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ABSTRACT

I explore an empirically robust but previously undocumented association between the foreign exchange reserves accumulated by central banks of emerging market economies and dollar-denominated debt held in the balance sheets of non financial sector firms. Borrowing in dollars can have damaging effects on corporate balance sheets in the event of exchange rate depreciation. However, firms may discount such risk because of the implicit insurance provided by the central bank's ex-ante reserve accumulation: in the event of a currency depreciation, firms may expect the central bank to stabilize the exchange rate using its stock of reserves. Using a novel firm-level balance sheet database, I investigate this possibility for close to 1500 firms in six of the largest Latin American economies, Argentina, Brazil, Chile, Colombia, Mexico and Peru. Results suggest that over the sample period, 1995-2007, an increase in the level of reserves is statistically and economically associated with an increase in the dollar borrowing of non financial sector firms of these economies. This could hint at a possible paradox: a higher level of reserves need not necessarily signify an economy that is more resilient to shocks. While reserve accumulation enables governments to weather macroeconomic risks arising from sudden stops in international capital flows, it can also increase the vulnerability of the corporate sector to currency risks by distorting incentives. Thus central banks, while formulating their foreign exchange intervention policies, may need to take into consideration the impact of the resultant reserve stockpiling on the private sector.

JEL Classification: F3; F4

Keywords: *Foreign exchange reserves, foreign currency denominated debt, corporate risk-taking, currency depreciation.*

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The objective of my paper is to throw light on the issue of corporate foreign currency debt in context of the international reserve (henceforth IR) accumulation policy of central banks in emerging market economies (henceforth EMEs). The topic of IR accumulation is an old one but has recently gained new prominence as the level of IR has increased dramatically over the last two decades in EMEs. In recent times, central banks of countries across the world especially EMEs, have been actively intervening in foreign exchange markets further adding to the existing stockpiles of IR. In this context, the findings of my current study have important policy relevance. Foreign exchange reserves maybe accumulated by the central banks of EMEs to provide insurance against financial instability triggered by sudden-stops in international capital flows (*precautionary* motive).[2] IR can enhance the ability of economies to defend themselves against macroeconomic shocks, provided the actions of the private sector are held constant. In practice however, private sector responses to central banks' IR accumulation policy maybe endogenous. A large stockpile of reserve assets can act as a public demonstration of a commitment to exchange rate stability. A country with sufficient liquidity can try to sustain the high value of its currency by buying domestic assets and selling reserves. Such country-level insurance may in turn induce foreign currency-debt issuing corporations in EMEs to perceive that they are implicitly insured against currency fluctuations.[3] Thus a reserve hoarding policy may increase the vulnerability of the corporate sector to currency risks by distorting incentives.

On one hand, interest rates on dollar debt are lower than on domestic currency debt. On the other hand, dollar debt exposes firms to a currency mismatch between foreign currency liabilities and domestic currency revenues, thereby increasing the vulnerabilities of firms to exchange rate depreciations.[4] However, firms may discount such risk because of the implicit insurance provided by the central bank's ex-ante reserve accumulation: in the event of a currency depreciation, firms may expect the central bank to stabilize the exchange rate using its stock of reserves. In this paper, using balance sheet information for close to 1500 firms in six of the largest Latin American economies (Argentina, Brazil, Chile, Colombia, Mexico and Peru) over the period 1995-2007, I explore the following question: Does hoarding of reserves by the central banks of EMEs encourage non financial sector firms of these economies to borrow more in dollars?

As pointed out by Bordo, Meissner and Stuckler (2009), all else equal, dollar debt exposure in the face of a sudden and large depreciation of exchange rate may make private sector debt default and hence corporate bankruptcies, more likely. According to Krugman (1999), there exists a type of external diseconomy to borrowing in foreign currencies. The decision by an individual firm to

[2]See, for example, Aizenman and Lee (2007). Another possible motivation lies in central banks' efforts to achieve a 'competitive' real exchange rate to boost exports (*mercantilist* motive), with reserve accumulation being a by-product of such a strategy. Henceforth, international reserves (IR) and foreign exchange reserves to be used interchangeably.

[3]Henceforth, dollar debt and foreign currency debt to be used interchangeably.

[4]The role played by currency mismatch in corporate balance sheets in particular, has been theoretically explored, among others by, Chang and Velasco (1999), Krugman (1999), Schneider and Tornell (2001), Caballero and Krishnamurthy (2003) and Aghion, Bacchetta and Banerjee (2004). Hausman, Panizza and Stein (2001) also provide evidence that most contracts between lenders and borrowers in emerging markets take the form of dollar debt.

borrow in dollars imposes costs on the rest of the economy when real depreciation interacts with capital-market imperfections to cause economic distress. Hence the issues to be considered have crucial implications for academic researchers and policy makers, alike. My choice of Latin American (henceforth LATAM) economies in the sample has been primarily dictated by data availability. As pointed out by Eichengreen and Hausman (1999), significant dollar borrowing by non financial sector firms was a major reason for severity of the 1990s LATAM financial crises.

Many observers argue that the large buildups of unhedged foreign liabilities in the corporate sector of EMEs have been caused mainly by fixed or pegged exchange rate regimes. Other authors, however, have claimed that the problem of private sector dollar indebtedness extends across EMEs, regardless of exchange rate regimes.[5] Although the debate among academicians and policy makers has been intense, no real consensus has been reached on the issue of firm-level dollar borrowing in EMEs, and the determinants thereof. While during a fixed exchange rate regime, firms have a higher incentive to borrow in dollars, as the economy shifts to a flexible regime, ideally dollar debt should decrease. However, the central bank of the economy may exhibit a lower credibility of maintaining a regime of float. In other words, the central bank may use its stock of foreign exchange reserves and actively intervene in the foreign exchange market to stabilize the exchange rate.[6] Despite the shift away from fixed exchange rates, central banks' holding of dollar assets has risen sharply in recent years (see, for example, Aizenman and Lee, 2007; and Aizenman, 2007). Such ex-ante reserve accumulation may provide an implicit guarantee to the firms who in turn may consider themselves insulated against the currency risk associated with incurring dollar debts and continue to borrow in dollars.[7] In other words, as a result of this perception of costless insurance or security, firms' share of liability dollarization (share of dollar denominated debt in total debt) may go up as central bank's stock of reserves increases.

My paper makes two important contributions to an understanding of the external financing choices of EME firms. Firstly, to the best of my knowledge, the association between central bank foreign exchange reserves and EME firms' foreign currency denominated debt has not been empirically explored before in the relevant literature. One exception is a recent study by Tong and Wei (2010) who investigate the effect of a country's reserve holding on its corporate firms' risk taking as proxied by domestic debt and find that higher level of reserves is indeed associated with higher risk

[5] See, for example, the evidence in Hausman et al. (2001) of the prevalence of dollar denominated debt in economies with fixed as well as flexible exchange rate systems. They argue that this problem arises due to the fundamental inability of EMEs to borrow abroad in their own currencies, a problem they refer to as the 'original sin'.

[6] Hausmann et al. (2001) argue that given the persistence of dollar liabilities in the private sector, central banks will float, but with a life jacket, i.e. they let the exchange rate float over some range but aggressively intervene if a certain threshold is reached. Exchange rate stabilization helps avoid damaging effects of a major currency depreciation on the balance sheets of a country's financial and non financial sectors.

[7] See, for example, Chamon and Hausmann (2005) who argue that if every atomistic firm expects all other firms to borrow in dollars, then it will also expect the central bank to stabilize the exchange rate at the expense of higher volatility of the interest rate (and hence hold higher reserves, as a precaution against a mass bankruptcy). Consequently, the firm itself will end up borrowing in dollars as well.

taking. However they do not look into the effect of reserves on firms' foreign currency denominated debt. Several studies, mostly theoretical, endogenize the currency composition of private sector debt.According to one approach, foreign currency debt arises in the banking sector because of the moral hazard created by systemic bailout guarantees doled out by the central bank as a lender of last resort.[8] Dooley (2000) points out that fixing the exchange rate offers free insurance to firms that borrow in dollars, thereby encouraging dollar borrowing and creating moral hazard. Distortion of private sector incentives owing to implicit free insurance is also behind the government-bailout-type models, such as in Burnside, Eichenbaum and Rebelo (2001). In their view, stabilizing the exchange rate creates moral hazard. It conveys the impression that the government is socializing the exchange risk, thereby encouraging the private sector to accumulate unhedged exposure. What has largely been neglected in the relevant literature is the possibility that recourse to self-insurance, or precautionary policies by central banks, may have diminished the incentives for firms in EMEs to reduce the extent of their dollar borrowing. The reserves-literature does not explore the impact of central banks' reserve hoarding policies on corporate risk-taking behavior. The currency mismatch literature looks into the the dynamics of dollar-debt, but not the response of corporations to reserve accumulation and neither does the corporate finance literature. The line of thinking expressed in my paper can also be linked to the famous 'fear of floating' hypothesis as proposed by Calvo and Reinhart (2002).[9]

The second contribution of my paper is the use of a novel firm-level balance-sheet database to explore the possible association between central bank's reserves and EME firms' dollar debt.[10] Most of the existing work in the relevant literature remains theoretical, primarily owing to the dearth of appropriate data on firm-level dollar denominated assets and liabilities. Yet, this issue remains in essence one that merits careful examination of suitable data. At the macro level there is a substantial literature documenting the high levels of foreign currency debt in EMEs.[11] However, to understand whether depreciations have a contractionary impact on these firms, EME firm-level studies on dollar debt have mostly documented the impact of currency depreciations on firm investments or net worth

[8] See, for example, McKinnon and Pill (1998); Burnside, Eichenbaum and Rebelo (2001) and Schneider and Tornell (2001).

[9] Moreover, the emphasis in the literature has usually been on the private banking sector's currency exposure but in any economy the corporate sector is much bigger and yet, few studies have looked at the relevant micro-level data. Banks' exposure may not necessarily appear as risky because they borrow as well as lend in dollars but if they lend to firms with limited or no dollar revenues or assets and if exchange rate depreciates, then the likelihood of corporate bankruptcy goes up. This in turn can set off a ripple effect through the entire economy. In other words, currency exposure of banks' clients matter too.

[10] The database used in this study was put together by Kamil (2004). In 2002, the Research Department of the Inter-American Development Bank (IDB) spearheaded a LATAM research project called 'Debt Composition and Balance Sheet effects of Exchange Rate Fluctuations in Latin America: A firm-level Analysis'. One of the main goals of this project was to collect firm-level data on liability composition for a large sample of LATAM companies. As a result of this project, new firm-level information was collected by the IDB for major LATAM economies such as Argentina, Brazil, Chile, Colombia, Mexico and Peru. This data was further enhanced and extended by Kamil (2004, 2009)-the source of all the firm-level information used in the current study.

[11] See, for example, Arteta (2002), Ize and Yeyati (2003), Cespedes, Chang and Velasco (2004).

in the presence of dollar-debt.[12] There is much less empirical work on the determinants of dollar debt at the micro level. Few exceptions include Cowan, Hansen and Herrera (2005), Kamil (2009), and Patnaik and Shah (2010) who find that the shift to floating exchange rate regimes has reduced corporate liability dollarization in EMEs. The current study is also closely related to Schmukler and Vesperoni (2001) who analyze the effect of financial liberalization on firms' financing choices during the 1980s and 1990s for a sample of EMEs. However, in absence of data on the currency composition of firm assets and liabilities, they are unable to examine the factors influencing firm use of foreign currency denominated debt.

My paper sheds light on the effects of reserve accumulation and other firm-level and country-level determinants, on firm-level dollar borrowing. My focus on corporate balance sheet data is useful in understanding the effect of country-level insurance on dollar borrowing from the point of view of the firms, and also allows me to exploit the heterogeneity across firms and countries in my sample. Regression analyses conducted on the panel data-set containing firms from all six economies yield several key findings. An increase in foreign exchange reserves is found to have a positive impact on the share of dollar debt held in the non financial sector firms of these economies. This effect is significant, even after controlling for firm-level characteristics (i.e. factors affecting individual firm's decision to self-select into dollar debt) as well as macroeconomic factors (i.e. common factors that may influence all firms' dollar borrowing decision). The latter include real exchange rate volatility, financial openness and differential borrowing cost between domestic and foreign economies. Secondly, firm specific features, such as the share of exports in sales, firm size, foreign ownership and access to international equity markets, are found to have a significant impact on firm dollar borrowing, across all economies in my sample, much more than the country-level control variables. The results of my analysis also survive a series of robustness checks.

1 Data and Methodology

1.1 Empirical Model

I use annual data for the non financial sector firms of six LATAM economies. My analysis covers the period from 1995 to 2007, chosen primarily on the basis of firm-level data availability. My baseline specification is given by the following regression model:

$$D_{ict} = \beta_0 + \beta_1 FXR_{ct-1} + X'_{ict}\beta_2 + Z'_{ct}\beta_3 + crisis + \gamma_{ct} + \epsilon_{ict}, (i = 1..N; c = 1..K; t = 1..T), \quad (1)$$

where i denotes firms (N=1573), c countries (K = 6), and t time (T = 16). D_{ict} is the ratio of dollar liabilities to total liabilities of firm i in country c at time t, FXR_{ct-1} is the ratio of reserves to GDP in

[12] See, for example, Bleakley and Cowan (2008).

country c at time t-1, X'_{ict} is a vector of firm-level control variables, Z'_{ct} denotes a vector of country-level control variables, *crisis* is a dummy variable and γ_{ct} are country-year dummies.[13] According to my hypothesis, the implicit guarantee provided by ex-ante reserve accumulation may result in firms increasing their dollar-denominated liabilities relative to total liabilities. Thus, I would expect β_1 to have a positive sign in my estimations. In order to account for possible endogeneity, I lag the reserves variable by 1 period so as to avoid potential feedback effect from corporate dollarization and associated financial instability into central banks' decision to accumulate reserves.[14] I cluster the standard errors at the country-year level given that my main independent variable of interest (foreign exchange reserves) varies at this level.

One problem with the baseline specification is that a large fraction of firms have zero dollar debt every year (roughly 23 percent in total). In other words, observations for dollar debt are *left-censored at 0*. In order to account for this type of a corner solution in the choice problem of firms, I estimate equation (1) using a Tobit (censored) model for a limited dependent variable.[15] The structural equation of my Tobit model is as follows:

$$D_{ict} = \quad D^*_{ict} = \beta_0 + \beta_1 FXR_{ct-1} + X'_{ict}\beta_2 + Z'_{ct}\beta_3 + crisis + \gamma_{ct} + \epsilon_{ict} \; if D^*_{ict} > 0, and \tag{2}$$

$$D_{ict} = \quad 0 \; if \; D^*_{ict} \leq 0, \tag{3}$$

where the residuals are *iid* and normally distributed with mean 0 and variance σ^2. D^*_{ict} is a latent variable observed for values greater than 0 observed D_{ict} is the observed level of firms' liability dollarization (i.e. share of dollar liabilities in total liabilities).[16]

To facilitate comparison across heterogenous firms with varying degrees of leverage, my dependent

[13] Using nominal GDP may introduce cyclicality and so, I re-estimated equation (1) using purchasing power parity (PPP) based measures of GDP. Results have not been reported here for brevity but are available upon request.

[14] I also estimated equation (1) using contemporaneous reserves to GDP ratio and the results were found to be weaker (in terms of coefficient magnitude as well as the model's explanatory power). Furthermore I also used 1 period lagged reserves as an instrumental variable, in order to deal with potential endogeneity issues. Results are robust to these specifications and are available upon request.

[15] Fixed effects regressions run on a panel data set of all firms of all six countries in the sample are reported in Table C in the Appendix. Results are robust to both the Fixed Effects and Tobit Model specifications. For further details on the Tobit model, see Technical Appendix in section (5.1).

[16] My baseline Tobit model estimations quantify the overall impact of reserves on firm liability dollarization with non-linear maximization of a log-likelihood function. The Tobit model weighs censored and uncensored observations differently from the standard normal. The net result is a combination of a Probit likelihood function for censored values and the likelihood of a normal distribution. Maximizing it over unknown parameters $(\beta_1, \beta_2, \beta_3, \gamma_{ct})$ we obtain the marginal effect on the latent variable (D^*_{ict}). However I am interested in the effect of the explanatory variables on the observed D_{ict} (i.e. dollar debt ratio of firms). In this model, the marginal effect of each variable on the expected value of the dependent variable is given by the marginal effect on the latent variable times the probability that the latent variable is above the censoring limit (in case of left censoring as is our case wherein dollar-debt is left censored at 0). It is this overall marginal effect, that I report and discuss in Section (2). It can be referred to as the overall effect as it sums both the effect on positive and censored values of dollar-debt. Since the dependent variable is censored and Tobit is a non-linear model, it is not technically feasible to use the fixed effects estimator. Moreover fixed effects estimator in non-linear models are inconsistent with the exception of Logit and Poisson Models (Hsiao, 2003).

variable is firm-level dollar debt normalized by total debt. Subsequently, I also estimate equation (1) using two alternative measures of firm liability dollarization. The explanatory variables can be grouped into two main categories: (i) firm-level microeconomic variables, and (ii) country-level macroeconomic indicators. The variables in the first category have mostly been identified in the corporate finance literature as important factors influencing firm financing choices.[17] The group of firm-level variables consists of the ratio of exports to sales for each firm, firm size (proxied by the natural logarithm of total assets of each firm expressed in US dollars), foreign ownership dummy variable that takes a value 1 if the firm in question is foreign-owned, and access to international equity markets, captured by a dummy variable that takes the value 1 from the year that a given firm starts trading (or raising capital) in a foreign equity market, and 0 otherwise.

The second category comprises country-level macroeconomic variables that may affect firm dollar borrowing. This includes the ratio of IR to GDP for each country, which is the focal point of my analysis, volatility of real exchange rate (measured using the annual standard deviation of monthly real exchange rates) interacted with two dummies respectively representing depreciation and appreciation of the exchange rate, differential borrowing cost measured using the difference between lending rates of each country and the LIBOR of similar duration and financial openness measured by the ratio of foreign assets and liabilities to GDP. The controls are explained in further detail in Section (2). The LATAM economies under consideration experienced a series of financial crises during the sample period.[18] In order to control for these periods, I incorporate a dummy variable, *crisis* that takes a value 1 for the years 1995 to 2002.[19] Data sources and definitions are detailed in the Appendix.

1.2 Data Sources

Data on firm-level dollar variables have been collected from the database described in Kamil (2004, 2009).[20] Rather than only the most liquid firms or firms with the highest market capitalization, as has been common in other related cross-country studies, all publicly traded firms that are listed or have been listed in these economies stock exchanges are included.[21] Most of the information has

[17] See, for example, Booth, Demirguc-Kunt, and Maksimovic (2001), Myers (1977) and Graham and Harvey (2001).

[18] The crisis episodes include (a) Mexican tequila crisis of 1995 that also affected Argentina, (b) Asian currency crisis of 1997 and the Russian crisis of 1999 that had contagious effects in the LATAM region, (c) Brazilian Real crisis of 1999, and (d) the Argentine crisis of 2001-2002.

[19] I also consider a few additional country_level explanatory variables such as external debt to GDP ratio, current account position of each country, political risk and a measure of financial depth of each country proxied by the M2 to GDP ratio- in each of these cases, my results remain the same and are available upon request.

[20] The database does not include commercial banks, brokerage firms, financial groups, insurance companies and mutual funds. Capital structure of financial-sector firms is not comparable with behavior of non financial firms, due to banking regulations impacting currency mismatches on balance sheets. For other studies that have used this database, see, Galindo, Panizza and Schiantarelli (2003), Cowan, Hansen and Herrera (2004), Pratap, Lobato and Somuano (2003), Benavente, Johnson and Morande (2003) and Bonomo, Martins and Pinto (2003).

[21] See, for example, Allayanis, Brown and Klapper (2003).

been collected from annual reports and audited corporate filings obtained from local stock markets and regulatory agencies in each country. Prior to using the data I checked for accounting inconsistencies. While there is no clear distinction regarding the specific currencies in which the debt is denominated, following Kamil (2009) I assume that majority of the debt is issued in US dollars.

Tables 1 and 2 respectively report the number of firms and descriptive statistics (mean and standard deviation) of the important variables (both firm-level and country-level) used in the analysis. Panel A in Table 2 reveals the extent of diversity in the average firm-level dollar debt among the economies in the sample. The average share of dollar debt in total debt of firms is reasonably different between Argentina, Mexico and Peru on one hand (more than 50 percent), and Brazil, Chile and Colombia on the other (15 percent). The overall average across all economies is 29 percent. With regard to reserves, Chile has the highest reserves to GDP ratio (19.1) followed by Peru (17.3). The evolution of the reserve to GDP ratio for each country over time, as well as of the respective country firm-level liability dollarization ratios can also be seen from Figure 1. Figure 2 shows the time-series evolution for both variables for the pooled-sample of all six countries taken together.

2 Estimation Results

The results of the Tobit estimations (equation 1) on the panel data set for all firms in all six countries in the sample are presented in Table 3. These are my baseline results on the effect of reserves on firm dollar debt, and their robustness is examined in subsequent analyses. The effect of reserves to GDP and firm-level control variables are reported under the columns labeled (1) and (2). Column (3) shows the contributions of other country-level variables.

In column (1) the coefficient estimate of reserves to GDP (*reserves/GDP*) is highly significant with a p-value less than 0.001. It has a positive impact on the ratio of firm-level dollar debt to total debt. Without controlling for the effects of other country-level determinants, an increase in reserves to GDP by one standard deviation (or 0.06 according to Table 2) is associated with a higher dollar-debt ratio by by 4.3 percentage points (0.72x0.06). This effect is consistent with my hypothesis that a higher level of reserves i.e. a higher country-level insurance against financial instability may lead the EME firms to borrow more in dollars, possibly due to the underlying implicit guarantee of exchange rate stabilization using the reserves and resultant insulation from currency risk. This specification accounts for around 54 percent of the variation in the share of dollar denominated debt in firm balance sheets.

All the firm-level explanatory variables are highly significant with the expected positive signs. Exports to sales (*exports/sales*) is statistically significant and the sign of its estimated coefficient

is in accordance with theoretical predictions. For instance, as discussed in Caballero and Krishnamurthy (2003), exporting firms may have better access to international credit markets, as they can pledge their export receivables as collateral to foreign lenders (Jeanne 2000). Also, they are likely to be able to better hedge their currency exposure using their dollar denominated export earnings, and thus may be expected to issue higher dollar debt as compared to non-exporting firms. Consistent with this prediction, in my case, the significant and positive coefficient of the exports to sales ratio across all specifications implies that an exporting firm is more likely to borrow in dollars.

Firm size (*firm_size*), measured by the natural log of total assets, is also positive, and statistically significant in all of the specifications in Table 3. This is consistent with the hypothesis that larger firms are likely to have more assets to pledge as collateral, and hence will be able to issue more dollar debt (Allayanis, Brown and Klapper, 2003). Access to international equity markets (*adr_gdr*), captured by a dummy variable, is also significant with a positive sign indicating that foreign stock market listing enables a firm to signal its superior quality to creditors (Allayanis et al, 2003), and hence facilitates the issuance of dollar debt. Finally, *forown*, the dummy variable representing foreign ownership of a firm is also positive and significant; these firms possibly have better access to external credit markets and hence can issue more dollar denominated debt as compared to their domestic counterparts.

In column (2) of Table 3, I report the effects of adding the differential cost of borrowing ($r - r*$), real exchange rate volatility interacted with a depreciation and an appreciation dummy (*rervol*dep* and *rervol*app*), and financial openness (*finopen*), to the baseline regression specification. As predicted by the static trade-off theory (Allayanis et al, 2003), the choice between local and foreign currency debt should be an increasing function of the benefits of each type of debt and a decreasing function of the costs of debt. One potential cost is the difference between interest rates in the domestic and the foreign borrowing markets.[22] Thus, I hypothesize that the difference between domestic and foreign interest rates should be positively associated with the use of foreign currency denominated debt. In the absence of precise data on corporate bond spreads, I proxy the differential borrowing cost in domestic and foreign capital markets (r-r^*) using the difference between the lending rates of respective economies and LIBOR of same maturity.[23] As seen in Table 3, the differential borrowing cost variable does have a positive sign, however it is not significant.[24]

[22]Graham and Harvey (2001) find that 44 percent of firms responding to their survey report that lower foreign interest rates are 'important or very important' in the decision to use foreign debt.

[23]I also used the difference between yields on domestic sovereign bonds and US Treasury Bonds of the same maturity, with data from Datastream the Macroeconomic Databases For Emerging And Developed Markets (CEIC). Results were the same and have not been reported here for brevity but are available upon request. I also tried to proxy the cost by the difference between CDS spreads of US and LATAM economies-however time series data availability for the LATAM economies prior to 2004 was a major issue.

[24]It is possible that there is a non-linear effect of this differential cost of borrowing on firm decision to issue dollar debt. Up to a certain threshold of $r - r*$, firms may find it more profitable to issue peso debt instead in order to avoid potential bankruptcy arising out of currency depreciation. Beyond a threshold, when peso debt becomes

Higher real exchange rate volatility, when interacted with the depreciation dummy implies higher currency fluctuations in the direction of currency depreciation. Fluctuations in this direction imply higher risk associated with issuing dollar debt, and should lead to a lower dollar debt to total debt ratio.[25] My results show that real exchange rate volatility has a negative sign when interacted with the depreciation dummy and it is statistically significant as well. On the other hand, the same real exchange rate volatility variable, when interacted with the appreciation dummy is positive and significant. The results imply that if the real exchange rate is appreciating, firms are willing to tolerate higher volatility of the exchange rate and continue to borrow in dollars. This too is intuitive because an appreciating exchange rate eases the dollar-debt burden of leveraged firms (just as a depreciation worsens the burden). Financial openness too has the expected positive sign (a higher level of financial openness should be associated with a higher level of dollar borrowing) and is highly significant. Finally, the dummy variable, *crisis*, is highly significant with a positive sign in both Columns (1) and (2) implying that during the relatively volatile periods when these LATAM economies experienced financial crises, corporate dollarization went up significantly.

In the presence of these country-level variables, the effect of the reserves to GDP remains significant and positive, and in fact increases in magnitude. After controlling for the effects of the micro and macro determinants of dollar debt, an increase in the reserves to GDP by one standard deviation (or 0.06 according to Table 2) is now associated with a higher dollar-debt ratio by 6.7 percentage points (1.12x0.06). This is non-trivial since the standard deviation of the dollar-debt ratio in the pooled sample is 0.31. Hence, in addition to statistical significance, the effect of the reserves to GDP is of practical relevance as well.

3 Robustness Checks

In this section I report the results of several robustness checks performed to validate the effect of central bank reserves on firm dollar borrowing across different scenarios.[26]

more expensive to issue, firms may disregard or underestimate the underlying currency risk and issue dollar debt. Accordingly the predicted sign of $r - r*$ could potentially go in either direction.

[25] See, for example, Burnside et al (2001a). At the same time if the firm in question happens to be an exporter with not as much dollar debt in its balance sheet, then an exchange rate depreciation will boost its export revenues against which the firm can now issue more dollar debt. So the predicted sign of the *rervol*dep* dummy variable can be ambiguous to some extent. The depreciation dummy is constructed such that it takes a value = 1 when change in the real exchange rate from last year is positive and 0 otherwise. An increase in real exchange rate here means depreciation. The appreciation dummy takes a value = 1 when change in thereal exchange rate from last year is negative and 0 otherwise. The real exchange rate is constructed as nominal exchange rate divided by the CPI of the respective country.

[26] In addition to those reported here, to ensure there is sufficient data for all firms, I deleted firms with less than three years of data and re-estimated equation (1). Results were found to be robust to this specification.

3.1 Alternative Measures of Liability Dollarization

I have so far normalized dollar denominated debt of firms by their total debt to facilitate comparison across firms with different magnitudes of liabilities. As additional robustness checks, I also estimate equation (1) using two other measures of liability dollarization, namely the ratio of net dollar debt (i.e. dollar liabilities - dollar assets) to total debt, and the ratio of dollar liabilities to total assets. While net dollar debt in some sense represents currency mismatch in firm balance sheets (i.e. the excess dollar debt not covered by dollar assets), the ratio of dollar debt to total assets facilitates comparison across firms of different size. The estimation results are presented in Table 4.

Column (1) shows the results for net dollar debt share and column (2) for dollar debt as a share of total assets. The effect of the reserves to GDP ratio is consistently robust across both specifications. When liability dollarization is measured as the share of net dollar debt in firm balance sheets, an increase in reserves to GDP by one standard deviation (or 0.06 according to Table 2) is associated with a higher dollar-debt ratio by by 3.4 percentage points (0.57x0.06). With dollar debt as the share of firms total assets as the dependent variable, an increase in reserves to GDP by one standard deviation (or 0.06 according to Table 2) is associated with a higher dollar-debt ratio by by 3.5 percentage points (0.59x0.06). The estimated impact of the firm level explanatory variables is fairly similar to the results in Table 2, in terms of sensible signs and statistical significance. Country-level factors when significant have the expected signs.

3.2 Alternative Measures of International Reserves

Normalization of IR by an economy's GDP facilitates comparison across economies of different sizes. While this normalization scheme is standard in the empirical literature on IR, it may understate the role of other economic variables in assessing the adequacy of IR holding. For instance, Obstfeld, Shambaugh and Taylor (2008) argue that when a country has open financial markets and aims to stabilize the exchange rate system, it needs to hold reserves proportional to the size of its banking system, proxied by M2. Thus, reserves normalized by M2 would facilitate comparison across my sample of LATAM economies with varying sizes of banking systems. To assess the robustness of the association between reserves and firm-level dollar debt to an alternative method of normalizing IR, I re-estimate equation (1) using the ratio of reserves to M2 as my primary independent variable. The estimation results for each of the three measures of firm-level of liability dollarization, are presented in Table 5a.

Columns (1)-(3) show the estimated effect of country-level reserves to M2 on firm-level share of dollar-debt in total debt, share of net dollar debt in total debt and share of dollar debt in total assets, respectively. The effect of reserves is robust to the alternative normalization across all three specifications. It is positive and statistically signicant with a p-value generally less than 0.001. The

estimated impact of most of the other explanatory variables remains more or less the same, both in terms of magnitude and sign. The differential cost of borrowing $(r - r*)$ is now statistically significant with the expected positive sign (a higher domestic cost of issuing debt encourages firms to issue debt in dollars).

Another common metric used in assessing reserve adequacy in EMEs is the total external debt of these economies. Accordingly I estimate equation (1), using the ratio of reserves to external debt as my main independent variable. Results are reported in Table 5b. Once again, reserves as a proxy for country-level insurance have a positive and statistically significant effect on corporate liability dollarization ratios in two of the three specifications. All other explanatory variables have the predicted signs and the coefficients are mostly comparable to the results of the previous tables.[27]

3.3 Lagged Explanatory Variables

It is possible that most of the explanatory variables (other than reserves to GDP) in equation (1) may themselves be affected by the share of dollar debt in firms' balance sheets. Thus, to control for potential feedback effects from the dependent to the independent variables, I lag all variables by one period and check robustness of the results. I do this for each of the three measures of liability dollarization, i.e. share of dollar debt in total debt, share of net dollar debt in total debt and share of dollar debt in total assets. Results are presented in columns (1), (2) and (3) of Table 6 respectively. Each column includes the same explanatory variables as discussed in the previous section. Reserves to GDP ratio lagged by one period consistently has the expected positive sign across all three specifications and is significant as well. Thus, once again I find evidence that when the level of reserves increases and an economy is possibly more insured against a speculative currency attack, firms are induced to borrow more in dollars, perhaps owing to the implicit expectation that central bank will use its reserves to stabilize the exchange rate. The explanatory power of the variables, when lagged by one period across all three specifications are comparable to the results in the previous tables.

3.4 Adding Sector Dummies

So far I have incorporated dummy variables controlling for the country level unobservable factors that may vary over time and affect firm dollar borrowing decisions. However, there could also be some factors that vary at the sectoral level such as a sector's tradability or vulnerability to inflation etc, that are not captured by the country dummies . Hence, in order to investigate whether the effect of reserves on firms liability dollarization is robust to such sectoral unobservables, I incorporate dummies for the nine sectors in the data (identified using ISIC one digit classification). The

[27]In addition to these, I also added IMF credit lines received by the countries in my sample to their respective stock of reserves and re-estimated equation (1) using this augmented definition of reserves as the main explanatory variable. The results still hold and are available upon request.

results are reported in Table 7. Reserves are normalized using a country's GDP as in the baseline specification of Table 3, and I include sector dummies for each of the three measures of firm dollar debt share. The effect of reserves continues to be robust, positive and statistically significant, and all other explanatory variables have the expected sign when significant.

4 Conclusion

In this study, I explore the possibility that implicit guarantee provided by the ex-ante accumulation of foreign exchange reserves by EMEs may encourage corporate firms to issue more dollar denominated debt. Using novel firm-level balance sheet data for close to 1500 firms across six major LATAM economies, I estimate a simple model with Tobit regression technique and present evidence that could provide support for my hypothesis under the scenarios investigated. I find that when the stock of reserves accumulated by the central banks of these EMEs increases, firms increase the share of dollar denominated debt in their balance sheets, possibly because they expect that the central bank will use its reserves to stabilize the exchange rate in the face of an adverse external shock. My results hold when controlled for firm-level determinants of dollar debt, including exports to sales ratio, variable firm size, ownership structure and access to international equity markets. The results are also robust to the inclusion of differential borrowing cost, real exchange rate volatility, financial openness and the effect of financial crises. Furthermore, the impact of reserves on firm-level dollar debt is sustained when I account for the fact that a significant fraction of the firms in my sample issue zero dollar debt. The result also holds when I incorporate country, sector and year specific effects.

My study has shed new light on the effect of central banks' reserve hoarding policy on firms' risk-taking behavior with regard to using dollar denominated debt as well as on the factors determining firms' foreign currency borrowing. However, a better and more complete understanding of the underlying dynamics requires information on off-balance sheet items that can significantly alter the overall currency exposure of a firm. This is particularly relevant in light of the substantial growth and development of foreign currency derivative trading in EMEs in recent years. This is left as a future exercise. The global financial crisis of 2008-09 is in many ways a watershed event, not only for the developed nations but also for major EMEs such as those in the LATAM region. In this context, an exercise such as the current one or future work in this direction maybe highly informative regarding the impact of the crisis on non financial sector firms of EMEs. For instance in a recent joint paper, using a comprehensive quarterly database with firm-level balance sheet data for the same six countries as in this current study, I examine how LATAM firms pre-crisis financial positions (such as liability dollarization) and international linkages affected their performance at the peak of the global crisis of 2008-09.

An increase in the central bank's stock of reserves should indicate a higher insurance against

sudden stops in international capital flows and accompanying exchange rate depreciation. However, this is relevant when the actions of the private sector of the economy are held constant, which need not be true in practice. My paper provides empirical evidence in support of the finding that as an economy's self insurance improves (in the form of higher foreign exchange reserves), non financial corporations' currency-risk taking may go up (in the form of higher liability dollarization) thereby making them more vulnerable to a negative shock such as a currency depreciation. This could be interpreted as evidence in favor of a potential moral hazard situation wherein firms take advantage of the implicit costless insurance provided by a higher stock of reserves. Such evidence could hint at a possible paradox: a higher level of reserves need not necessarily signify an economy that is more resilient to shocks. While reserve accumulation enables governments to weather external shocks, it may also distort the incentives of the corporate sector. Thus central banks, while formulating their foreign exchange intervention policies, may need to take into consideration the impact of the resultant reserve stockpiling on the private sector.

5 Appendix

5.1 Technical Appendix: Tobit Model

My baseline regressions which are Tobit model estimations, quantify the overall impact of reserves on firms' liability dollarization with non-linear maximization of the following log-likelihood function:

$$\begin{aligned}\Lambda = \quad & \textstyle\sum_{D_{ijct}=0} log\left[\Phi(-\beta_1 R_{ct} + X'_{ijct}\beta_2 + Z'_{ct}\beta_3 + \alpha_j + \gamma_c + \delta_t)\right] + \\ & \textstyle\sum_{D_{ijct}>0} log\left[\phi(-\beta_1 R_{ct} + X'_{ijct}\beta_2 + Z'_{ct}\beta_3 + \alpha_j + \gamma_c + \delta_t)\right] \end{aligned} \tag{4}$$

where Φ and ϕ represent the CDF and the PDF respectively of a standard normal distribution. The Tobit model weighs censored and uncensored observations differently from the standard normal. The net result is a combination of a Probit likelihood function for censored values and the likelihood of a normal distribution. Maximizing it over unknown parameters $(\beta_1, \beta_2, \beta_3, \alpha_j, \gamma_c, \delta_t)$ we obtain the marginal effect on the latent variable (D^*_{ijct}).

However I am interested in the effect of the explanatory variables on the observed D_{ict} (i.e. dollar debt ratio of firms). In this model, the marginal effect of each variable on the expected value of the dependent variable is given by the marginal effect on the latent variable times the probability that the latent variable is above the censoring limit (in case of left censoring as is our case wherein dollar-debt is left censored at 0). For instance the marginal effect of reserve to GDP ratio will be given by:

$$\frac{\delta E\left[D_{ijct}(R_{ct}, X'_{ijct}, Z'_{ct}, \alpha_j, \gamma_c, \delta_t)\right]}{\delta R_{ct}} = \beta_1 * P(D^*_{ijct} > 0) \tag{5}$$

It is this overall marginal effect, indicated in equation (8) above that I report and discuss in section (3). It can be referred to as the overall effect as it sums both the effect on positive and censored values of dollar-debt.

Appendix: Table A: Country-Level Variable Definitions and Descriptions

Variables	Definitions	Descriptions
$reserves/GDP$	International Reserves to GDP ratio	Total Reserves minus Gold over GDP
$reserves/M2$	Reserves to M2 Ratio	Total Reserves minus Gold over M2
$reserves/debt$	Reserves to Debt Ratio	Total Reserves minus Gold over Total External Debt
$r - r*$	Differential Borrowing Cost	Difference between domestic lending rate and LIBOR
$rervol * dep$	Real Exchange Rate Volatility times depreciation	Annual Standard Deviation of Monthly Real Exchange Rates
interacted with depreciation dummy		
$rervol * app$	Real Exchange Rate Volatility times appreciation	Annual Standard Deviation of Monthly Real Exchange Rates
interacted with appreciation dummy		
$finopen$	Financial Openness	Sum of Absolute Capital Outflows & Inflows over GDP

Appendix: Table B: Country-Level Data Sources

Variable Definitions	Data Sources
Total Reserves minus Gold	International Financial Statistics from International Monetary Fund (IFS-IMF)
GDP (Gross Domestic Product)	World Economic Outlook (WEO)
M2 (Broad Money)	World Development Indicators from World Bank (WDI)
Total External Debt	World Development Indicators from World Bank (WDI)
Domestic Lending Rates	Global Financial Database (GFD)
LIBOR	Global Financial Database (GFD)
Capital Outflows and Inflows	International Financial Statistics from International Monetary Fund (IFS-IMF)
Monthly Exchange Rates	Global Financial Database (GFD)
Monthly Consumer Price Index (CPI)	Global Financial Database (GFD)

Table C below shows results of fixed effects panel estimations based on equation (1) in the text. This estimation incorporations firm-specific effects and hence controls for unobserved heterogeneous factors at the firm level that may affect firm dollar debt but that cannot be explicitly controlled for owing to lack of data, such as risk appetite of firms, stock market value of firms, share of imported inputs etc. However, such fixed effects linear estimation model does not take into account the censored nature of the dependent variable and hence may produced biased coefficient estimates. Results show that the reserves to GDP ratio is consistently positive and significant implying that a higher level of reserves (and hence higher insurance against a potential speculative attack) may increase firms' dollar borrowing.

Appendix: Table C: Firm Dollar-Debt and Central Bank Dollar-Reserves

	Dep. Var: Dollar debt/Total debt	
Indep.Vars.	(1)	(2)
$reserves/GDP$	1.123***	1.117**
	(0.415)	(0.527)
$exports/sales$	0.109***	0.113***
	(0.026)	(0.027)
$firm\_size$	3.500***	3.304***
	(0.745)	(0.761)
adr_gdr	1.757	1.288
	(1.830)	(1.955)
$forown$	-2.307	-2.748
	(1.611)	(1.665)
$r - r*$		0.058**
		(0.029)
$rervol * dep$		-6.587**
		(4.442)
$rervol * app$		30.910*
		(16.458)
$finopen$		0.154
		(0.141)
$crisis$	16.927***	21.573***
	(3.816)	(5.011)
Constant	-59.824***	221.330
	(14.370)	(192.635)
Country-Year Dummies	Y	Y
Observations	9852	9577
R^2	0.108	0.110

Note: Columns (1) and (2) correspond to equation (1) in the text. Table reports results of fixed effects estimations on a panel dataset of all firms of all 6 LATAM countries in the sample. Robust Standard errors are in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.

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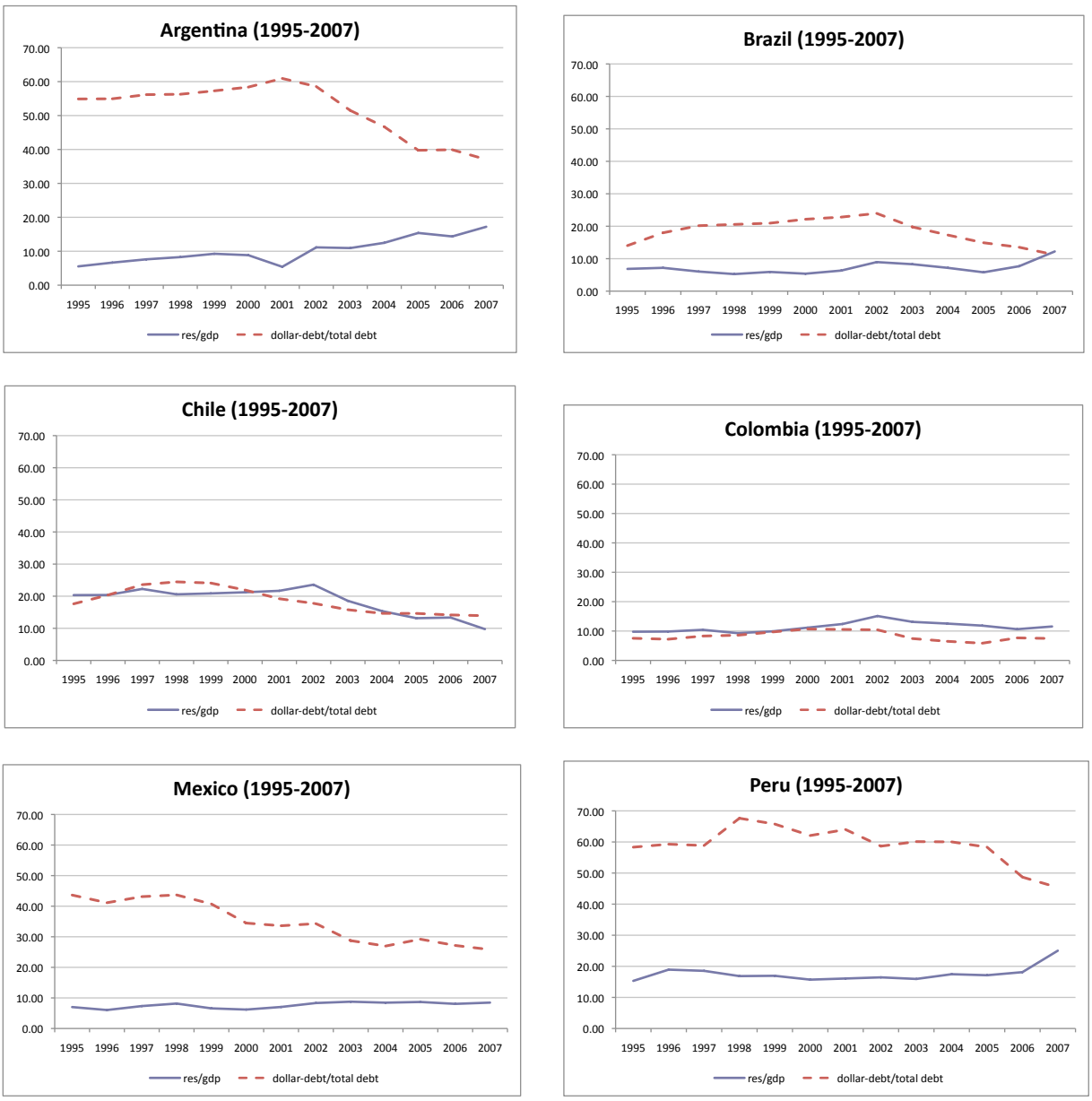

FIGURE 1: The figures above plot the reserve to GDP ratios of Argentina, Brazil, Chile, Colombia, Mexico, and Peru respectively and also the annual average liability dollarization ratios across all firms in each country.

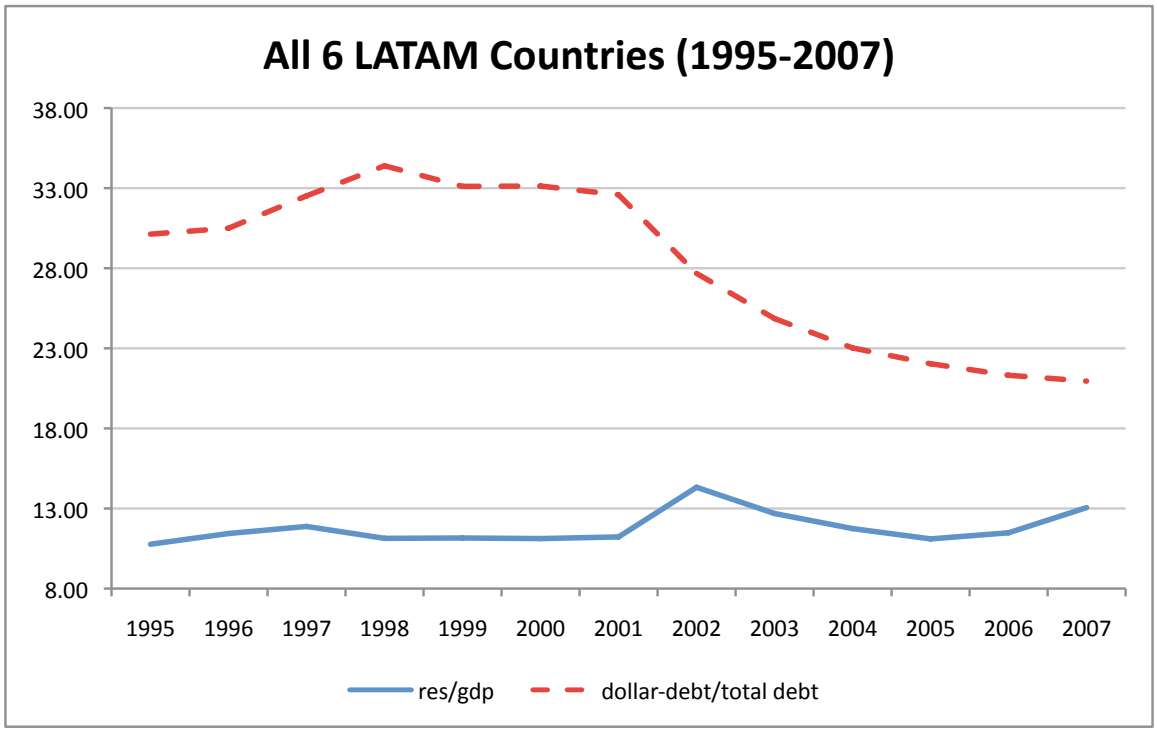

FIGURE 2: This figure shows the average reserve to GDP ratio of the pooled sample (Argentina, Brazil, Chile, Colombia, Mexico, and Peru) over the period 1995-2007, and the annual average firm-level dollar liabilities to total liabilities of the non financial sector firms of the six countries taken together.

TABLE 1: Number of Firms by Year

Countries	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Panel A: Number of Firms by Country														
Argentina	177	185	198	213	215	213	200	93	79	81	81	78	79	1892
Brazil	331	346	346	372	453	429	389	316	315	293	267	200	183	4240
Chile	234	240	240	242	240	236	231	226	220	209	203	195	186	2902
Colombia	172	182	175	131	136	107	125	128	123	118	92	83	76	1648
Mexico	191	182	174	160	143	120	151	145	117	110	95	85	78	1751
Peru	134	161	160	150	130	133	130	111	107	103	98	94	93	1604
Total	1239	1296	1293	1268	1317	1238	1226	1019	961	914	836	735	695	14037
Panel B: Number of Firms by Economic Sector														
Agriculture	50	52	53	50	50	49	47	46	42	39	31	28	29	566
Mining	52	53	53	50	47	46	47	42	37	37	35	34	33	566
Manufacturing	637	640	611	579	585	551	544	454	432	409	370	323	305	6440
Construction	111	120	139	144	151	152	151	105	107	104	97	82	78	1541
Utilities	43	47	44	45	50	48	46	38	38	38	34	32	27	530
Commerce	96	104	107	97	110	100	102	80	74	68	65	57	52	1112
Transport	91	109	115	138	149	130	120	93	80	72	71	57	53	1278
Services	84	90	88	89	99	96	94	95	90	87	79	73	70	1134
Miscellaneous	75	81	83	76	76	66	75	66	60	59	53	49	47	866
Total	1239	1296	1293	1268	1317	1238	1226	1019	961	914	836	735	695	14037

Source: Author's own calculations based on the firm-level database described in the text.

TABLE 2: Descriptive Statistics by Country

Variables	Argentina	Brazil	Chile	Colombia	Mexico	Peru	All
Panel A: Descriptive Statistics of Firm-Level Variables							
Dollar debt/Total debt(%)	53.9	19.0	19.2	8.3	37.3	58.3	29.1
(std. dev.)	(30.9)	(20.6)	(28.5)	(16.1)	(30.6)	(28.2)	(31.0)
Net Dollar debt/Total debt (%)	38.2	18.5	-15.0	4.4	21.1	13.2	10.3
(std. dev.)	(49.8)	(19.5)	(91.4)	(14.1)	(37.0)	(72.7)	(62.2)
Dollar debt/Total assets(%)	29.8	17.4	7.1	3.9	20.6	28.6	16.8
(std. dev.)	(25.7)	(239.7)	(12.7)	(9.1)	(23.7)	(22.4)	(127.9)
Exports/Sales(%)	7.8	11.1	6.2	10.3	16.9	16.9	10.8
(std. dev.)	(17.7)	(20.5)	(18.1)	(20.9)	(23.3)	(27.8)	(21.4)
Total assets(billions USD)	0.5	1.9	0.3	0.2	1.4	0.2	0.93
(std. dev.)	(1.3)	(7.0)	(0.8)	(0.5)	(3.5)	(0.4)	(4.2)
Access to Foreign Stock Mkts (in %: Yes=1, No=0)	11.0	15.0	8.0	2.0	34.0	5.0	12.5
(std. dev.)	(31.0)	(35.0)	(27.0)	(14.0)	(47.0)	(21.0)	(33.0)
Foreign Ownership (in %: Yes=1, No=0)	42.0	30.0	19.0	22.0	37.0	33.0	29.5
(std. dev.)	(49.0)	(46.0)	(40.0)	(41.0)	(48.0)	(47.0)	(45.6)
Panel B: Descriptive Statistics of Country-Level Variables (%)							
$Reserves/GDP$	9.0	6.8	18.8	10.1	7.2	17.5	11.2
(std. dev.)	(3.1)	(1.8)	(3.4)	(1.0)	(1.0)	(2.2)	(5.5)
$Reserves/M2$	33.3	16.6	41.4	42.8	27.1	65.4	34.0
(std. dev.)	(10.3)	(3.8)	(10.4)	(14.4)	(5.5)	(14.2)	(18.0)
$Reserves/Debt$	17.1	25.0	45.1	32.3	25.6	40.1	30.7
(std. dev.)	(6.0)	(13.5)	(11.6)	(5.6)	(11.3)	(16.0)	(7.2)
$r - r*$	12.5	59.2	5.9	21.5	17.1	23.1	26.5
(std. dev.)	(14.4)	(15.2)	(2.0)	(10.6)	(15.0)	(4.1)	(23.6)
$FinancialOpenness$	11.4	7.0	18.2	9.1	6.8	7.6	10.2
(std. dev.)	(4.7)	(2.1)	(6.9)	(2.6)	(1.7)	(2.7)	(5.9)

Panel A columns report avg. values across all firms in each country.

Panel B columns report average values across all years in each country.

Last Column in both panels reports avg. values across all countries pooled.

Source: Author's own calculations based on the firm-level database described in the text. Columns in Panel A report average values across all firms in each country. Columns in Panel B report average values across all years in each country. The last column reports average values across all firms and years in the pooled sample of all six countries.
*(in %; Yes =1, No=0)

TABLE 3: Firm Dollar-Debt and Central Bank Dollar-Reserves

	Dep. Var: Dollar debt/Total debt	
Indep.Vars.	(1)	(2)
$reserves/GDP$	0.724***	1.116**
	(0.215)	(0.181)
$exports/sales$	0.248***	0.250***
	(0.016)	(0.016)
$firm\_size$	3.391***	3.418***
	(0.185)	(0.190)
adr_gdr	4.581***	4.663***
	(0.523)	(0.534)
$forown$	2.679***	2.585***
	(0.512)	(0.525)
$r - r*$		0.011
		(0.013)
$rervol * dep$		-3.177**
		(1.649)
$rervol * app$		16.834***
		(2.149)
$finopen$		0.246***
		(0.081)
$crisis$	8.029***	11.663***
	(1.100)	(0.596)
Constant	-77.318***	-94.190***
	(7.951)	(8.297)
Country-Year Dummies	Y	Y
Observations	9852	9577
Uncensored Obs. (in percent)	77.1	77.0
McFadden's Adj. R^2	0.543	0.539

Note: Column (3) corresponds to equation (1) in the text. Table shows results of Tobit regressions over the sample period 1995-2007 for non financial firms of all six LATAM economies. *reserves/GDP* is international reserves scaled by GDP of each country, *exports/sales* is the ratio of firm-level exports and sales, *firm_size* is variable firm size measures by log of total assets, *adr_gdr* is a dummy variable denoting whether the firm is listed in a foreign stock exchange, *rervol*dep* and *rervol*app* are volatility of exchange rate of each country interacted with a depreciation and an appreciation dummy respectively. *r-r** and *finopen* are the difference between domestic and external borrowing costs and financial openness of an economy, respectively. Coefficient estimates denote marginal effects on dependent variable, evaluated at mean values of independent variables. For dummies, it is the effect of discrete changes from 0 to 1. Robust Standard errors clustered at country-year level in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 4: Alternative Measures of Liability Dollarization

Indep.Vars.	(Net Dollar debt/Total debt)	(Dollar Debt/Total Assets)
$reserves/GDP$	0.573***	0.591***
	(0.149)	(0.149)
$exports/sales$	0.076***	0.213***
	(0.009)	(0.009)
$firm\_size$	2.810***	4.205***
	(0.139)	(0.139)
adr_gdr	0.627	2.170**
	(0.751)	(0.751)
$forown$	1.486***	3.148***
	(0.628)	(0.628)
$r - r*$	0.002	0.001
	(0.007)	(0.007)
$rervol * dep$	-3.164***	0.183
	(0.797)	(0.797)
$rervol * app$	15.461***	7.994***
	(1.178)	(1.178)
$finopen$	0.113***	0.212**
	(0.043)	(0.043)
$crisis$	10.994***	4.384***
	(0.420)	(0.420)
Constant	-116.552***	-252.175***
	(7.965)	()
Country-Year Dummies	Y	Y
Observations	8530	9577
Uncensored Obs. (in percent)	61.4	77.0
McFadden's Adj. R^2	0.359	0.022

Note: Table shows results of Tobit regressions over the sample period 1995-2007 for non financial firms of all six LATAM economies. All explanatory variables are as in Table 3. Coefficient estimates denote marginal effects on dependent variable, evaluated at mean values of independent variables. For dummies, it is the effect of discrete changes from 0 to 1. Robust Standard errors clustered at country-year level in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 5a: Alternative Measure of Reserves

Indep.Vars.	(Dollar debt/Total debt)	(Net Dollar debt/Total debt)	(Dollar Debt/Total Assets
$reserves/M2$	0.429***	0.181***	0.189**
	(0.111)	(0.048)	(0.087)
$exports/sales$	0.249***	0.072***	0.221***
	(0.016)	(0.010)	(0.053)
$firm\_size$	3.377***	2.815***	4.343***
	(0.201)	(0.143)	(0.919)
adr_gdr	4.706***	0.708	2.341**
	(0.538)	(0.764)	(1.059)
$forown$	2.900***	1.810***	3.623***
	(0.535)	(0.629)	(1.046)
$r - r*$	0.042***	0.016***	0.015*
	(0.008)	(0.003)	(0.009)
$rervol * dep$	4.390**	-0.026	3.258*
	(2.233)	(0.945)	(1.754)
$rervol * app$	17.231***	15.614***	8.283***
	(2.583)	(1.098)	(2.219)
$finopen$	-0.025	-0.015	0.089
	(0.113)	(0.046)	(0.099)
$crisis$	11.870***	10.870***	4.293***
	(1.192)	(0.510)	(1.345)
Constant	-96.828***	-116.580***	-261.122***
	(11.876)	(8.746)	(66.829)
Country-Year Dummies	Y	Y	Y
Observations	8801	7890	8801
Uncensored Obs. (in percent)	77.0	61.3	77.0
McFadden's Adj. R^2	0.541	0.362	0.022

Note: Columns (1) and (2) correspond to equation (1) in the text. All explanatory variables are as in Table 3. Coefficient estimates denote marginal effects on dependent variable, evaluated at mean values of independent variables. For dummies, it is the effect of discrete changes from 0 to 1. Robust Standard errors clustered at country-year level in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 5b: Alternative Measure of Reserves

Indep.Vars.	(Dollar debt/Total debt)	(Net Dollar debt/Total debt)	(Dollar Debt/Total Assets
$reserves/debt$	1.044***	0.447***	0.303
	(0.359)	(0.150)	(0.294)
$exports/sales$	0.248***	0.072***	0.221***
	(0.016)	(0.010)	(0.053)
$firm\_size$	3.377***	2.815***	4.343***
	(0.201)	(0.143)	(0.919)
adr_gdr	4.708***	0.709	2.342**
	(0.538)	(0.764)	(1.059)
$forown$	2.898***	1.809***	3.623***
	(0.536)	(0.629)	(1.047)
$r - r*$	0.027***	0.010**	0.008
	(0.012)	(0.005)	(0.011)
$rervol * dep$	4.881*	0.221	2.505
	(2.635)	(1.094)	(2.334)
$rervol * app$	25.259***	19.090***	9.511***
	(4.026)	(1.724)	(3.242)
$finopen$	0.133	0.052	0.140
	(0.142)	(0.057)	(0.118)
$crisis$	0.292	6.492***	-0.162
	(2.585)	(0.911)	(2.262)
Constant	-96.048***	-114.228***	-261.712***
	(7.829)	(6.839)	(66.580)
Country-Year Dummies	Y	Y	Y
Observations	8801	7890	8801
Uncensored Obs. (in percent)	77.0	61.3	77.0
McFadden's Adj. R^2	0.541	0.362	0.022

Note: Columns (1) and (2) correspond to equation (1) in the text. All explanatory variables are as in Table 3. Coefficient estimates denote marginal effects on dependent variable, evaluated at mean values of independent variables. For dummies, it is the effect of discrete changes from 0 to 1. Robust Standard errors clustered at country-year level in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 6: With Lagged Explanatory Variables

Indep.Vars.	(Dollar debt/Total debt)	(Net Dollar debt/Total debt)	(Dollar Debt/Total Assets
$L.reserves/GDP$	0.928***	0.322***	0.334***
	(0.106)	(0.045)	(0.121)
$L.exports/sales$	0.240***	0.065***	0.210***
	(0.016)	(0.010)	(0.051)
$L.firm\_size$	3.409***	2.800***	4.489***
	(0.197)	(0.139)	(1.010)
$L.adr_gd$r	5.020***	0.841***	2.331***
	(0.572)	(0.759)	(0.965)
$L.forown$	2.665***	1.612***	3.247***
	(0.500)	(0.614)	(0.919)
$L.r - r*$	-0.018*	-0.063***	-0.004
	(0.010)	(0.004)	(0.018)
$L.rervol * dep$	11.963***	6.385***	5.785***
	(0.537)	(0.305)	(0.846)
$L.rervol * app$	28.263***	13.409***	10.320***
	(1.284)	(0.720)	(2.514)
$L.finopen$	-0.003	0.012	0.040
	(0.022)	(0.016)	(0.058)
$crisis$	15.714***	11.956***	5.547***
	(0.416)	(0.306)	(0.505)
Constant	-96.048***	-114.228***	-261.712***
	(7.829)	(6.839)	(66.58)
Country-Year Dummies	Y	Y	Y
Observations	9170	8025	9170
Uncensored Obs. (in percent)	76.5	59.9	76.5
McFadden's Adj. R^2	0.542	0.362	0.023

Note: Columns (1) to (3) correspond to equation (1) in the text. All explanatory variables are as in Table 3. Coefficient estimates denote marginal effects on dependent variable, evaluated at mean values of independent variables. For dummies, it is the effect of discrete changes from 0 to 1. Robust Standard errors clustered at country-year level in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 7: Adding Sector Dummies

Indep.Vars.	(Dollar debt/Total debt)	(Net Dollar debt/Total debt)	(Dollar Debt/Total Assets
$reserves/GDP$	1.144***	0.591***	0.753***
	(0.199)	(0.156)	(0.250)
$exports/sales$	0.223***	0.076***	0.180***
	(0.014)	(0.008)	(0.042)
$firm\_size$	3.382***	2.687***	4.111***
	(0.179)	(0.124)	(0.885)
adr_gdr	4.815***	0.712	2.389**
	(0.504)	(0.715)	(0.948)
$forown$	2.162***	1.275**	2.150***
	(0.507)	(0.603)	(0.794)
$r - r*$	0.010	0.001	-0.001
	(0.014)	(0.007)	(0.016)
$rervol * dep$	-2.560*	-.894***	1.739
	(1.667)	(0.826)	(1.945)
$rervol * app$	17.739***	15.962***	7.442***
	(2.216)	(1.241)	(2.402)
$finopen$	0.222***	0.115***	0.185*
	(0.083)	(0.044)	(0.104)
$crisis$	11.778***	11.047***	4.770***
	(0.628)	(0.431)	(1.068)
Constant	-94.088***	-119.591***	-262.916***
	(7.501)	(7.742)	(66.73)
Country-Year Dummies	Y	Y	Y
Sector Dummies	Y	Y	Y
Observations	9577	8530	9577
Uncensored Obs. (in percent)	77.0	61.4	77.0
McFadden's Adj. R^2	0.565	0.372	0.025

Note: Columns (1) and (2) correspond to equation (1) in the text. All explanatory variables are as in Table 3. Coefficient estimates denote marginal effects on dependent variable, evaluated at mean values of independent variables. For dummies, it is the effect of discrete changes from 0 to 1. Robust Standard errors clustered at country-year level in parentheses. ***, **, and * denote signicance at the 1 percent, 5 percent, and 10 percent levels, respectively.