WHAT HINDERS INVESTMENT IN THE AFTERMATH OF FINANCIAL CRISES:
INSOLVENT FIRMS OR ILLIQUID BANKS?

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ABSTRACT

We provide evidence on the real effects of credit supply shocks. By utilizing a new firm-level database from six Latin American countries between 1990 to 2005 and using a differences-indifferences methodology, we empirically test whether bank credit supply shocks affect exporters' investment holding their creditworthiness constant. We compare investment undertaken by domestic exporters to that of foreign-owned exporters, where the latter's exposure to the liquidity shock in the domestic banking sector is lower. Conditional on changes in firms' exposure to short term foreign currency debt, we find that foreign-owned exporters increase investment by 15 percentage points relative to domestic exporters in the aftermath of steep devaluations. This result only holds when the currency crisis occurs simultaneously with a banking crisis, implying that the key factor hindering investment and growth in the aftermath of financial crises is the decline in the supply of credit.

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1　Introduction

How do financial crises turn into real recessions? There are two leading views. The first view highlights the importance of a troubled banking sector that cuts lending in the face of a negative liquidity shock (bank lending channel). As argued by Bernanke (1983) if firms cannot smooth out the liquidity shortage from their banks, this can have large contractionary real effects. Chang and Velasco (2001) develop a model for a typical emerging market crisis, where deteriorating access to liquidity is at the center of the problem, hindering investment and growth. During the 2007–2009 global crisis central banks around the world spent hundreds of billions of dollars to rescue their banking systems in fear of such shortages in lending.

The second view stresses the relevance of firms' weak balance sheets and the associated decline in their net worth (balance sheet channel).[1] Bernanke and Gertler (1989) show that shocks that affect net worth can amplify fluctuations. Business downturns deteriorate firms' net worth, which increase the cost of borrowing and decrease investment even further (the so-called accelerator effect). The deterioration of firms' net worth can be the result of a "maturity mismatch" and/or a "currency mismatch" in firms' balance sheets. Maturity mismatch refers to the practice of financing relatively illiquid long-term assets with short-term debt (e.g. Bernanke, Gertler, and Gilchrist (1996)). Currency mismatch results from the practice of denominating assets and liabilities in different currencies and hence exposing the firm to exchange rate fluctuations. Cespedes, Chang and Velasco (2004) propose a model in which insolvent firms with weak balance sheets cannot borrow and contract production during depreciations.[2] Given the possibility of such balance sheet effects, central banks have been reluctant to let currencies devalue in response to external shocks, as shown by Calvo and Reinhart (2002).

In order to be able to link financial crises to real outcomes, we have to know the relative importance of these financial constraints. Is it the case that firms cannot borrow due to insolvency or is it the case that banks cannot extend credit given the credit crunch? Both of these channels may cause firms to decrease investment and hinder growth. Our contribution in this paper is twofold. First and foremost, we provide systematic evidence on how financial crises turn into recessions by disentangling these two main sources of financing constraints, bank illiquidity versus firm insolvency. Second, we provide first-time evidence on substantial real effects of bank credit

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[1]Note that the literature also refers to this as the collateral channel since a negative (positive) shock to firms' collateral (which is part of the balance sheet) causes firms' borrowing capacity and net worth to go down (up). See Holmstorm and Tirole (1997).

[2]See also Krugman (1999) and Eichengreen and Hausman (1999).

supply shocks, namely on firm-level investment. Although, there is an extensive empirical literature on the bank lending channel that tests the link between shocks to bank capital and the decline in credit provision for firms, this literature has so far been unsuccessful in providing evidence on the effects of such shocks on real outcomes.[3]

The main challenge to identification comes from the necessity of separating the demand for credit by firms from the supply of credit by banks while conditioning on changes in firms' creditworthiness as a result of shocks to their balance sheet. To do so, we utilize the experience of six Latin American countries that went through a range of crises during 1990–2005. We rest our identification on the fact that different types of crises—currency versus banking—affect the supply and demand of credit differentially. During a currency crisis and a twin crisis (which involves both currency and banking crises) demand for credit by exporters will be relatively higher given the depreciated currency, while supply of credit will be relatively lower under a twin crisis. Hence, we assume the demand for credit on the part of exporters goes up under both type of crises while the supply of credit goes down relatively more under twin crises. The key is to compare the investment undertaken by exporters under currency crises episodes, where there is a positive demand shock, with the investment of exporters under a twin crisis. In the latter case, the profit opportunity is still there but there is also an economy wide credit shortage as a result of the negative supply shock to domestic banks. In these twin crisis episodes, prior to the currency crash the banking system collapses, as shown by Kaminsky and Reinhart (1999) and Reinhart and Rogoff (2010).

We identify from *within* firm changes and therefore we must control for changes in firms' creditworthiness to disentangle the financing constraints. Since both types of crises involve a depreciation of the domestic currency in excess of 25 percent, the creditworthiness of exporters with foreign currency denominated debt is at stake under both type of crises. Conditioning on the changes in creditworthiness through holdings of foreign currency debt, we exploit the degree of foreign ownership of the firm, as a proxy for firm-level liquidity. This strategy allows us to investigate the differential response of foreign-owned versus domestic exporters to a positive demand shock—conditioning on their holdings of foreign currency debt—under currency and twin crises, where only the latter involves a big negative supply shock to the local banking sector.[4]

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[3]Most of this literature has not focused on real activity. An early exception is the work by Peek and Rosengren (2000), who investigated using state level data from the U.S., changes in real estate activity in states with large presence of Japanese banks after the Japan banking crisis. Two recent exceptions are the work by Paravisini, Rappoport, Schnabl, and Wolfenzon (2011), and the work by Amiti and Weinstein (2011). Both papers focus solely on exports, showing a negative effect of bank supply shocks on exports. See section 2 for a detailed review.

[4]In a recent paper Jimenez, Ongena, Peydro-Alcalde and Saurina (2011) propose an alternative strategy to identify

We study four episodes of currency crises (Mexico 1995, Argentina 2002, Brazil 1999 and 2002). Two of these episodes were twin crises since they were combined with a banking crisis (Mexico 1994, Argentina 2001). In order to have firm-level measures of insolvency and liquidity over time, 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 1,300 listed firms, we observe time-varying measures of the currency denomination and maturity structure of both debt and assets, firm's export revenue, and foreign ownership stakes. To our knowledge, the data is unique in an emerging market setting as it contains cross-country, time-varying information on the currency and maturity composition of firms' balance sheets, the breakdown of sales into domestic and export revenues, and a precise measure of foreign ownership.

We define a potentially insolvent firm as one with high leverage and holdings of *short-term* foreign currency denominated debt that are not matched by a dollar denominated stream of income like dollar assets and/or export revenue. This is based on Allen et al. (2002), who argue that maturity and currency mismatch interact to determine firm's solvency risk. These firms are obviously more likely to experience a decline in net worth in the face of a currency crisis. We measure the liquidity shock, first, at the country-level, by focusing on twin crisis episodes that are characterized by a general dry up of credit in the year prior to the currency crisis for *all* firms. Second, we use different firm-level measures that proxy the relative ease of access to finance, such as bond and stock issuance abroad, and also direct foreign investment into the firm. Given that during crises times markets shy away from emerging countries the former may not be the best measures of access to finance during such times, as argued by Reinhart and Reinhart (2010). Instead, we argue that foreign ownership that captures direct and portfolio equity investment by foreigners is a better measure of access to finance during financial crises and use it throughout the analysis as our preferred firm-level measure of access to liquidity. The reason is that foreign-owned firms are likely to have better access to international markets during crises in the absence of well functioning domestic banks. Foreign affiliates also have the possibility of drawing funds from the parent

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the effect of negative supply shocks to banks on domestic credit provision based on matched bank-firm level data. They provide evidence that the bank lending channel is stronger if one accounts for unobserved time-varying firm heterogeneity. Their estimation strategy that uses firm-year fixed effects prevents studying the effects of shocks to banks on firm-level real outcomes.

company through internal capital-market lending.[5]

The differences-in-differences identification strategy allows us to investigate the following hypothesis. If the illiquidity channel is the main source of financial constraints, foreign-owned exporters should perform better compared to domestic exporters during twin crises but not during currency crises, conditional on short-term foreign currency denominated debt and leverage. The reason is that only the former is associated with an illiquidity problem that does not affect foreign firms (or would affect them relatively less than domestic firms). Notice in this case we are holding the balance sheet channel constant, by comparing exporters holding short-term dollar debt that only differ in ownership status. In other words, given two firms with the same level of short-term dollar debt and exports, only the foreign-owned firm would increase investment during twin crises. We account for unobserved firm-level heterogeneity via firm fixed effects. Hence we solely identify from *within* firm changes. Use of sector-year fixed effects accounts for all macro and industry supply and demand shocks that are common to all exporters in an industry. 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. For example, if the shock is common to all our countries (or to the world) then it will be absorbed by our time effects. The country-year effects will also allow us to account for the different nature of each crisis, valuation effects and the prior country-level trends.

Although the direction of causality between banking and currency crises is debated in the literature (see Kaminsky and Reinhart (1999), for example) for our purposes this is not relevant given our differences-in-differences methodology that identifies from relative changes in firm-level outcomes. In the twin crisis episodes that we consider the banking crises were not the result of firm bankruptcies as in some other countries and they predated the currency crises. Nevertheless in order to avoid any concerns about anticipating the *currency* crisis we conduct most of our analysis based on predetermined variables that characterized firms according to their economic outcomes three years prior to the first crisis in each country.

A key advantage of our estimation strategy is that it allows to quantify the extra investment undertaken by firms with access to liquidity as well as the decline in investment as a result of a balance sheet weakness. Our main results are summarized as follows. Conditional on exposure to short term dollar debt, foreign-owned exporters perform better than domestic exporters *only* during

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[5]Desai, Foley and Forbes (2008) argue that multinational affiliates access parent equity when local firms are most constrained. Similarly, Antras, Desai and Foley (2009) present evidence that suggests that even during "normal" times, foreign affiliates increase their reliance on capital flows from the parent company in the presence of weak financial institutions in the country of operation.

twin crises, where domestic firms access to finance is limited given the troubled banking sector. There is no difference in investment between these firms during currency crises. This implies that both set of exporters have similar access to liquidity under currency crises. During twin crises, however, domestic exporters suffer from the credit crunch. Conditional on changes in short term dollar denominated debt, foreign-owned exporters increase investment by 15 percentage points relative to domestic exporters. Domestic exporters in turn, decrease investment by 11 percentage points relative to foreign exporters. The latter effect suggests not only the inability of domestic exporters to take the investment opportunity but the additional hampering effect of not being able to roll over the short-term debt. 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. This result is fully consistent with the model of Chang and Velasco (2001), where adding foreign direct investment precludes the bank run result of their model.

We proceed as follows. Section 2 discusses the relevant literature. Section 3 presents our data. Section 4 discusses the identification strategy. Section 5 presents the empirical results. Section 6 presents robustness analysis and discusses alternative stories and threats to identification. Section 7 concludes.

2   Related Literature

Our paper is related to different strands of the literature. First, the literature on the bank lending channel focuses on establishing the causal link between a shock to bank capital and lower lending to firms. Unfortunately due to data and/or estimation strategy limitations, this literature does not study the real effects of lower credit such as the effects on firms' investment. The aim of this literature is to establish a casual relationship from the negative supply shocks to banks to declining credit provision to firms. The findings in a developing country context show that this is indeed the case.[6]

Second, our paper draws from the literature on the organization of the firm and in particular, the recent theoretical advances that highlight the interplay by firm heterogeneity and incomplete contracts in explaining the degree of vertical integration of the firm.[7] Specifically, Antras, Desai and Foley (2009) develop a model in which firms wanting to exploit technologies abroad will engage in foreign direct investment, acting as multinationals especially in environments with weak investor

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[6]See Khwaja and Mian (2008), Paravisini (2008), and Schnabl (2010).
[7]See Antras (2003, 2005); Antras and Helpman (2004).

protection. External funders require multinational companies' participation in the local project to ensure better monitoring of the investment. As a result, weak financial institutions increase the reliance on capital flows from the parent company. This higher reliance on financing through internal capital markets by the foreign affiliate in general plays a critical role during financial crises. There is a growing literature that investigates the role of foreign ownership and FDI during financial crises. Desai, Foley and Forbes (2008) 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 foreign affiliates outperform their local counterparts across these performance measures. 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 (2008) 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.[8] They reinforce the conclusion of Desai, Foley and Forbes (2008) by showing that foreign-owned exporters clearly increase investment relative to domestic exporters. Alfaro and Chen (2010) using a world-wide dataset on multinational subsidiaries show that, establishments sharing stronger vertical production and financial linkages with the parent company increase sales during the recent "Global Financial Crisis."

All these results are consistent with the existence of financial constraints but the source of the constraint is not clear. It is possible that foreign-owned exporters have stronger balance sheets through having less dollar denominated debt than their domestic counterparts. Alternatively they may have more dollar denominated debt but at the same time they may have matching dollar revenue from their exports. Or simply, foreigners might be better at managing their balance sheet. In any of these cases foreign exporters will have higher net worth and will not be facing solvency issues. This creates a selection problem, where certain firms with no solvency issues are in the exporter sample, biasing results on export performance. Solving this selection bias caused by omitting the balance-sheet weakness is at the heart of our paper.

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[8]Note that Desai, Foley, and Forbes (2008) also investigate the differential impact of the depreciation on multinationals that are export-oriented by proxying exports with sales from subsidiaries abroad. 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.

Thus, our paper is also related to the literature that investigates the effect of foreign currency borrowing and the associated weak balance sheets on firms' investment. The work by Aguiar (2005) shows that firms with heavy exposure to short-term foreign currency debt before the Mexican crisis decreased investment compared to firms with lower dollar debt exposure. 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 during a major currency crisis episode. However, in a very similar study using a bigger sample of Latin American countries during the period 1991–1999, Bleakley and Cowan (2008) show the opposite result focusing on total debt: firms holding dollar debt invest more during exchange rate depreciations. They are the first to argue that firms match the currency composition of their liabilities with that of their income streams or assets, avoiding insolvency during a currency depreciation. Our findings can bridge these two set of studies and provide an explanation for seemingly conflicting results.

3 Data and Construction of Regression Variables

The empirical analysis draws on a unique database with accounting information for over 1,300 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.[9] A distinct feature of this data 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 corporate bond issuances 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 and 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. These are all assets or liabilities outstanding which are denominated in -or indexed to- foreign currency, issued domestically or abroad. In the case of liabilities, these include bank loans, commercial debt, trade credit and foreign securities. Foreign currency assets include cash, government securities indexed to the dollar, bank deposits abroad and overseas client credits.

While firms in many cases report both consolidated and unconsolidated financial statements,

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[9]Details of the data are provided in Appendix and further details in Kamil (2009).

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.

3.1 Investment

Our left hand side variable is investment in fixed capital. 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 percent level at the country level to control for outliers before it is used in the regression. The stock of physical capital, in turn, is defined as the sum of expenditures on property, plant, equipment, plus technical reappraisal (valuation change), minus cumulated depreciation. We attempt to minimize any exchange rate and valuation effects 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 accounting bias in the value of capital stock by estimating the models with firm-level fixed effects.

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

The sources of foreign currency financing differ across countries. In Argentina, Chile, Mexico and Peru firms can borrow in dollars from domestic banks. In the case of Colombia and Brazil, however, most of companies' foreign currency borrowing is obtained abroad (whether bond issuances, bank loans or trade credit).[10] 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,

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[10]We thank Laura Alfaro for pointing this out.

loans and equity abroad or through trade credit with foreign suppliers. 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.

Exporter status defined by export to sales ratio where sales is defined as gross sales from main operating activities. 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 firms' export revenue represents more than 10 percent of the sales 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 revenue (either a binary tradable/non-tradable classification or industry export shares).

To control for selection, we also define exporting firms based on a predetermined dummy variable. A firm is classified as exporter if she reported export revenue at any time during the three years *prior* to the first crisis.[11] In addition, given the severity of the banking crisis in Colombia, exporters in this country are defined based on whether the firm reported export revenue in 1995, 1996, or 1997 (three years prior to the banking crisis). In Peru and Chile where no substantial banking crisis and/or currency crisis took place during our sample period, predetermined exporters are defined based on whether firms reported export revenue at any time during the period of analysis. 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 between 1999 and 2001, as oppose to 50 percent decline in credit to private sector in the case of Mexico.

3.3 Foreign Ownership

One of the contributions of our paper is to construct a continuous measure of foreign ownership for each firm in our sample. Our indicator of foreign ownership is based on precise dates of ownership

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[11]In the case of Argentina, we refer to years 1998, 1999 and 2000; Brazil 1996, 1997 and 1998; Mexico 1991, 1992 and 1993.

changes, foreigner's share in the firm and the nationality of the parent and global ultimate parent. 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 percent of the firm's capital structure and zero otherwise. To check whether or not the results are driven by firms becoming foreign-owned during the crises, 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, where we provide details on the construction of the foreign ownership variable in the appendix. First, we 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. 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, that is 1990. 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 ultimate parent. 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 a target firm in our sample 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.

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 at a given point in time. Figure 1 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 1990s. 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 percent of the firms are domestic, as shown in Figure 2.[12] Figure 3 shows that among those firms with positive foreign ownership, 40 percent of the observations are between 85 percent and 100 percent foreign-owned. Hence foreign investors prefer to have a controlling stake in general.

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[12]We choose 2000 for being an intermediate year but similar figures are obtained using any other year.

These distributions look similar by country.

3.4 The Crises Episodes

Table 1 shows the currency crisis and banking crisis episodes for our sample of countries together with percent changes in macro aggregates before, during and after the crisis episodes. Following Desai, Foley and Forbes (2008) we identify a currency crisis in a given year if the real exchange rate increased by more than 25 percent with respect to the previous year. We identify four currency crisis episodes in our sample: Mexico (1995), Brazil (1999), Brazil (2002), and Argentina (2002).[13]

Following Reinhart and Rogoff (2008) we identify the following banking crises: Argentina (1995) and (2001), Brazil (1995), Mexico (1994) and Colombia (1998). Reinhart and Rogoff (2008) base their classification of banking crises on two types of events. First, they focus on bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions. Second, in the absence of bank runs, according to their classification, a banking crisis involves the closure, merging, takeover, or large-scale government assistance of an important financial institution (or group of institutions) that marks the start of a string of similar outcomes for other financial institutions.

The banking crises in our analysis, Argentina (2001) and Mexico (1994) were precipitated by different events. In Argentina, in March 2001, a bank run started due to lack of public confidence in government policy actions. There was strong opposition from the public to the new fiscal austerity package sent to the Congress and the amendment to the convertibility law (change in parity from being pegged to the dollar, to being pegged to a basket composed of the US dollar and Euro) as described in Laeven and Valencia (2008). As a result of the bank run, partial withdrawal restrictions were imposed (corralito) and fixed-term deposits (CDs) were reprogrammed to stop outflows from banks (corralon). In Mexico the 1994 banking crisis had different origins. Until 1991 banks were nationalized. With the privatization process in 1991-1992, investors with scarce previous experience in banking wanting to quickly recover their investment extended large amounts of loans without a proper credit risk analysis. This behavior, together with the stagnation of real estate prices and

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[13]All four episodes implied a considerable depreciation of the real exchange rate, the two episodes in Brazil amounted to a 34 percent depreciation while Mexico witnessed a 47 percent depreciation and Argentina 96 percent. Notice Mexico abandoned the peg in December 1994 and consequently the end-of year exchange rate only depreciated between December 94 and December 95. As expected we do not observe significant differences in the investment rates of foreign-owned exporters relative to domestic exporters during 1994 when the exchange rate had not yet depreciated, since no new investment opportunity had arisen.

the increase in US real interest rates eroded banks' balance sheets. In 1994, 9out of 34 banks were intervened and 11 banks participated in the loan/purchase recapitalization program of 34 commercial banks. The 9 banks accounted for 19 percent of the financial system assets.

Table 1 shows that, in terms of macroeconomic preconditions in these countries at the time of the crisis, with the exception of Argentina, the other countries were showing similar growth rates of GDP, investment and trade balance. All these percent changes are averages over two years. During and post crisis experiences differ from country to country, showing the importance of including country-year effects. A common feature of recovery in all countries is the increase in investment and exports leading to a positive growth in the trade balance.

3.5 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 being more accurate and comprehensive. Moreover, relative to other available databases the coverage of small and medium-sized publicly traded firms is better since we have the whole universe of listed firms. 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 data sets used widely in cross-country studies such as Worldscope.

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. Since we identify of 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 percent of the sampled firms. The size of the sample changes as new firms enter and exit the sample. Only less than 10 percent of the firms delisted and hence we believe the survivorship bias is negligible.[14]

This cleaning procedure outlined in the appendix leave us with complete information for an

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[14]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.

unbalanced panel of 6,175 firm-year observations, which consist of 931 firms with an average of around 7 years each. Finally, data on additional controls included later on in the estimation leaves us with a sample of 5,063 observations or 864 firms.

3.6   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 percent) by a foreign investor and zero otherwise. In Argentina 53 percent of the sampled firms are foreign-owned while in Colombia only 16 percent would be considered foreign-owned. Another important variable in our analysis is export status. Around 56 percent of the observations report some export revenue and half of those observations report a ratio of export revenue to sales greater than 10 percent. Regarding dollar assets and liabilities, 81 percent of the sample reports some positive debt holding denominated in foreign currency while only 59 percent of the sample reports positive dollar assets. Again these figures vary by country. In Argentina, Brazil, Mexico and Peru, we have a greater number of observations with positive values of dollar debt.

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 percent of their short-term debt denominated in foreign currency while exporters hold on average higher values of their debt denominated in foreign currency (35 percent). 20 percent of total liabilities correspond to short-term bank debt and exporters seem to exhibit only a slightly higher dependence on short-term bank debt at 22 percent. Finally, bonds and equity issuance abroad is limited at 2 percent and loan issuance abroad is only 5 percent. Appendix Table A1 shows 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-owned 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-owned 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 hold short-term dollar denominated debt.

4 Identification Strategy

Our objective is twofold: We want to identify whether financial crises translate into lower firm-level investment, and, if so, through which channel this happens. The main challenge to identification is to separate the demand for credit by firms from the supply of credit by banks, holding firm creditworthiness constant. Exploiting firm-level variation during different type of crises that moves demand and supply for credit in opposite direction is key for our identification. A currency crisis is a positive demand shock for exporters and a banking crisis is a negative supply shock.

Currency crises can also impact firms' creditworthiness by inflating the value of dollar denominated debt holdings. In order to account for the balance sheet channel we incorporate into the analysis the dollar debt holdings of these exporting firms. Exporting firms without dollar debt holdings would not experience a decrease in net worth due to a depreciated currency. The decline in net worth experienced by exporting firms holding dollar debt would ultimately depend on their ability to match dollar denominated income (exports) and dollar debt holdings. As a result, we focus on the sample of exporting firms that are the ones expected to increase investment and at the same time have the opportunity to avoid a mismatch on their balance sheet. Table 4 shows that the median exporting firm holds on average 31 percent of short-term debt denominated in foreign currency while the median non-exporting firm holds less than 1 percent of the short-term debt denominated in dollars (notice the high variation across countries).

Regarding the liquidity channel, we exploit both country and firm-level heterogeneity. We observe more than one depreciation episode and some of these episodes are combined with banking crises. Hence, *all* the currency crises episodes share the depreciation of the currency and consequently, a potential balance sheet weakness. However, in *some* of the depreciation episodes there is in addition, an economy-wide liquidity shock resulting from the troubled domestic banking sector (these are the so-called twin crises episodes). As argued by Kaminsky (2006) not all currency crises are the same. Twin and currency crises are different treatment events. They are both characterized by the depreciation of the currency but in addition, twin crises involve a general dry up of available funds. During twin crises, even firms that do not experience a deterioration of their net worth might have difficulties in accessing external financial resources and therefore invest less.

We exploit firm-level heterogeneity in liquidity under different crisis episodes utilizing data on the ownership structure of the firm. As discussed before, several recent papers have shown that foreign-owned companies outperform domestic companies during financial crises. This evidence is consistent with an access to finance explanation where foreign-owned firms outperform the domes-

tic counterparts during a crisis given their connections to international financial markets and/or deeper internal capital markets. An alternative explanation for the higher investment of foreign-owned firms is that these firms may not suffer from weak balance sheets since they are insulated from exchange rate fluctuations. Our identification strategy will allow us to disentangle these two sources of liquidity constraints, insolvency versus illiquidity. We compare investment of foreign-owned exporting firms with dollar debt holdings to that of domestic exporting firms who also have dollar debt holdings. This will allow us to identify the exact mechanism for the financial constraint. Conditional on the assumption that during a currency crisis the financial sector does not face liquidity constraints, we should observe no significant differences between foreign-owned and domestic exporting firms holding their creditworthiness constant. During a twin crisis, on the other hand, foreign-owned exporting firms should outperform domestic exporting firms since domestic firms that are heavily reliant on the domestic banking system will witness a sharp decline in the availability of credit. Our data on bank dependence (i.e., the ratio of short-term bank debt to total liabilities) confirm that on average the ratio of short-term bank debt to total liabilities for exporting firms is 16 percent while that of high exporters is 25 percent. This is in line with the channel outlined in Amiti and Weinstein (2011) where exporting firms rely heavily on short-term debt for operation. Within the sample of high exporters there are no major significant differences across domestic and foreign-owned companies regarding their reliance on short-term bank debt (both types of firms show a bank dependence ratio of around 24 percent).[15] Despite the similar reliance of domestic and foreign-owned companies on bank credit, which confirms the suitability of comparing these firms, foreign-owned exporting firms would still have access to international financial markets either directly or through the parent company.

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 twin crises compared to currency crises. Since the seminal work of Kaminsky and Reinhart (1999), there has been an extensive literature highlighting the role of a troubled banking sector that turns a currency crisis into a twin crisis. This is especially relevant for emerging markets where stock and bond markets are less developed and banks are the main source of credit. Therefore, bank illiquidity means a halt in domestic credit provision. Banks can also be insolvent if they have a balance-sheet mismatch of their own. For our purposes of focusing on the real effects of the crisis, where the investment decision is taken by the

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[15]Notice that we are not able to determine whether the bank debt is from domestic or international banks that might be more or less exposed to the national country shock

firm, the key factor is whether or not banks can provide liquidity to firms, regardless of whether they are themselves illiquid or insolvent. The extensive literature on the bank lending channel also provides evidence on the causal link between a negative shock to banks and the credit provision to firms in a developing country context, as reviewed in section 2. The critical issue here is that all the banking crises predate the currency crises and were not originated by firm bankruptcy, which was the case as discussed in section 3.4. 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 firm-level access to finance measure –foreign ownership– should not have differential explanatory power among the types of crisis, i.e., domestic firms should do worse than foreign-owned firms under both types of crisis.

Figure 4 demonstrates the case in point and shows that in our sample, countries that experienced a twin crisis witnessed a significant decline in domestic credit provision, whereas this did not happen in countries that went thorough currency crisis episodes. The top left panel shows 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 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 collapse in bank lending during the currency crises of 1999 and 2002.[16]

For our identification strategy, summarized above, we need to run a triple difference-in-difference specification that we estimate for the sample of exporting firms:

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[16]Notice the beginning of the 90s was a very turbulent period in Brazil. Inflation was rampant with a peak of 82.4 percent 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 4. The scale 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.

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

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 scaled by total assets to control for firm size.

Foreign can be used as a continuous variable and also as 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 as mentioned in the introduction, the literature argues that this is the most relevant variable determining balance sheet mismatch vulnerability (See Setser et al. 2005).[17] *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, α_i are firm-specific effects, and $\xi_{i,c,j,t}$ is the error term.[18] By using firm fixed effects we 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 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:

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[17]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.

[18]Notice that the Post dummy is captured in the country-year fixed effects. Time dummies are also absorbed by this fixed effect.

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

In equation (1), β_4 is the effect of holding dollar debt after the crisis *only* for the sample of domestic exporting firms. This is not the case for β_4 in equation (2) since now this coefficient will reflect a combined effect of foreign-owned and domestic exporting firms. Similarly, β_3 in equation (1) captures the investment behavior of foreign-owned exporting companies with no dollar debt relative to those foreign-owned exporting companies with dollar debt at the time of the crisis, β_1. Compared to equation (2) the advantage is that the coefficient β_3 in equation (1) does not confound the effect of foreign-owned exporting companies holding and not holding dollar debt as it would be the case of the coefficient β_3 in equation (2).

If exporting firms match their dollar holdings with export revenue, we expect β_4 in equation (1) to be insignificant since domestic exporting firms who hold dollar debt should not perform differently than foreign-owned exporting firms with dollar debt. We expect them both to have strong balance-sheets as a result of matching their dollar debt to their export revenue. Hence, β_1 compared to β_4 is the incremental effect of being a foreign-owned company among exporting firms holding dollar debt. If $\beta_1 > \beta_4$ (i.e., foreign-owned exporting firms holding dollar debt outperform domestic exporters holding dollar debt) we interpret this as the "access to finance" effect or evidence for the liquidity channel. Both foreign-owned and domestic exporting firms experience a similar change in their net worth but foreign-owned exporting firms manage to increase investment *relative* to domestic exporting firms. This means that there is something different about foreign-owned exporting firms 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-owned exporting firms with dollar debt under performing relative to foreign-owned exporters without dollar debt holdings) would highlight the importance of insolvency since comparing firms that have the best access to liquidity (i.e., foreign-owned companies), those with a deterioration in their balance sheet would under perform.

Therefore, to summarize, if both foreign-owned and domestic exporters with dollar debt holdings can avoid a mismatch on their balance-sheet and hence insolvency, then the differential response between the two captures access to liquidity. This result should only hold when domestic companies suffer from a liquidity problem. Hence, we should see foreign-owned exporters with dollar debt investing more relative to domestic exporters with dollar debt holdings only under twin crises. This can only be done by means of a triple interaction rather than a double interaction that would mask the groups of interest. In addition, one of the key advantages of this specification is that it allows to quantify the total effect of dollar debt holdings and identify those firms that are benefited/hurt by the crisis. Finally, the identification strategy 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 show this is indeed the case. Next, we turn to our regression analysis.

5   Results

Table 5 shows the results from estimating equation (1) for the sample of exporting firms.[19] 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 main reasoning behind choosing this sample is to consider firms with enough export revenue to compensate any potential mismatch derived from dollar debt holdings. According to our estimation strategy, columns (1) to (4) of Table 5 concentrate on the twin crises episodes, (i.e., Argentina (2002) and Mexico (1995) where both countries had a banking crises in the year prior to the currency crisis). Columns (5) to (8) refer to the currency crises episodes (i.e., Brazil (1999, 2002) which involved a depreciation of the currency of more than 25 percent but there was not a decline in the supply of credit (see Figure 4)).[20]

Column (1) in Table 5 shows our main result: foreign-owned exporters holding dollar debt increase investment (0.211) relative to domestic exporters holding dollar debt (-0.150) and foreign-owned exporters with no dollar debt (0.127) during twin crises. On the contrary, column (5) shows

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[19]In order to properly implement country-year and sector-year fixed effects in the presence of triple interactions and continuous variables, through out the analysis we demean all continuous variables by removing country-year and sector-year averages from firm-level values.

[20]Notice the post dummy always refers to the year of depreciation and year after. Given that the treatment is based on a time dummy, standard errors are clustered at the year level throughout the analysis. However, similar results where obtained for most specifications when clustering at the country level.

that foreign-owned exporters holding dollar debt (-0.068) do not behave significantly differently than domestic exporters with dollar debt (0.053) or foreign-owned 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 during the currency crises years. In fact none of the total effects are significant under currency crisis episodes.

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 percent of sales during the three years prior to the crises. The recent literature on firm heterogeneity and trade shows that it is most productive firms that enter the export market and among those, only the ones with the highest productivity will engage in FDI activities (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. 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 percent of the exporting observations at the time of the crisis. These findings are similar to those in Gopinath and Neiman (2011) that show how during the 2002 Argentinean financial crisis there was not a significant change in the number of exported varieties.[21] Nevertheless, to avoid concerns about selection into the export market at the time of the crises columns (2) to (4) and (6) to (8) use a predetermined export dummy to define the exporter sample.

We include in all columns firm-specific control variables to account for the following concerns. First, dollar debt holdings 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 most of the short-term debt is denominated in dollars. This type of firm may not face an insolvency problem. Second, 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, such as Demirguc-Kunt and Levine (2001). Therefore, we control for the ratio of short-term bank debt to total liabilities to proxy for bank dependence and leverage, which enters as negative and significant. Third, we also assume that firms are not able to borrow in international markets at the time of the crisis.

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[21]Gopinath and Neiman (2011) also show that the extensive margin of imports played a small role during the 2002 Argentinean crisis and it was mainly driven by small importers. However, the churning of inputs within firms played a sizeable role in aggregate adjustment. For our purposes the important finding is that they show how these differences are not driven by differences between domestic and MNCs.

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 crisis. To check this, using data from Dealogic Bondware and Loanware, we include measures of access to international markets like "bond abroad" dummy that takes the value of one in the year the firm issues a corporate bond abroad, "international loan" dummy that takes the value of one in the year the firm issues a syndicated loan abroad, and "equity abroad" dummy that takes the value of one in the year the firm issues stock abroad (either as ADR or GDR, whether in the US or other stock market). Although these measures are good proxies for external sources of financing during tranquil times we believe these measures will be relatively weak during financial turbulent times as argued by the sudden stop literature since markets shy away from emerging markets during such times (see for example Calvo and Mendoza (2001) and Reinhart and Reinhart (2010)). Indeed these measures turn out to be insignificant in all specifications. We rely on foreign ownership as a main arms' length source of financing for foreign affiliates located in emerging markets, especially during financial crises.

A potential threat to a proper identification arises from the possibility that productive firms are bought out by foreigners during the crisis 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. Nevertheless, we define foreign status as a dummy based on the ownership status of the firm three years prior to the crisis in columns (3) and (7). Clearly, the results are not sensitive to the way foreign and export status are defined. 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. Finally, columns (4) and (8) explore whether the results could be driven by foreign-owned firms being on a different trend than domestic firms. To shed some light on this possibility columns (4) and (8) add foreign-year fixed effects. The results stay the same.

If insolvency through a worsening of the balance sheet was the dominant channel hindering investment we should observe no difference between foreign-owned and domestic exporters that hold dollar debt under any type of crisis. Clearly, foreign-owned firms do not suffer an illiquidity problem during a twin crisis and do better relative to domestic exporters, regardless of their solvency issues. The results imply sizeable impact. Results in column (1) indicate that comparing a domestic exporter in the 90th percentile of the distribution of short-term dollar debt to a domestic exporter in the 10th percentile, implies a decrease of investment of 11 percentage points for the former. At the same time, a foreign exporter experiencing a similar increase in the short-term dollar debt ratio

would have increased investment by 15 percentage points relative to a domestic exporter. These effects are economically significant especially given the variation absorbed by the battery of fixed effects.

6 Robustness and Threats to Identification

6.1 Robustness

We conduct a series of robustness checks for our main results obtained in column (4) of Table 5 and present the results in Table 6.

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 firms' balance-sheets during crises could be mitigated by significant holdings of foreign currency denominated assets. 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 in column (2) 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. Our main results are not affected.

Columns (3) and (4) look at other measures of leverage. All the results in Table 5 controlled for the ratio of short term bank debt to total liabilities. Similarly, 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 higher investment of foreign-owned exporters with dollar debt relative to domestic exporters holding dollar debt is that foreign-owned 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 percent of the exporting observations at the time of the crises). However, it might be that foreign-owned exporters have better connections or information about international markets and are better able to increase their sales abroad. This effect would be absorbed by the foreign-year effects. We also worry that due to contagion effects, exporters in the crisis country do 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 (unfortunately we do not have firm-level data on the destination of exports).[22]

Finally, it is also possible that both foreign-owned and domestic firms reduce their dollar liabilities in anticipation to the crisis. This can explain the no-difference result between foreign-owned and domestic exporting firms in the case of currency crises. Thus, we show in Figure 5, that there was no systematic decrease in dollarization for foreign-owned firms relative to domestic firms in the eve of crisis. Nevertheless, we repeat our basic results using a predetermined dummy for dollar debt holdings. A firm is defined as having high dollar debt if her share of short term dollar debt in total short term debt is greater than 35 percent at any time during the three years prior to the crises.[23] Results (available upon request) confirm that our main results are not driven by foreigners decreasing dollar debt holdings faster at the time of the crisis.

6.2 Threats to Identification

Given our differences-in-differences strategy we might have several threats to identification. Foreign-owned 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 firm fixed effect estimation. As shown before our results are also robust to controlling for foreign-year fixed effects to account for different trends between foreign-owned and domestic companies. In addition, the triple interaction regression controls 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, at the time of the crisis. Nevertheless, Figure 6 shows the average investment rates for two types of firms: foreign-owned 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

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[22]An alternative explanation for the better investment of foreign-owned exporters is related to the role of 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. Nevertheless, to test for this possibility, 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 obtained similar results. The lack of data prevents us from exploring the possibility that foreign-owned exporters have access to cheaper imported goods through the parent company.

[23]Recall 35 percent corresponds to the mean holdings in the exporter sample.

trends between foreign and domestic firms holding high levels short-term dollar debt prior to the depreciation episode in Mexico.

Similarly, 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 foreign currency though. In fact, Table 4 shows that although lower than the Argentinean and Mexican levels, short-term dollar debt in Brazil represents on average 20 percent 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. Although the median domestic exporter in Brazil holds lower levels of dollar debt than the foreign-owned counterpart, so do Argentinean domestic exporters and it does not seem to be something specific to Brazil.

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 7 repeats the main specification in Table 5 by country and episode. Column (1) shows that foreign-owned 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. Therefore, comparing columns (1) and (2) we can say that results are robust to focusing on currency 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-owned and domestic exporters with dollar debt.

6.3 Alternative Estimation Strategy

The results in Table 5 are consistent with the interpretation that the real problem is illiquidity. To further substantiate this point we propose an alternative specification instead of a triple interaction. This strategy involves defining a sample of solvent firms (i.e., firms with high leverage and holdings of *short-term* foreign currency denominated debt that are not matched by a dollar denominated stream of income like export revenue). Table 8 shows how foreign-owned firms perform relative to domestic firms when we focus in a sample of firms with no currency mismatch. To avoid any selection issues at the time of the crisis, we define matched balance sheets based on whether the firm had revenue in excess to short-term dollar liabilities at any time during the three years prior to the crises.[24] Columns (1) to (3) show the results under twin crises while columns (4) to (6) refer to currency crises. Column (1) shows how foreign-owned firms invest 5 percentage points more relative to domestic firms during twin crises. It is reassuring that results are robust to the use of a predetermined variable that classifies firms into foreign-owned and domestic according to their ownership status three years *before* the crises (see columns (2) and (3)). Finally, column (3) examines the sample of exporters. Within solvent firms we expect exporting firms to be the ones taking the investment opportunity generated by the depreciation of the currency. To avoid concerns about selection into the export market at the time of the crises column (3) uses a predetermined export dummy to define the exporter sample. Within this sample of solvent exporters, foreign-owned exporters increase investment by 8 percentage points relative to domestic exporters.[25] In addition, these columns show that results are robust to controlling for measure of access to international markets. It seems to be the case in which parent companies inject liquidity into foreign-owned firms during crises.[26]

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[24] We define firms with no mismatch as those in which $\frac{Exports - ShortDollarLiab}{Assets} \geq 0$. Notice we control for leverage in all the columns in Table 8. Appendix Table A2 shows similar regression in total sample of firms.

[25] The earlier estimate of 15 percentage points raise in investment of foreign-owned exporters was calculated based on the 10th to 90th percentile change in short term dollar debt.

[26] 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.

6.4 The Role of Exporters: Reconciling with the Literature

Finally, we would like to explore previous seemingly conflicting results in the literature and argue that proper measurement of access to international liquidity via foreign ownership can account for those findings.

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 use a predetermined export dummy in the regressions below, 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 literature generally finds that this is not the case, as shown in column (1) of Table 9. There might be various explanations why exporters do not increase investment in the aftermath of currency crises such as 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. Column (2) includes short-term dollar debt as a control for financial constraints but the result do not change. Notice that we would have expected a positive coefficient on the export propensity variable once dollar debt holdings were taken into account if the associated mismatch on the balance sheet was the reason hindering investment on the part of exporters. However, this is not the case, suggesting that controlling for dollar debt holdings is not enough to explain the investment behavior of exporters during crises. The result in column (2) is consistent with Aguiar (2005).

Columns (3) and (4) investigate the role of different crises: 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). 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? This is because under currency crisis there is no illiquidity problem and solvency problem should not be an issue for exporters who can hedge using their dollar income. Column (5)

shows that this is indeed the case since now the triple interaction specification show that exporters with short term dollar debt do better than non-exporters with short term dollar debt, which is consistent with Bleakley and Cowan (2008).[27] Our results show that Aguiar (2005) results are driven by domestic exporters who do not have access to liquidity under a twin crisis and Bleakley and Cowan (2008) results are driven by ability of exporters to avoid insolvency as they highlight and take advantage of investment opportunity during depreciations.

7   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 1,300 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 investment between these firms during currency crises. This implies foreign currency denominated debt is not a problem for exporters perse since they match their short-term dollar debt with export revenue to avoid insolvency. During twin crises, however, domestic exporters suffer from the problem of illiquidity and hence contract investment and production as oppose to foreign-owned exporters.

Our results have important policy implications. First, to the best of our knowledge, this paper is first in quantifying the significant real effects of shocks to banking sector using firm-level investment

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[27]The equation we estimate is given by:

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

Notice that in order to be able to compare to Bleakley and Cowan (2008) and show that exporters with high export revenue can match their balance sheets we follow Aguiar (2005) and define a high exporter as one that exports more than ten percent of the sales.

data. Second, short-term foreign currency borrowing may not be detrimental to firms' balance-sheets as long as their access to finance is not limited during periods of instability. 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.

References

[1] Alfaro, L. and Chen, M. (2010) "Surviving the Global Financial Crisis: Foreign Direct Investment and Establishment Performance," Harvard Business School Working Paper 10-110.

[2] Allen, M., Rosenberg, C., Keller, C., Setser, B. and Roubini, N. (2002) "A Balance Sheet Approach to Financial Crisis," IMF Working Paper WP/02/210, Washington, D.C.

[3] Antras, P. (2003) "Firms, Contracts, and Trade Structure," *Quarterly Journal of Economics*, 118(4), 13751418.

[4] Antras, P. (2005) "Incomplete Contracts and the Product Cycle," *American Economic Review*, 95(4), 1054-1073.

[5] Antras, P. and Helpman, E. (2004) "Global Sourcing," *Journal of Political Economy*, 112(3), 552-580.

[6] Antras, P., Desai, M. and Foley, F. (2009) "Multinational Firms, FDI Flows and Imperfect Capital Markets," *Quarterly Journal of Economics*, 124 (3), 1171-1219.

[7] Amiti, M. and Weinstein, D.E. (2011) "Exports and Financial Shocks,"*Quarterly Journal of Economics*, forthcoming.

[8] Aguiar, M.A. (2005) "Investment, Devaluation, and Foreign Currency Exposure: The Case of Mexico," *Journal of Development Economics*, 78, 95-113.

[9] Aguiar, M.A. and Gopinath,G. (2005) "Fire-sale FDI and Liquidity Crises," *Review of Economics and Statistics*, 87(3), 439-452.

[10] Bernanke, B.S. (1983) "Nonmonetary Effects of the Financial Crisis in Propagation of the Great Depression," *American Economic Review*, 73(3), 257-276.

[11] Bernanke, B.S. and Gertler, M. (1989) "Agency Costs, Net Worth, and Economic Fluctuations," *American Economic Review*, 79, 14-31.

[12] Bernanke, B.S., Gertler, M. and Gilchrist, S. (1996) "The Financial Accelerator and the Flight to Quality," *Review of Economics and Statistics*, 78(1), 1-15.

[13] Blalock, G., Gertler, P.J. and Levine, D.I. (2008) "Financial Constraints on Investment in an Emerging Market Crisis," *Journal of Monetary Economics*, 55(3), 568-591.

[14] Bleakley, H. and Cowan, K. (2008) "Corporate Dollar Debt and Depreciations: Much Ado About Nothing?" *Review of Economics and Statistics*, 90(4), 612-626.

[15] Calvo, G.A. and Reinhart, C.M. (2002) "Fear of Floating," *Quarterly Journal of Economics*, 107(2), 379-408.

[16] Chang, R. and Velasco, A. (2001) "A Model of Financial Crisis in Emerging Markets," *Quarterly Journal of Economics*, 116(2), 489-517.

[17] Cespedes, L.F., Chang, R. and Velasco, A. (2004) "Balance Sheets and Exchange Rate Policy," *American Economic Review*, 94(4), 1183-93.

[18] Desai, M., Foley, F. and Forbes, K.J. (2008) "Financial Constraints and Growth: Multinational and Local Firm Responses to Currency Depreciations,"*Review of Financial Studies*, 21, 2857-2888.

[19] Demirguc-Kunt, A. and Levine, R. (2001) "Bank-Based and Market-Based Financial Systems: Cross-Country Comparisons" in Financial Structure and Economic Growth: A Cross-Country Comparison Eds. Asli Demirguc-Kunt and Ross Levine, Cambridge, MA: MIT Press.

[20] Eichengreen, B. and Hausmann, R. (1999) "Exchange Rates and Financial Fragility," in New Challenges for Monetary Policy, Kansas City, Missouri: Federal Reserve Bank of Kansas City, 329-368.

[21] Forbes, K.J. (2002) "How Do Large Depreciations Affect Firm Performance?" *International Monetary Fund Staff Papers*, 49,214-238.

[22] Gopinath, G. and Neiman, B. (2011) "Trade Adjustment and Productivity in Large Crises", Harvard Economics Department and Chicago Booth School of Business, mimeo.

[23] Helpman, E., Melitz, M. and Yeaple,S. (2004) "Export Versus FDI with Heterogeneous Firms," *American Economic Review*, 94, 300-316.

[24] Holmstrom, B. and Tirole, J. (1997) "Financial Intermediation, Loanable Funds, and the Real Sector," *Quarterly Journal of Economics*, 112, 663-691.

[25] Jimenez, G., Ongena, S., Peydro-Alcalde, J.L. and Saurina, J. (2011) "Credit Supply: Identifying Balance-Sheet Channels with Loan Applications and Granted Loans," CEPR working paper DP7655.

[26] Kamil, H. (2009) "How Do Exchange Rate Regimes Affect Firms' Incentives to Hedge Currency Risk in Emerging Markets?" Washington, D.C., International Monetary Fund, mimeo.

[27] Kaminsky, G.L. (2006) "Currency Crises: Are They All the Same?" *Journal of International Money and Finance*, 25, 503-527.

[28] Kaminsky, G.L. and Reinhart, C.M. (1999) "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems," *American Economic Review*, 89(3), 473-500.

[29] Khwaja, A. and Mian, A. (2008) "Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market," *American Economic Review* 98(4), 1413-1442.

[30] Krugman, P. (1999) "Balance Sheets, the Transfer Problem, and Financial Crises," *International Tax and Public Finance*, 6(4), 459-472.

[31] Laeven, L. and Valencia, F. (2008) "Systemic Banking Crises: A New Database," IMF Working Paper No. 08/224, International Monetary Fund: Washington, DC.

[32] Paravisini, D. (2008) "Local Bank Financial Constraints and Firm Access to External Finance," *The Journal of Finance* 63(5), 2160-2193.

[33] Paravisini, D., Rappoport, V., Schnabl, P. and Wolfenzon, D. (2010) "Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data," Coumbia Business School and NYU Stern School of Business, mimeo.

[34] Peek, J. and Rosengren, E.S. (2000) "Collateral damage: Effects of the Japanese Bank Crisis on Real Activity in the United States," *American Economic Review*, 90(1), 30-45.

[35] Reinhart, C.M. and Reinhart, V.R. (2010) "Capital Flow Bonanzas," NBER ISOM, forthcoming.

[36] Reinhart, C.M. and Rogoff, K. (2008) "Banking Crises: An Equal Opportunity Menace," NBER Working Paper No. 14587.

[37] Reinhart, C.M. and Rogoff, K. (2010) "Growth in a Time of Debt," *American Economic Review*, 100(2), 573-578.

[38] Schnabl, P. (2010) "Financial Globalization and the Transmission of Bank Liquidity Shocks: Evidence from an Emerging Market," *The Journal of Finance*, forthcoming.

[39] Setser, B., Nystedt, J., House, B.E., Halikias, I., Keller, C., Pitt, A. and Rosenberg, C.B. (2005) "Debt-Related Vulnerabilities and Financial Crises," IMF Occasional Papers 240, International Monetary Fund.

Table 1 — Macroeconomic Outcomes of Twin and Currency Crises

Outcome	Period	Argentina 2002	Mexico 1995	Brazil 1999	Brazil 2002
GDP per capita growth	prior crisis	-3.7%	1.3%	0.2%	1.3%
	crisis	-2.5%	-2.4%	0.8%	0.5%
	post crisis	7.8%	4.2%	1.3%	3.1%
GFKF to GDP	prior crisis	-12.0%	2.7%	4.0%	2.7%
	crisis	-6.5%	-9.5%	-1.8%	-5.0%
	post crisis	25.0%	14.4%	2.7%	6.1%
Trade Balance to GDP	prior crisis	1.0%	3.9%	3.1%	11.9%
	crisis	29.4%	24.0%	15.7%	2.6%
	post crisis	6.1%	1.1%	11.9%	-0.8%

Notes: Using data on CPI, the real exchange rates were obtained as the deflated end of period exchange rates. A currency crisis is defined as a 25 percent increase in the real exchange rate relative to the previous year. We identify four depreciation episodes in our sample: Argentina (2002), Mexico (1995), Brazil (1999) and Brazil (2002). Mexico abandoned the peg in December 1994, Brazil in January 1999 and finally, Argentina in January 2002. Following Reinhart and Rogoff (2008) we identify the following banking crises that predated a currency crisis: Argentina (2001) and Mexico (1994). Therefore, there are two twin crises episodes (simultaneous currency and banking crisis) in our sample: Argentina (2002) and Mexico (1995). Consequently the crises years are Argentina 2002 and 2003; Mexico 1995 and 1996; Brazil 1999 and 2000; Brazil 2002 and 2003. We report percentage changes over a two year period. GDP stands for Gross Domestic Product. GFKF to GDP stands for the ratio of Gross Fixed Capital Formation to GDP. Trade Balance to GDP stands for the ratio of Exports minus Import to GDP.

Table 2 — Percentage of Observations by Country

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

Notes: Observations refer to the sample of firms left after the cleaning procedure. 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 a value of one if foreigners own more than 50% of the company's capital. *Exporter* is a dummy that takes a value of one if the firm reports export revenue and zero otherwise. *HighExporter* is a dummy that takes a value of one if the firm reports export revenue greater than 10% of sales. *DumTotalDollarDebt* is a dummy that takes a value of one if the firm reports positive total dollar denominated liabilities. *DumShortDollarDebt* is a dummy that takes a value of one if the firm reports positive short-term dollar denominated liabilities. *DumDollarAssets* is a dummy that takes a value of one if the firm reports positive total dollar denominated assets.

Table 3 — Descriptive Statistics

	Total Sample				Exporter Sample		
	Mean	sd	Obs		Mean	sd	Obs
SalesGrowth	0.01	0.33	5063		0.01	0.32	2988
Investment	0.001	0.07	5063		0.001	0.10	2988
TotalAssets	18.72	2.00	5063		19.00	1.79	2988
ShortDollarDebt	0.26	0.28	5063		0.35	0.29	2988
ExportShare	0.11	0.21	5063		0.17	0.24	2988
HighExporter	0.28	0.45	5063		0.42	0.49	2988
Foreign	0.15	0.36	5063		0.14	0.34	2988
Foreign Exporter	0.09	0.28	5063		.	.	.
Foreign HighExporter	0.04	0.19	5063		0.06	0.23	2988
ShortBankDebt	0.20	0.19	5063		0.22	0.20	2988
BondAbroad	0.02	0.14	5063		0.02	0.16	2988
LoanAbroad	0.05	0.21	5063		0.06	0.24	2988
EquityAbroad	0.02	0.15	5063		0.02	0.15	2988

Notes: Statistics refer to the final sample of firms used in the estimation. The exporter sample is based on a predetermined export dummy that is equal to one if the firm reported export revenue during the three years prior to the first crisis and zero otherwise. *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 a 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 takes a value of one if the firm has issued bonds abroad (lagged). *LoanAbroad* dummy is similarly defined if the firm has issued syndicated loans abroad (lagged). *EquityAbroad* dummy is equal to one if the firm has issued equity abroad (lagged).

TABLE 4 —DOLLAR DEBT BY FIRM TYPE

	Exporter			Non-Exporter		
	Mean	Median	Observations	Mean	Median	Observations
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		
	Mean	Median	Observations	Mean	Median	Observations
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		
	Mean	Median	Observations	Mean	Median	Observations
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		
	Mean	Median	Observations	Mean	Median	Observations
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: Mean, median and number of observations for the variable *ShortDollarDebt* are reported. *ShortDollarDebt* is the ratio of short-term dollar denominated liabilities to short-term debt. *Exporter* is a dummy variable that takes a value of 1 if the firm reports any export revenue at any time during the three years prior to the first crisis and 0 otherwise. *Foreign* is a dummy variable that takes a value of 1 if the firm is more than 50% owned at any time during the three years prior to the first crisis and 0 otherwise. *HighExporter* is a dummy variable that takes a value of 1 if the firm reports export revenue higher than 10% of sales at any time during the three years prior to the first crisis and 0 otherwise.

TABLE 5 — THE DIFFERENTIAL RESPONSE OF FOREIGNERS HOLDING DOLLAR DEBT DURING CRISES
DEPENDENT VARIABLE: INVESTMENT
SUBSAMPLE OF EXPORTERS

Crisis	Twin Crises				Currency Crises			
Exporter Definition	Benchmark	Predetermined			Benchmark	Predetermined		
Foreign Definition	Benchmark	Benchmark	Predeterm	Predeterm	Benchmark	Benchmark	Predeterm	Predeterm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ShortDollarDebt \times Foreign \times Post$	0.211**	0.280**	0.183*	0.191**	-0.068	-0.013	-0.060	-0.063
	(0.07)	(0.11)	(0.09)	(0.06)	(0.07)	(0.10)	(0.09)	(0.09)
$ShortDollarDebt \times Foreign$	0.017	0.045*	0.007	0.017	0.034	0.056**	0.020	0.025
	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
$Foreign \times Post$	0.127*	0.143*	0.113*	0.043	-0.033	0.003	-0.019	-0.011
	(0.07)	(0.07)	(0.06)	(0.04)	(0.03)	(0.05)	(0.03)	(0.04)
$ShortDollarDebt \times Post$	-0.150**	-0.190**	-0.182**	-0.182**	0.053	0.060	0.063	0.063
	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
$Foreign$	0.012	0.018	.	.	0.016	0.020	.	.
	(0.02)	(0.02)	.	.	(0.02)	(0.02)	.	.
$ShortDollarDebt$	-0.013	0.009	0.015	0.016	-0.025	-0.003	0.003	0.005
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$ShortBankDebt$	-0.023	-0.037**	-0.037**	-0.041**	-0.021	-0.036**	-0.036**	-0.042**
	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
$BondAbroad$	0.029*	0.030	0.030	0.026	0.033**	0.035	0.035	0.031
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$InternationalLoan$	0.000	0.011	0.012	0.011	0.001	0.011	0.011	0.011
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
$Equity$	0.002	-0.004	-0.006	-0.005	-0.001	-0.009	-0.011	-0.008
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
Observations	1394	1445	1445	1445	1394	1445	1445	1445
Firms	305	233	233	233	305	233	233	233
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	no	yes	no	no	no	yes
F-test								
$ShortDollarDebt$	0.039	0.007	0.034	0.008	0.703	0.079	0.855	0.751
$Foreign$	0.006	0.009	0.230	0.016	0.731	0.219	0.883	0.692
$ShortDollarDebt \times Post$	0.014	0.020	0.013	0.004	0.630	0.651	0.647	0.662
$Foreign \times Post$	0.007	0.028	0.139	0.008	0.524	0.908	0.784	0.566

Notes: Standard errors are corrected for clustering at the year level and are reported in parenthesis. *Investment* is normalized by total assets. In columns (1) to (4) *Post* is a dummy variable that takes a value of one in the year of the twin crisis and one year after; the starting year is 2002 for Argentina and 1995 for Mexico. Columns (5) to (7) refer to currency crises; the starting year is 1999 and 2002 in Brazil. Starting years are the depreciation years in both cases. 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 first crisis. *Foreign* is a dummy variable that takes a 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 (3), (4), (7) and (8) where foreign is a dummy variable that takes a value of one if foreign investors own more than 49 percent of the company at any time in the three years prior to the first 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 a value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes a value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes a 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.

Exporter Definition	Predetermined			
Foreign Definition	Predetermined			
	(1)	(2)	(3)	(4)
$ShortDollarDebt \times Foreign \times Post$	0.236**	0.178**	0.121**	0.191**
	(0.12)	(0.07)	(0.06)	(0.07)
$ShortDollarDebt \times Foreign$	0.026	0.024	0.026	0.031
	(0.04)	(0.03)	(0.03)	(0.03)
$ShortDollarDebt$	0.012	0.008	0.022	0.016
	(0.02)	(0.03)	(0.02)	(0.03)
$ShortDollarDebt \times Post$	-0.238**	-0.152**	-0.209**	-0.182**
	(0.11)	(0.07)	(0.08)	(0.07)
$Foreign$	.	.	.	.
	.	.	.	.
$Foreign \times Post$	0.083	0.037	0.030	0.053
	(0.07)	(0.03)	(0.04)	(0.04)
$DollarAssets$	-0.019			
	(0.04)			
$DollarAssets \times Post$	-0.362			
	(0.30)			
$Cash$		0.216***		
		(0.04)		
$Cash \times Post$		-0.521		
		(0.32)		
$Leverage$			-0.086***	
			(0.02)	
$Leverage \times Post$			0.245*	
			(0.14)	
$LongBankDebt$				-0.056**
				(0.02)
$ShortBankDebt$	-0.048**	-0.039**	-0.036**	-0.054**
	(0.02)	(0.01)	(0.01)	(0.02)
$BondAbroad$	-0.002	0.009	0.031	0.022
	(0.03)	(0.02)	(0.02)	(0.02)
$InternationalLoan$	0.021	0.007	0.011	0.016
	(0.02)	(0.02)	(0.02)	(0.02)
$Equity$	0.004	-0.011	-0.003	-0.004
	(0.02)	(0.02)	(0.02)	(0.02)
Observations	1188	1409	1445	1392
Firms	200	230	233	231
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				
$ShortDollarDebt$	0.199	0.034	0.016	0.006
$ShortDollarDebt \times Post$	0.080	0.020	0.007	0.005
$Foreign \times Post$	0.102	0.025	0.136	0.028
$NewControl \times Post$	0.443	0.000	0.000	0.002

Notes: Standard errors are corrected for clustering at the year level and are reported in parenthesis. *Investment* is normalized by total assets. In columns (1) to (4) *Post* is a dummy variable that takes a 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 first crisis. Foreign is similarly defined in terms of predetermined values and takes a value of one if foreign investors own more than 49 percent of the company at any time during the three years prior to the first 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 a value of one if foreign investors own more than 49 percent of the company at any time in the three years prior to the first 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 a value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes a value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes a 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.

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Exporter Definition	Predetermined		
Foreign Definition	Predetermined		
	Mexico 1995	Brazil 1999	Brazil 2002
	(1)	(2)	(3)
$ShortDollarDebt \times Foreign \times Post$	0.242**	0.540	-0.025
	(0.09)	(0.34)	(0.13)
$ShortDollarDebt \times Foreign$	-0.189	0.191**	0.160
	(0.15)	(0.07)	(0.09)
$ShortDollarDebt$	0.016	-0.058	-0.031
	(0.06)	(0.06)	(0.06)
$ShortDollarDebt \times Post$	-0.158	0.142	0.006
	(0.10)	(0.09)	(0.07)
$Foreign$	.	.	.
	.	.	.
$Foreign \times Post$	0.187	0.153	0.092
	(0.13)	(0.13)	(0.09)
$ShortBankDebt$	-0.027	-0.068	-0.045
	(0.04)	(0.06)	(0.07)
$BondAbroad$	0.043*	-0.033	-0.056
	(0.02)	(0.07)	(0.07)
$LoanAbroad$	-0.029	0.062	0.066
	(0.02)	(0.05)	(0.05)
$EquityAbroad$	0.014	0.034	0.038
	(0.02)	(0.03)	(0.03)
Observations	393	212	212
Firms	71	49	49
Firm Fixed-Effects	yes	yes	yes
Sector*year	yes	yes	yes
Year	yes	yes	yes
Foreign*year	yes	yes	yes
F-test			
$ShortDollarDebt$	0.032	0.000	0.000
$ShortDollarDebt \times Post$	0.010	0.067	0.980
$Foreign \times Post$	0.031	0.289	0.260

Notes: Standard errors are corrected for clustering at the year level and are reported in parenthesis. *Investment* is normalized by total assets. In column (1) *Post* is a dummy variable that takes a 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 a 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 a value of one in 2002 and one year after corresponding to the currency crisis in Brazil. 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 first crisis. Foreign is similarly defined in terms of predetermined values and takes a value of one if foreign investors own more than 49 percent of the company at any time during the three years prior to the first 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. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes a value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes a value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes a 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.

	Twin Crises			Currency Crises		
Sample of Firms	All	All	Exporter	All	All	Exporter
Foreign Definition	Benchmark	Predetermined	Predetermined	Benchmark	Predetermined	Predetermined
Exporter Definition			Predetermined			Predetermined
	(1)	(2)	(3)	(4)	(5)	(6)
$Foreign \times Post$	0.045*	0.054*	0.083**	0.002	-0.000	-0.009
	(0.03)	(0.03)	(0.04)	(0.02)	(0.02)	(0.03)
$Foreign$	0.007			0.009		
	(0.01)			(0.01)		
$ShortBankDebt$	-0.031**	-0.032**	-0.046**	-0.030**	-0.030**	-0.042**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
$BondAbroad$	0.063*	0.063*	0.047	0.063*	0.063*	0.049
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)
$InternationalLoan$	-0.012	-0.012	0.002	-0.012	-0.013	0.002
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$Equity$	-0.015	-0.016	-0.006	-0.016	-0.016	-0.006
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Observations	2956	2956	1849	2956	2956	1849
Firms	454	454	278	454	454	278
F-test						
$Foreign$	0.049	.	.	0.602	.	.
Firm Fixed-Effects	yes	yes	yes	yes	yes	yes
Sector*year	yes	yes	yes	yes	yes	yes
Country*year	yes	yes	yes	yes	yes	yes

Notes: Standard errors are corrected for clustering at the year level and are reported in parenthesis. *Investment* is normalized by total assets. In columns (1) to (3) *Post* is a dummy variable that takes a value of one in the year of the twin crisis and one year after in Argentina (2002) and Mexico (1995). In columns (4) to (6) *Post* is a dummy variable that takes a value of one in the year of currency crises and one year after in Brazil (1999) and (2002). The "solvent" firm sample refers to the sample of firms with no mismatch and is defined as firms with $\frac{Exports - ShortDollarLiab}{Assets} \geq 0$. In columns (3) and (6) the subsample of exporters is based on predetermined values and it refers to those firms with positive export to sales ratios at any time during the three years prior to the first crisis. *Foreign* is a dummy that takes a value of one if foreign investors own more than 49 percent of the company. In columns (2), (3), (5) and (6) Foreign is defined in terms of predetermined values and takes a value of one if foreign investors own more than 49 percent of the company at any time during the three years prior to the first crisis and zero otherwise. *ShortBankDebt* is the ratio of short term debt from banks to total liabilities. *BondAbroad* is a dummy that takes a value of one in the year the firm issues a corporate bond abroad. *InternationalLoan* is a dummy that takes a value of one in the year the firm issues syndicated loans abroad. *Equity* is a dummy that takes a 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 —Performance of Exporters During Crises
Dependent variable: Investment
Exporter Definition: Predetermined Dummy

	All Crises		Twin Crises	Currency Crises	
	(1)	(2)	(3)	(4)	(5)
$Exporter \times Post$	0.0001	0.007	-0.007	0.024**	0.043**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
$ShortDollarDebt \times Post$		-0.056**	-0.078**	-0.013	-0.063
		(0.03)	(0.03)	(0.04)	(0.05)
$ShortDollarDebt$		-0.004	-0.007	-0.012	-0.002
		(0.01)	(0.01)	(0.01)	(0.01)
$ShortDollarDebt \times Exporter \times Post$					0.134*
					(0.02)
$ShortDollarDebt \times Exporter$					-0.023
					(0.02)
$Exporter$					-0.024**
					(0.01)
Observations	5063	5063	5063	5063	5063
Firms	864	864	864	864	864
Firm Fixed-Effects	yes	yes	yes	yes	yes
Country*year	yes	yes	yes	yes	yes
Sector*year	yes	yes	yes	yes	yes
F-test					
$ShortDollarDebt$		0.040	0.001	0.395	0.404
$Exporter$					0.014
$ShortDollarDebt \times Post$					0.242
$Exporter \times Post$					0.086

Notes: Standard errors are corrected for clustering at the year level and are reported in parenthesis. Sales regressions control for size by including the log of total assets lagged one period. *Investment* is normalized by total assets. *Post* is a dummy variable that takes a value of one in the year of the depreciation and one year after. Columns (1) and (2) refer to all crises so that the starting depreciation year is 2002 for Argentina and Brazil, 1999 for Brazil and 1995 for Mexico. Column (3) refers to twin crises so that the starting depreciation year is 2002 for Argentina and 1995 for Mexico. Finally column (4) 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 first crisis and 0 otherwise. Only in column (5) *Exporter* is defined as one if the firm exported more than ten percent of sales. *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.
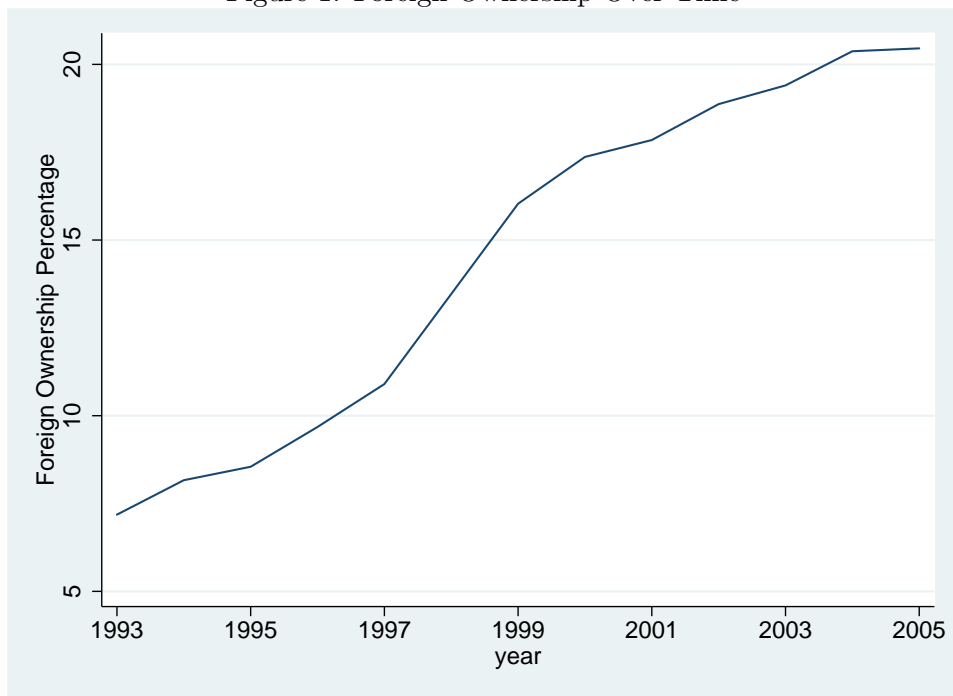
Figure 1: Foreign Ownership Over Time

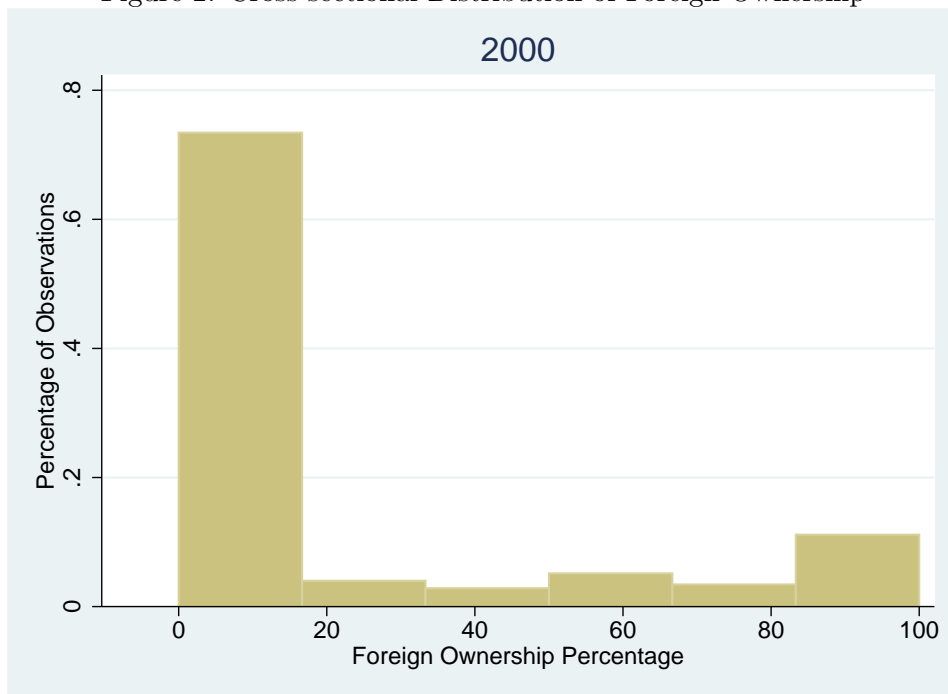Figure 2: Cross-sectional Distribution of Foreign Ownership

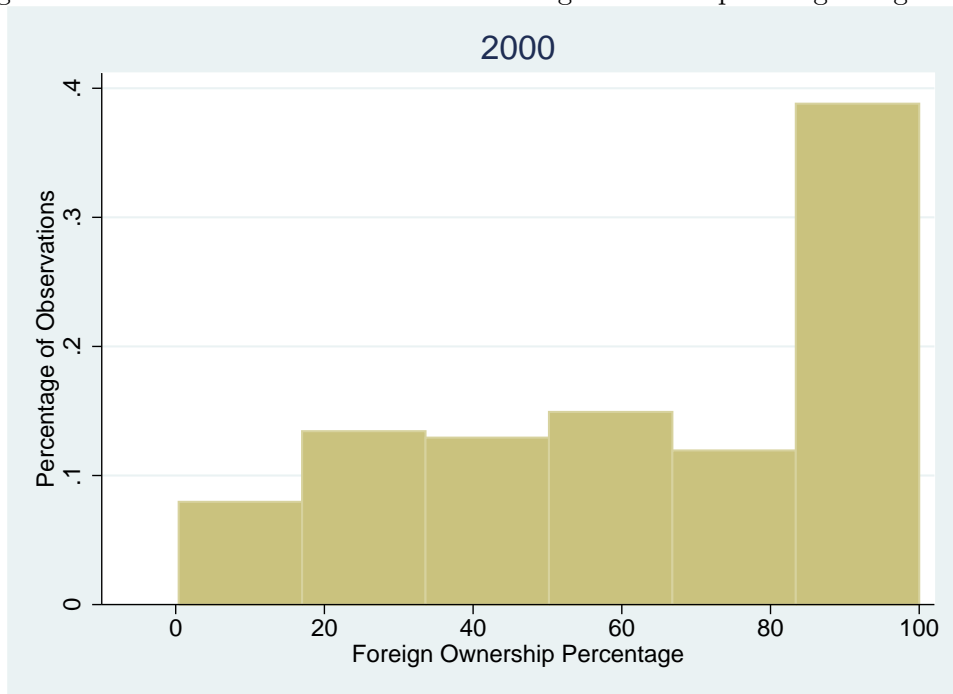Figure 3: Cross-sectional Distribution of Foreign Ownership among foreign firms
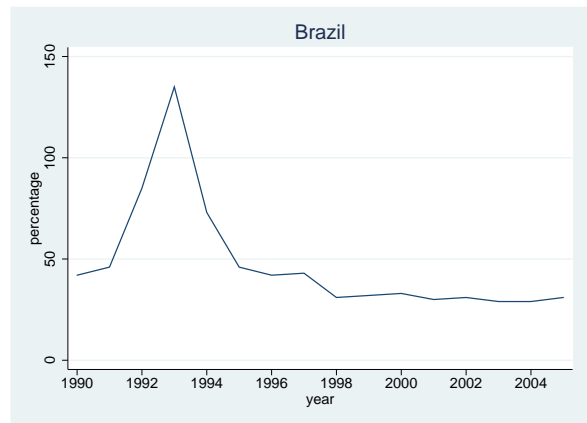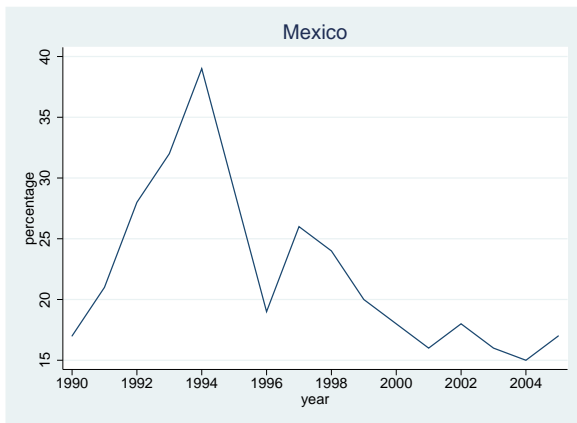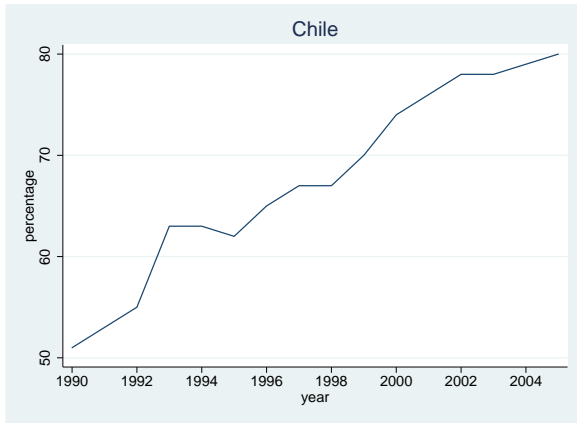
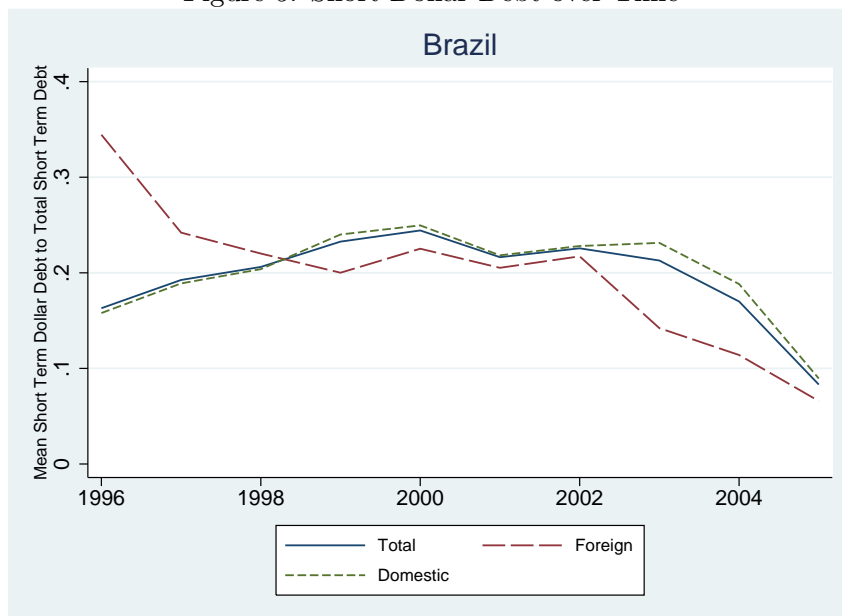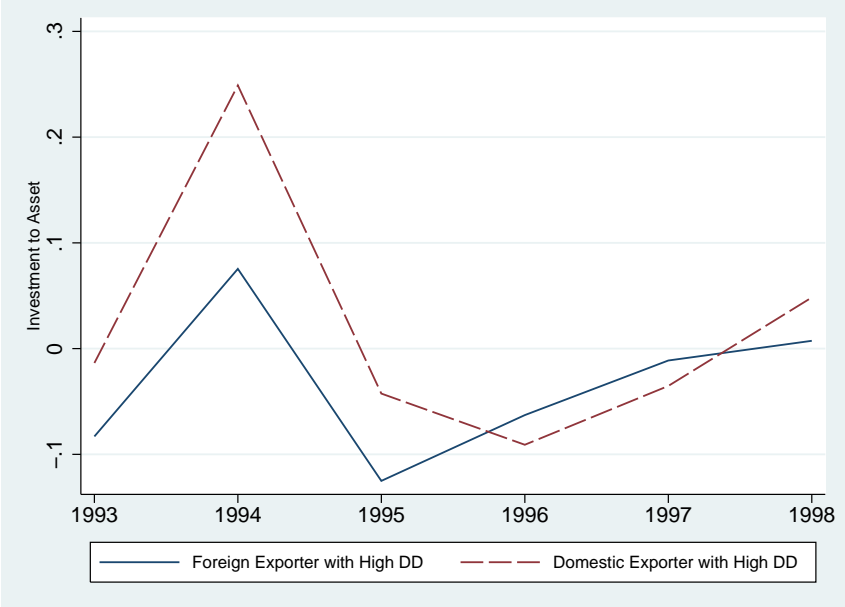Figure 4: Domestic Credit to GDP

Figure 5: Short Dollar Debt over Time

Figure 6: Trends in Investment according to Foreign Currency Denominated Debt

A Cleaning Procedure

We drop all firm/year observations in which the accounting data are not self-consistent. In particular, we drop observations if dollar liabilities (assets) exceed total liabilities (assets) or if the ratio of exports to sales is greater than one. 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 percent 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. 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 percent of the remaining firm-year observations. 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. Notice through out the analysis we use lagged values of the main variables and therefore, we loose one year. Finally, data on additional controls included later on in the estimation leaves us with a sample of 5,063 observations or 864 firms.

B Foreign Ownership Variable

We gathered information on all cross-border Mergers and Acquisitions (M&A) in Latin America between 1981 and 2005 using the SDC Platinum database from Thompson (for the period 1981 to 2001) and Zephyr from Bureau Van Dijk (from 1997 to 2005). 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 doubled 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/) that provides information on companies' history.

We construct a continuous, time-varying measure of foreign ownership based on the percentage

fraction of shares held by foreign and domestic investors in each year. 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 each other, from other domestic investors, 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. We then merged this information with annual balance sheet data. 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.

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. This database contains international public and private business profiles and corporate linkage ("who owns whom") for approximately 184,000 public and private companies worldwide. Notice, in addition to the "formal" sources of foreign ownership data we checked firm by firm company's history. After this extensive search of all these alternative sources, if we find no evidence of foreign ownership we assume the company is domestic.

C Appendix Tables

TABLE A1— CORRELATIONS

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*	-0.0569*	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*	-0.0708*	-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

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).

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Table A2 — Performance of Foreigners during Crises
Dependent variable: Investment

Crisis	All Crises	Twin Crises			Currency Crises		
Sample	All	All	Exporter	Exporter	All	Exporter	Exporter
Foreign Definition	Benchmark	Benchmark	Benchmark	Predeterm	Benchmark	Benchmark	Predeterm
Exporter Definition			Predeterm	Predeterm		Predeterm	Predeterm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Foreign \times Post$	0.036***	0.042***	0.051**	0.058**	0.031**	0.021	-0.002
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$Foreign$	-0.005	-0.000	0.003		-0.003	0.004	
	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)	
$ShortBankDebt$	-0.021**	-0.020**	-0.037***	-0.037***	-0.021**	-0.037***	-0.036***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
$BondAbroad$				0.049*			0.049*
				(0.03)			(0.03)
$InternationalLoan$				0.002			0.002
				(0.01)			(0.01)
$Equity$				-0.003			-0.004
				(0.01)			(0.01)
Observations	5063	5063	2967	2967	5063	2967	2967
Firms	864	864	470	470	864	470	470
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
F-test							
$Foreign$	0.002	0.002	0.004	.	0.127	0.364	.

Notes: Standard errors corrected for clustering at the year level are reported in parenthesis. 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 (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.