investment (6)
<i>ExportShare</i> × <i>Post</i>	0.222* (0.11)	-0.002 (0.03)	0.159 (0.10)	0.028 (0.02)	0.018 (0.03)	0.045** (0.02)
<i>ExportShare</i>	-0.043 (0.11)	-0.049** (0.02)	-0.035 (0.11)	-0.051** (0.02)	-0.046** (0.02)	-0.049** (0.02)
<i>ShortDollarDebt</i> × <i>Post</i>			0.129** (0.06)	-0.060** (0.03)	-0.084** (0.03)	-0.018 (0.04)
<i>ShortDollarDebt</i>			-0.006 (0.03)	-0.001 (0.01)	-0.004 (0.01)	-0.009 (0.01)
Observations	5063	5063	5063	5063	5063	5063
Firms	864	864	864	864	864	864
<u>F-test</u>						
<i>ExportShare</i>	0.135	0.012	0.253	0.014	0.025	0.009
<i>ShortDollarDebt</i>			0.056	0.036	0.000	0.552
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

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. *Post* is a dummy variable that takes the value of one in the year of the depreciation and one year after. Columns (1) to (4) refer to all crises so that the starting depreciation year is 2002 for Argentina and Brazil, 1999 for Brazil and 1995 for Mexico. Column (5) refers to twin crises so that the starting depreciation year is 2002 for Argentina and 1995 for Mexico. Finally column (6) refers to currency crises and the starting depreciation year is 1999 and 2002 in Brazil. *ExportShare* is the ratio of export revenue to sales and it is lagged one period. *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to total short-term liabilities and it is lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

TABLE 6 — THE RELATION BETWEEN EXPORTS AND DOLLAR LIABILITIES DURING CRISES  
DEPENDENT VARIABLE: INVESTMENT

	Twin Crises		Currency Crises	
	(1)	(2)	(3)	(4)
<i>ShortDollarDebt</i> × <i>Exporter</i> × <i>Post</i>	-0.110*** (0.03)	-0.111** (0.03)	0.134* (0.08)	0.134* (0.08)
<i>ShortDollarDebt</i> × <i>Exporter</i>	-0.010 (0.02)	-0.010 (0.02)	-0.023 (0.02)	-0.023 (0.02)
<i>Exporter</i> × <i>Post</i>	-0.038** (0.02)	-0.038** (0.02)	0.043** (0.02)	0.042** (0.02)
<i>ShortDollarDebt</i> × <i>Post</i>	-0.042* (0.02)	-0.035* (0.02)	-0.063 (0.05)	-0.061 (0.05)
<i>Exporter</i>	-0.019** (0.01)	-0.018** (0.01)	-0.024** (0.01)	-0.024** (0.01)
<i>ShortDollarDebt</i>	-0.003 (0.01)	-0.001 (0.01)	-0.002 (0.01)	0.001 (0.01)
<i>ShortBankDebt</i>		-0.016 (0.01)		-0.017* (0.01)
<i>BondAbroad</i>		0.048* (0.02)		0.050* (0.03)
<i>InternationalLoan</i>		0.000 (0.01)		-0.000 (0.01)
<i>Equity</i>		-0.011 (0.01)		-0.012 (0.01)
Observations	5063	5063	5063	5063
Firms	864	864	864	864
Firm Fixed-Effects	yes	yes	yes	yes
Sector*year	yes	yes	yes	yes
Country*year	yes	yes	yes	yes
<u>F-test</u>				
<i>ShortDollarDebt</i>	0.000	0.000	0.404	0.450
<i>Exporter</i>	0.000	0.001	0.014	0.018
<i>ShortDollarDebt</i> × <i>Post</i>	0.002	0.003	0.242	0.239
<i>Exporter</i> × <i>Post</i>	0.001	0.004	0.086	0.087

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. In columns (1) and (2) *Post* is a dummy variable that takes the value of one in the year of the twin crisis and one year after, the starting years are Argentina (2002) and Mexico (1995). In columns (3) and (4) *Post* is a dummy that takes the value of one in the year of the currency crisis and one year after, the starting years are Brazil (1999) and (2002). *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to total short-term liabilities. *Exporter* is a dummy variable that takes the value of one if the company's export share is more than 10 percent and zero otherwise. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes the value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes the value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes the value of one in the year the firm issues equity abroad. All variables are lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

TABLE 7 — PERFORMANCE OF FOREIGNERS DURING CRISES  
DEPENDENT VARIABLE: INVESTMENT

<u>Crisis</u>	<u>All Crises</u>	<u>Twin Crises</u>			<u>Currency Crises</u>		
	<u>All</u>	<u>All</u>	<u>Exporter</u>	<u>Exporter</u>	<u>All</u>	<u>Exporter</u>	<u>Exporter</u>
<u>Sample</u>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Foreign × Post</i>	0.036*** (0.01)	0.042*** (0.01)	0.047** (0.02)	0.053** (0.02)	0.031** (0.02)	0.020 (0.02)	-0.003 (0.02)
<i>Foreign</i>	-0.005 (0.01)	-0.000 (0.01)	0.006 (0.01)		-0.003 (0.01)	0.007 (0.01)	
<i>ShortBankDebt</i>	-0.021** (0.01)	-0.020** (0.01)	-0.031** (0.01)	-0.032** (0.01)	-0.021** (0.01)	-0.031** (0.01)	-0.030** (0.01)
<i>BondAbroad</i>				0.058* (0.03)			0.058* (0.03)
<i>InternationalLoan</i>				0.004 (0.01)			0.004 (0.01)
<i>Equity</i>				-0.010 (0.01)			-0.011 (0.01)
Observations	5063	5063	2988	2988	5063	2988	2988
Firms	864	864	457	457	864	457	457
<u>F-test</u>							
<i>Foreign</i>	0.002	0.002	0.004	.	0.127	0.265	.
Year Fixed-Effects	yes	yes	yes	yes	yes	yes	yes
Firm Fixed-Effects	yes	yes	yes	yes	yes	yes	yes
Sector*year	yes	yes	yes	yes	yes	yes	yes
Country*year	yes	yes	yes	yes	yes	yes	yes

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. *Post* is a dummy variable that takes the value of one in the year of the depreciation and one year after. Column (1) refers to all crises so that the starting depreciation year is 2002 for Argentina and Brazil, 1999 for Brazil and 1995 for Mexico. Columns (2) to (4) refer to twin crises so that the starting depreciation year is 2002 for Argentina and 1995 for Mexico. Finally, columns (5) to (7) refer to currency crises and the starting depreciation year is 1999 and 2002 in Brazil. Columns (3), (4), (6), and (7) report results for the sample of exporters where *Exporter* is a dummy variable that takes the value of 1 if the firm reports export revenue at any time during the three years prior to the crisis and 0 otherwise. In columns (1) to (3) and (5) and (6), *Foreign* is a dummy variable that takes the value of 1 if foreign investors own more than 50% of the company and zero otherwise, and it is lagged one period. In columns (4) and (7) *Foreign* is a dummy variable that takes the value of 1 if the firm is more than 50% owned at any time during the three years prior to the crisis and 0 otherwise. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes the value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes the value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes the value of one in the year the firm issues equity abroad. All variables are lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

TABLE 8 — THE DIFFERENTIAL RESPONSE OF FOREIGNERS HOLDING DOLLAR DEBT DURING CRISES:  
DEPENDENT VARIABLE: INVESTMENT  
SUBSAMPLE OF EXPORTERS

Crisis	Twin Crises				Currency Crises			
	Lagged	Predetermined			Lagged	Predetermined		
		(1)	(2)	(3)		(4)	(5)	(6)
<i>ShortDollarDebt</i> × <i>Foreign</i> × <i>Post</i>	0.211** (0.07)	0.302** (0.11)	0.312*** (0.09)	0.204** (0.06)	-0.068 (0.07)	0.021 (0.10)	0.007 (0.10)	-0.087 (0.09)
<i>ShortDollarDebt</i> × <i>Foreign</i>	0.017 (0.03)	0.023 (0.03)	0.031 (0.03)	0.018 (0.03)	0.034 (0.03)	0.030 (0.03)	0.037 (0.03)	0.026 (0.03)
<i>Foreign</i> × <i>Post</i>	0.127* (0.07)	0.147* (0.08)	0.117* (0.06)	0.038 (0.04)	-0.033 (0.03)	0.021 (0.05)	0.020 (0.05)	-0.023 (0.04)
<i>ShortDollarDebt</i> × <i>Post</i>	-0.150** (0.06)	-0.221*** (0.05)	-0.221*** (0.05)	-0.213*** (0.05)	0.053 (0.07)	0.061 (0.07)	0.060 (0.07)	0.068 (0.07)
<i>Foreign</i>	0.012 (0.02)	0.000 (0.02)	0.031 (0.03)	.	0.016 (0.02)	-0.002 (0.02)	0.023 (0.03)	.
<i>ShortDollarDebt</i>	-0.013 (0.02)	0.006 (0.02)	0.006 (0.03)	0.007 (0.03)	-0.025 (0.02)	-0.006 (0.02)	-0.006 (0.02)	-0.004 (0.02)
<i>ShortBankDebt</i>	-0.023 (0.02)	-0.037** (0.01)	-0.039** (0.01)	-0.037** (0.01)	-0.021 (0.02)	-0.036** (0.01)	-0.039** (0.01)	-0.038** (0.01)
<i>BondAbroad</i>	0.029* (0.02)	0.027 (0.02)	0.023 (0.02)	0.022 (0.02)	0.033** (0.02)	0.031 (0.02)	0.028 (0.02)	0.027 (0.02)
<i>InternationalLoan</i>	0.000 (0.01)	0.012 (0.02)	0.011 (0.02)	0.011 (0.02)	0.001 (0.01)	0.012 (0.02)	0.011 (0.02)	0.011 (0.02)
<i>Equity</i>	0.002 (0.02)	-0.005 (0.01)	-0.005 (0.01)	-0.005 (0.01)	-0.001 (0.01)	-0.009 (0.01)	-0.008 (0.01)	-0.009 (0.01)
Observations	1394	1479	1479	1479	1394	1479	1479	1479
Firms	305	227	227	227	305	227	227	227
Firm Fixed-Effects	yes	yes	yes	yes	yes	yes	yes	yes
Sector*year	yes	yes	yes	yes	yes	yes	yes	yes
Country*year	yes	yes	yes	yes	yes	yes	yes	yes
Foreign*year	no	no	yes	yes	no	no	yes	yes
<b>F-test</b>								
<i>ShortDollarDebt</i>	0.039	0.000	0.000	0.000	0.703	0.524	0.525	0.791
<i>Foreign</i>	0.006	0.000	0.000	0.004	0.731	0.703	0.761	0.679
<i>ShortDollarDebt</i> × <i>Post</i>	0.014	0.000	0.000	0.000	0.630	0.513	0.582	0.546
<i>Foreign</i> × <i>Post</i>	0.007	0.001	0.000	0.002	0.524	0.822	0.711	0.532

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. In columns (1) to (4) *Post* is a dummy variable that takes the value of one in the year of the twin crisis and one year after, so that the starting depreciation year is 2002 for Argentina and 1995 for Mexico. Columns (5) to (8) refer to currency crises and the starting depreciation year is 1999 and 2002 in Brazil. In columns (1) and (5) the subsample of exporters refers to those firms with export to sales ratios greater than 10 percent lagged one period. In columns (2), (3), (4), (6), (7) and (8) the subsample of exporters is based on whether the firm reported export revenue greater than 10% of sales at any time during the three years prior to the crisis. *Foreign* is a dummy variable that takes the value of one if foreign investors own more than 49 percent of the company and zero otherwise and it is lagged one period except in columns (4) and (8) where *foreign* is a dummy variable that takes the value of one if foreign investors own more than 49 percent of the company at any time in the three years prior to the crisis. *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to total short-term liabilities. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes the value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes the value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes the value of one in the year the firm issues equity abroad. All variables are lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.



TABLE 9 — ROBUSTNESS DURING TWIN CRISES  
DEPENDENT VARIABLE: INVESTMENT  
SUBSAMPLE OF EXPORTERS

	(1)	(2)	(3)	(4)
<i>ShortDollarDebt</i> × <i>Foreign</i> × <i>Post</i>	0.252** (0.11)	0.202** (0.07)	0.158** (0.07)	0.205** (0.07)
<i>ShortDollarDebt</i> × <i>Foreign</i>	0.033 (0.04)	0.024 (0.03)	0.026 (0.03)	0.030 (0.04)
<i>Foreign</i> × <i>Post</i>	0.034 (0.05)	0.034 (0.04)	0.017 (0.04)	0.045 (0.04)
<i>ShortDollarDebt</i> × <i>Post</i>	-0.329*** (0.09)	-0.191*** (0.05)	-0.241*** (0.06)	-0.217*** (0.05)
<i>Foreign</i>	.	.	.	.
<i>ShortDollarDebt</i>	0.010 (0.03)	0.000 (0.03)	0.012 (0.03)	0.008 (0.03)
<i>DollarAssets</i>	-0.013 (0.04)			
<i>DollarAssets</i> × <i>Post</i>	-0.024 (0.21)			
<i>Cash</i>		0.236*** (0.04)		
<i>Cash</i> × <i>Post</i>		-0.492* (0.27)		
<i>Leverage</i>			-0.018** (0.01)	
<i>Leverage</i> × <i>Post</i>			0.046 (0.04)	
<i>LongBankDebt</i>				-0.055** (0.02)
<i>ShortBankDebt</i>	-0.048** (0.02)	-0.036** (0.01)	-0.034** (0.01)	-0.049** (0.02)
<i>BondAbroad</i>	0.000 (0.02)	0.008 (0.01)	0.024 (0.02)	0.019 (0.02)
<i>InternationalLoan</i>	0.018 (0.02)	0.007 (0.02)	0.010 (0.02)	0.015 (0.02)
<i>Equity</i>	-0.003 (0.02)	-0.013 (0.02)	-0.004 (0.01)	-0.005 (0.02)
Observations	1217	1444	1479	1426
Firms	205	224	227	225
Firm Fixed-Effects	yes	yes	yes	yes
Sector*year	yes	yes	yes	yes
Country*year	yes	yes	yes	yes
Foreign*year	yes	yes	yes	yes
F-test				
<i>ShortDollarDebt</i>	0.005	0.000	0.000	0.000
<i>ShortDollarDebt</i> × <i>Post</i>	0.002	0.001	0.000	0.000
<i>Foreign</i> × <i>Post</i>	0.006	0.011	0.068	0.012
<i>NewControl</i> × <i>Post</i>	0.935	0.000	0.041	

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. In columns (1) to (4) *Post* is a dummy variable that takes the value of one in the year of the twin crisis and one year after in Argentina (2002) and Mexico (1995). The subsample of exporters is based on predetermined values and it refers to those firms with export to sales ratios greater than 10 percent at any time during the three years prior to the crisis. *Foreign* is similarly defined in terms of predetermined values and takes the value of one if foreign investors own more than 49 percent of the company at any time during the three years prior to the crisis and zero otherwise. All specifications control for foreign\*year trends. *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to total short-term liabilities. *DollarAssets* is the ratio of dollar assets to total assets. *Foreign* is a dummy that takes the value of one if foreign investors own more than 49 percent of the company at any time in the three years prior to the crisis. *Cash* is the ratio of cash holdings to total assets. *Leverage* is the log of the ratio of total liabilities to total assets. *LongBankDebt* is the ratio of long term debt from banks to total liabilities. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes the value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes the value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes the value of one in the year the firm issues equity abroad. All variables are lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

TABLE 10 — THE DIFFERENTIAL RESPONSE OF FOREIGNERS HOLDING DOLLAR DEBT DURING CRISES: BY COUNTRY  
DEPENDENT VARIABLE: INVESTMENT  
SUBSAMPLE OF EXPORTERS

	<u>Mexico1995</u> (1)	<u>Brazil 1999</u> (2)	<u>Brazil 2002</u> (3)
<i>ShortDollarDebt</i> × <i>Foreign</i> × <i>Post</i>	0.275** (0.11)	0.181 (0.19)	-0.061 (0.09)
<i>ShortDollarDebt</i> × <i>Foreign</i>	-0.027 (0.07)	0.073 (0.07)	0.129 (0.12)
<i>Foreign</i> × <i>Post</i>	0.189* (0.10)	0.036 (0.08)	-0.004 (0.05)
<i>ShortDollarDebt</i> × <i>Post</i>	-0.133 (0.08)	0.135 (0.08)	-0.066 (0.07)
<i>Foreign</i>	-0.011 (0.04)	0.018 (0.04)	0.023 (0.05)
<i>ShortDollarDebt</i>	-0.045 (0.04)	-0.036 (0.06)	0.007 (0.06)
<i>ShortBankDebt</i>	0.003 (0.04)	-0.080 (0.06)	-0.056 (0.06)
<i>BondAbroad</i>	0.047** (0.02)	-0.043 (0.06)	-0.075 (0.06)
<i>LoanAbroad</i>	-0.022 (0.01)	0.053 (0.05)	0.052 (0.05)
<i>EquityAbroad</i>	-0.005 (0.02)	0.035 (0.03)	0.039 (0.02)
Observations	551	241	241
Firms	115	62	62
Firm Fixed-Effects	yes	yes	yes
Sector*year	yes	yes	yes
year	yes	yes	yes
<u>F-test</u>			
<i>ShortDollarDebt</i>	0.063	0.010	0.583
<i>Foreign</i>	0.110	0.003	0.579
<i>ShortDollarDebt</i> × <i>Post</i>	0.075	0.079	0.364
<i>Foreign</i> × <i>Post</i>	0.050	0.046	0.718

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. In column (1) *Post* is a dummy variable that takes the value of one in the year of the twin crisis in Mexico (1995) and one year after. In column (2) *Post* is a dummy that takes the value of one in the year of the 1999 currency crisis and one year after in Brazil. In column (3) *Post* is a dummy that takes the value of one in 2002 and one year after corresponding to the currency crisis in Brazil. The subsample of exporters refers to those firms with export to sales ratios greater than 10 percent in the previous year and foreign is a dummy variable that takes the value of one if foreign investors own more than 49 percent of the company and zero otherwise and it is lagged one period. *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to total short-term liabilities. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes the value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes the value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes the value of one in the year the firm issues equity abroad. All variables are lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

TABLE A1—BASIC CORRELATION

Panel A: Total Sample											
	Sales	Assets	Investment	DollarDebt	ExportShare	Exporter	Foreign	BankDebt	Bond	Loan	Equity
Sales Growth	1										
Total Assets	0.0432*	1									
Investment	0.2130*	0.0005	1								
ShortDollarDebt	0.0201	0.2736*	-0.0128	1							
ExportShare	0.0101	0.1150*	-0.0651*	0.3902*	1						
HighExporter	0.0014	0.1554*	-0.0887*	0.3768*	0.7814*	1					
Foreign	0.0166	0.1346*	0.0068	0.0195	-0.0316*	-0.0264	1				
ShortBankDebt	-0.025	-0.0617*	-0.0318*	0.2960*	0.2103*	0.1965*	-0.0601*	1			
BondAbroad	0.0206	0.2026*	0.0776*	0.0909*	0.0112	0.0333*	0.0393*	-0.05569*	1		
LoanAbroad	0.0191	0.3066*	0.0083	0.1626*	0.0426*	0.0511*	0.0617*	-0.0438*	0.2656*	1	
EquityAbroad	0.0253	0.1721*	0.021	0.0576*	0.0158	0.0049	0.0027	-0.0340*	0.1358*	0.1130*	1

Panel B: Exporter Sample											
	Sales	Assets	Investment	DollarDebt	ExportShare	Exporter	Foreign	BankDebt	Bond	Loan	Equity
Sales Growth	1										
Total Assets	0.0377*	1									
Investment	0.2101*	-0.0086	1								
ShortDollarDebt	0.0267	0.2178*	0.0043	1							
ExportShare	0.0213	0.0232	-0.0465*	0.2850*	1						
HighExporter	0.0076	0.0703*	-0.0787*	0.2269*	0.7008*	1					
Foreign	-0.0101	0.0225	0.0035	-0.0502*	-0.0703*	-0.0703*	1				
ShortBankDebt	-0.0374	-0.1514*	-0.0418*	0.2877*	0.1952*	0.1616*	-0.0857*	1			
BondAbroad	0.0295	0.2358*	0.1017*	0.0776*	-0.0151	0.011	0.0046	-0.0832*	1		
LoanAbroad	0.0242	0.3640*	0.0177	0.1344*	0.0118	0.0171	0.0067	-0.0825*	0.2907*	1	
EquityAbroad	0.0259	0.2023*	0.0205	0.0328	0.0016	-0.0184	-0.0204	-0.0682*	0.0984*	0.1247*	1

Notes: Sales Growth is the change in log sales. Investment is physical stock of capital at time  $t$  minus physical stock of capital at time  $t - 1$  normalized by total assets. *TotalAssets* is the log of lagged total assets. *Foreign* is the percentage of capital owned by foreign investors (lagged). *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to short term debt (lagged). *ExportShare* is the ratio of export revenue to total sales (lagged). *HighExporter* is a dummy that takes value of one if the ratio of exports to sales is higher than 10% (based on lagged *ExportShare*). *Exporters* refers to those firms whose export to sales ratio is greater than 0 (based on lagged exports). *ShortBankDebt* is the ratio of short-term bank debt to total liabilities (lagged). *BondAbroad* dummy that equals one if the firms issued bond abroad (lagged). *LoanAbroad* dummy that equals one if the firms issued loans abroad (lagged). *EquityAbroad* dummy that equals one if the firms issued equity abroad (lagged). *DollarAssets* is the ratio of total dollar assets to total assets (lagged).

TABLE A2 — PERFORMANCE OF EXPORTERS DURING CRISES

	All Crises				Twin Crises	Currency Crises
	Sales Growth (1)	Investment (2)	Sales Growth (3)	Investment (4)	Investment (5)	Investment (6)
<i>Exporter</i> × <i>Post</i>	0.099** (0.03)	-0.002 (0.01)	0.080** (0.03)	0.005 (0.01)	-0.011 (0.01)	0.024** (0.01)
<i>ShortDollarDebt</i> × <i>Post</i>			0.146** (0.07)	-0.055** (0.03)	-0.076** (0.03)	-0.013 (0.04)
<i>ShortDollarDebt</i>			-0.012 (0.03)	-0.004 (0.01)	-0.007 (0.01)	-0.012 (0.01)
Observations	5063	5063	5063	5063	5063	5063
Firms	864	864	864	864	864	864
<u>F-test</u>						
<i>ShortDollarDebt</i>			0.065	0.040	0.001	0.395
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

Notes: Standard errors corrected for clustering at the country-year level are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. Notice *Investment* is normalized by total assets. *Post* is a dummy variable that takes the value of one in the year of the depreciation and one year after. Columns (1) to (4) refer to all crises so that the starting depreciation year is 2002 for Argentina and Brazil, 1999 for Brazil and 1995 for Mexico. Column (5) refers to twin crises so that the starting depreciation year is 2002 for Argentina and 1995 for Mexico. Finally column (6) refers to currency crises and the starting depreciation year is 1999 and 2002 in Brazil. *Exporter* is a dummy variable that takes the value of 1 if the firm reports export revenue at any time during the three years prior to the crisis and 0 otherwise. In the case of countries with no currency or banking crisis the exporter dummy equals one if the firm exported at any time during the period of observation (see table 1 for a full definition). *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to total short-term liabilities and it is lagged one period. The F-test reports the corresponding p-values associated to the joint significance of the coefficients associated with each variable of interest. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively.

Figure 1: Domestic Credit to GDP

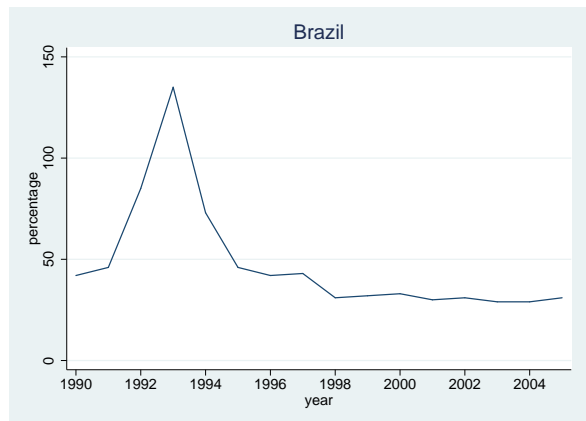
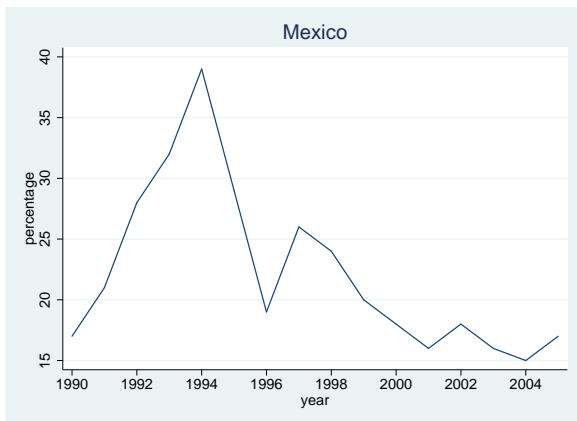
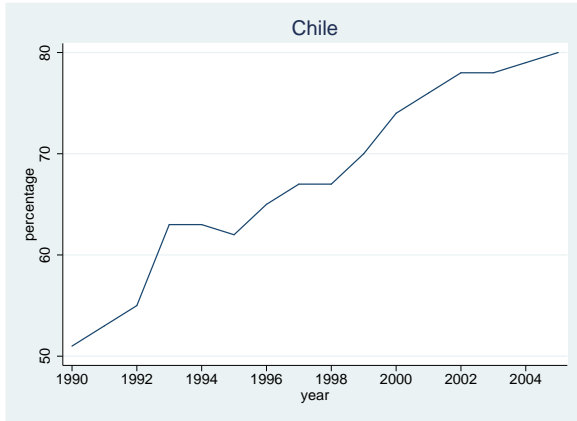


Figure 2: Foreign Ownership Over Time

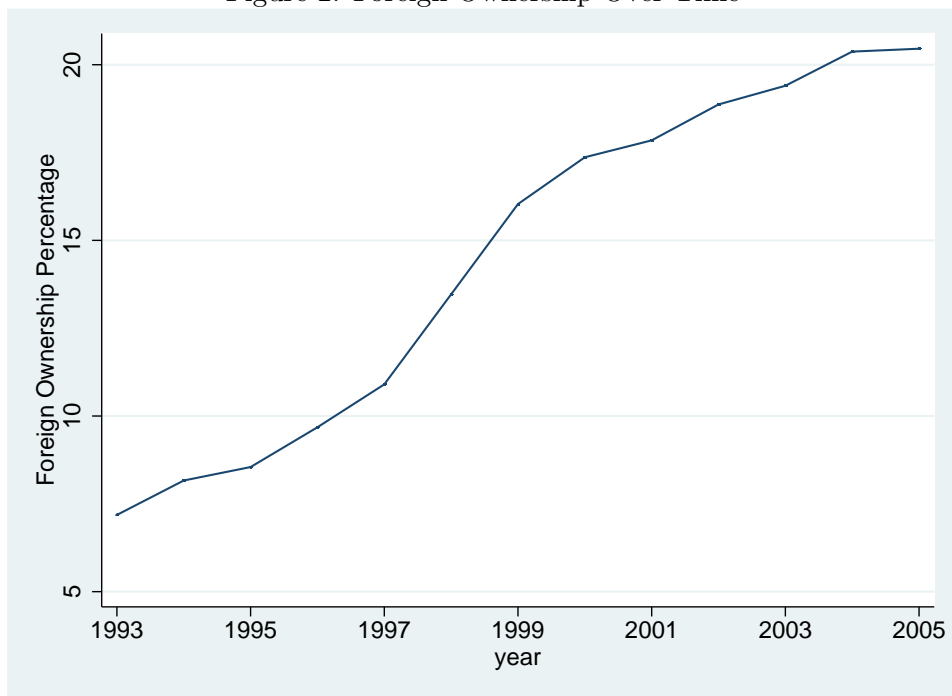


Figure 3: Cross-sectional Distribution of Foreign Ownership

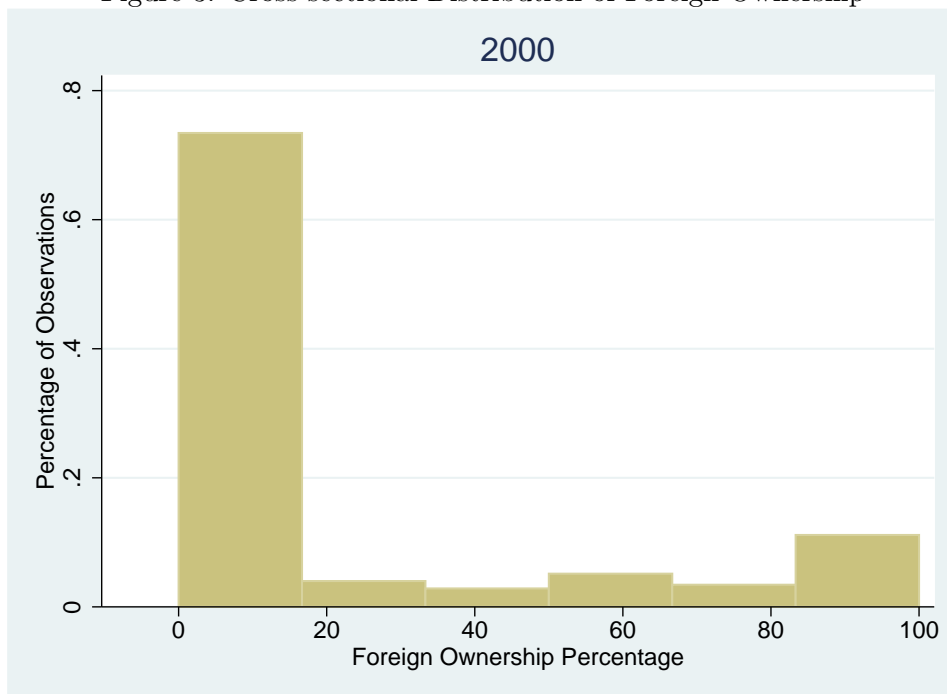


Figure 4: Cross-sectional Distribution of Foreign Ownership among foreign firms

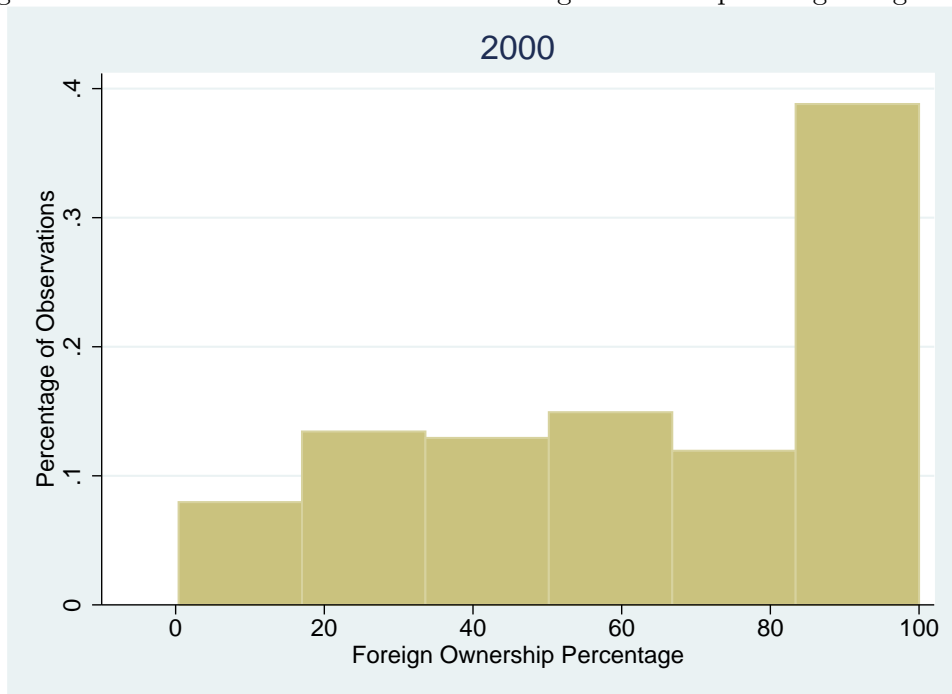




Figure 5: Trends in Investment according to Foreign Currency Denominated Debt

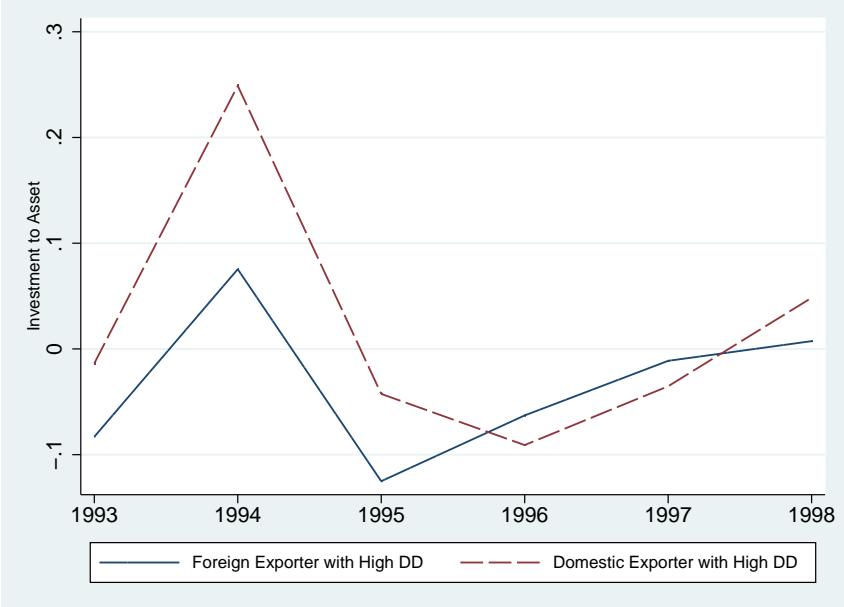


Figure 6: Short Dollar Debt over Time

