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Evidence from the 2000s

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Abstract[1]

This paper empirically tests the effects of foreign currency debt on economic performance and investment behavior in non-financial firms in six Latin America and Caribbean countries. It is found find that domestic-currency depreciations may surprisingly increase the exchange-rate induced profits of particularly highly foreign currency-indebted firms (especially those that are foreign owned and others with foreign links). Such depreciations have only a mild correlation with gross profits. Foreign-currency debt seems to have ambiguous effects on fixed investment purchases behavior, possibly attributable to non-financial firms' behavior as financial intermediaries. This effect tends to vanish when financial derivatives are considered.

JEL classifications: G32, F34
Keywords: Balance sheet currency composition, Carry-trade, Financial derivatives

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1. Introduction

The extraordinary excess liquidity available to Emerging Market countries in the aftermath of the 2007-2008 sub-prime crisis seemed to have induced Latin America and the Caribbean (LAC) firms to increase their foreign-currency borrowing (mainly through foreign-currency bond issues), profiting from exceptionally low interest rates.[2] This process somehow reversed the debt de-dollarization dynamics witnessed in the first decade of the twenty-first century, bringing new words of caution, mainly from policymaking-related organizations. This concern has not arisen solely from the well-known problems associated with high debt dollarization in several LAC countries during the 1990s.[3] Instead, the main reason for new warnings was the increasing evidence on the destination of receipts from those bond issues. Indeed, several recent papers[4] document that non-financial corporations used a large share of the receipts from such bond issues to increase their liquidity positions in local banks or other financial intermediaries, acting in this case as a branch of those intermediaries.

On the other hand, since the late 1990s and, especially, from the beginning of the new century, there has been evidence on the growing participation by non-financial firms in LAC in active risk management practices, including trading in currency and other financial derivative instruments.[5] This evidence suggests that trading in derivatives may play some role in the new process of foreign-currency borrowing, which it did not have in the first wave of debt dollarization in the early and mid-1990s.

This paper has two main goals. The first is to analyze the possible influence of the level of foreign-currency debt of firms on their performance, investment behavior and liquid assets accumulation. In the end, the importance of the above-mentioned warning about the possibility of returning to highly dollarized debt may be mitigated if it can be shown that such debt composition decisions do not negatively affect firms' profits. The second goal is to analyze the role that currency and other financial derivatives trading has in the influence of foreign-currency debt on firm performance and behavior. One question that naturally arises is whether that growth of firm trading in these derivative securities favors currency risk hedging such that average

[2] There is a growing literature presenting empirical evidence on this process. See, e.g,, Gozzi et al (2015)
[3] See, e.g., Powell (2014).
[4] See, e.g., Hattori, Shin and Takahashi (2009), Chung et al. (2014), Shin and Zhao (2013), Bruno and Shin (2015) and Caballero, Panizza and Powell (2015). The literature review below links these papers with ours.
[5] See, e.g., Schiozer and Saito (2009), Rossi Jr. (2004 and 2013), Qu (2011) and Buscio, Gandelman and Kamil (2012).

profits are higher for such firms relative to those not trading with derivatives. A second related question is whether firms trading in these derivatives display different investment and liquid asset behavior than those not trading in those securities. The second goal of this paper is then to provide a first answer to the last two questions posed here.

To fulfill those two objectives, the paper uses a hand-collected database of 128 non-financial public firms from six countries: Argentina, Brazil, Chile, Colombia, Mexico and Peru. This database not only contains the traditional accounting data coming from annual statements, but also includes (when available) data on two types of foreign-currency derivatives (swaps and forwards) as well as commodity and interest rate derivatives. This database is the main data source for all the econometric exercises performed to answer the questions posed in each of the three goals.

The main results are as follows. Overall, the correlation between the share of lagged financial debt denominated in foreign currency and firm performance presents mixed evidence. OLS-based estimates reveal that a higher share of that foreign-currency debt may be correlated to lower firm profitability (especially when normalizing profits by size), although the negative link tends to be statistically weak. Yet, for some specific firms (exporters, foreign owned), that negative link may be reversed. However, when IV-based methods dealing with endogenous regressors and unbalancedness of panel datasets are used the link tends to be statistically non-significant.

Also, while OLS-based estimates tend to find a positive link between foreign currency debt share and investment in fixed assets, the IV-based method finds no effect between the two variables. Both OLS and IV estimates reveal either no link or a positive link in some firms between foreign currency loans and bonds and assets deposited in banks. Although the cases for which a significant positive link are very few, this result suggests that there might be some "carry-trade" behavior by non-financial firms in LAC, at least for those with certain additional features (e.g., those only locally owned).

The inclusion of financial derivatives (normalized by firm size) in the regressions, while confirming some of the results mentioned in the paragraph above (especially those related to the link with firm performance), changes some others. In particular, the correlation between foreign-currency denominated loans and bonds and liquid assets in banks changes in sign. For most specifications the correlation becomes negative and statistically significant in some of the latter.

This suggests that the behavior of firms actively trading in derivatives concerning the destination of the receipts from their borrowing in foreign currency may be very different from those not trading in derivatives. Even though the robustness of these results are not quite proven given sample-size issues, this result constitutes a challenge to the recent carry-trade literature (discussed below) on financial decisions by non-financial firms.

This paper contributes to the traditional literature on exchange rate exposure. Classic references are Dominguez and Tesar (2001, 2006) and Lane and Shambaugh (2010a and 2010b),[6] while Chue and Cook (2008) and Ye, Hutson and Muckley (2014) present recent studies on exchange rate exposure in Emerging Market countries. For Latin American and Caribbean companies, two representative pieces of work are Rossi Jr. (2009) and Hansen and Hyde (2010). Rossi Jr. (2009) shows that about 25 percent of publicly traded Brazilian firms show significant exchange rate exposure, particularly during crises and in fixed-exchange rate regimes, for the period 1996-2006. That paper also shows that use of both foreign-currency debt and derivative instruments affects the level of exchange rate exposure, especially after the regime moved towards floating regimes. On the other hand, Hansen and Hyde (2010) provide a measure of exchange-rate exposure for publicly-listed Chilean companies. The most significant determinants of the exposure level are assets and liabilities, but not whether the firm produces non-tradables or tradables, or other characteristics.

Although the last two references are close in spirit to the current study, there are some methodological differences. The first basic one is the measure of firm performance. While the studies mentioned above analyze the impact of exchange rate movements on stock market returns, we chose to measure firm performance by using the return-on-assets measure based on accounting statements. The reason is that the relative illiquidity of stock markets in some countries of the LAC region may distort the exchange rate exposure measure.[7] That literature

[6] For a survey on this empirical literature applied to U.S. firms see, e.g., Muller and Verschoor (2006b). The type of exercises in the above-mentioned papers generated a long-lasting stream of papers studying other factors affecting exchange rate exposure. Examples are Aggarwal and Harper (2010), who study the exchange rate exposure of purely domestic U.S. firms; Bartram, Brown and Minton (2010), who link exchange rate exposure and exchange-rate pass-though; Chaieb and Mazzotta (2013), who study the link between exposure and macro-cyclical factors in the United States; Doidge, Griffin and Williamson (2006), who use a portfolio approach to measure exchange rate exposure; Forbes (2002), who analyzes the impact of depreciations between 1997 and 2000 on market capitalization and firm growth; Hutson and Laing (2014), who study the foreign exchange rate exposure of U.S. multinational firms; and Muller and Verschoor (2006a), who find non-linear effects of exchange rates on U.S. multinational firms' returns,

[7] Incidentally, Bartram (2008) is one example from the exchange rate exposure international literature in using cash-flows as an alternative performance measure.

was still focused on the measure of the exposure itself, while in this paper the focus is on the link between the exposure and the currency denomination of debt.

A second branch of literature related to this paper is that analyzing the link between foreign currency borrowing and the use of the receipts of that borrowing. Indeed, as stated above, it is not obvious that the proceeds from bond issues and new loans are to be mostly used in financing fixed capital investment or otherwise in other forms of investment that would induce faster growth or an increase in labor employment. The traditional agency cost[8] approach to corporate finance already warns against potential inefficient use of funds.

More recently, the empirical evidence shows mixed results regarding the link between foreign-markets borrowing by non-financial firms Emerging Market countries and real firm performance and behavior. Didier and Schmukler (2013) and Didier, Levine and Schmukler (2015) present evidence of a strong positive correlation between bond issues in foreign markets, on the one hand, and growth, employment and, in the case of firms from China and India, fixed capital expenditures, on the other. Also, the results of papers by Shin and Zhao (2013), Bruno and Shin (2015) and Caballero, Panizza and Powell (2015) constitute evidence favoring the hypothesis that a large of non-financial firms (including studies comprising firms from Emerging Market countries and LAC) that issue bonds abroad use most of those receipts to increase cash holdings and liquid assets rather than fixed capital investment (a form of carry-trade behavior).

This paper also contributes to the latter discussion by providing evidence on the possible link between foreign-currency loans and bonds and liquid assets held in banks. While the papers mentioned above find a strong positive correlation between those variables, the evidence found here is much weaker. Of course, a big portion of this difference is directly linked to the differences in databases. Yet this paper, being focused on LAC firms, stresses precisely that what seems a strong correlation for a wider coverage of firms included in papers like Bruno and Shin (2015) and Caballero, Panizza and Powell (2015) may become weaker when only a particular region is considered.

A third branch of literature related to this paper studies the potential effect of the currency-derivatives use on firm's value (measured as Tobin's q). A first example of that literature is Fauver and Naranjo (2010). They find a negative correlation between derivative usage and Tobin's q for firms with high agency costs, taking a sample of 1,746 U.S.-based firms

[8] See, e.g., Jensen (1986) and Hart (1995).

for the period 1991-2000. A second example is Allayanis, Brown and Klapper (2012). Using a sample of 372 firms in 39 developed and developing countries they show that the positive impact of the use of derivatives on market value increases with the quality of governance (either at the firm level or at the country level). This paper contributes to this literature by linking the possible carry-trade activities by non-financial firms with financial derivatives trading. To the best of our knowledge, this link has never been developed before.

The rest of the paper is as follows. Section 2 presents the main database characteristics, descriptive statistics and facts about the currency composition of debt (including the analysis of its possible determinants). Section 3 presents the analysis on the consequences of that currency composition for firm performance, especially for on profitability and investment and liquid assets behavior. Section 4 presents the analysis of the role of currency and other financial derivatives trading in the links analyzed in Section 3. Section 5 presents robustness checks. Finally, Section 6 concludes.

2. Data Sources, Sample and Summary Statistics

2.1. Data Sources

As stated in the introduction, the paper uses hand-collected data from annual financial statements downloaded from the websites of a subset of publicly-listed companies,[9] together with other public sources of accounting information (such as the website of financial regulators, as in the case of Colombia). Those statements provide a quite detailed accounting data on assets and liabilities composition, as well as some information on export status, holdings of different types of derivatives activities and some corporate governance features, variables that are also used as controls in the regressions (see below). Yet, this second database also presents a high fraction of missing values for some years for some of those more disaggregated variables. We ended up with annual data corresponding to 127 companies from Argentina, Brazil, Chile, Colombia,

[9] The process of data collection started by looking at the *Economatica* database, used in other similar studies. The latter contains major accounting variables of 1,561 major public companies from Argentina, Chile, Brazil, Colombia, Chile, United States and Venezuela, mostly for the period 2003-2013 (although for a fraction of firms there are observations since 1993). However, such database lacks information of key disaggregated variables such as the export status (with very few exceptions), use of currency and interest-rate derivatives and others that are used for the current study. Also, the fraction of missing values for several variables is quite high. So, we end up using Economatica as a baseline database to complete a first list of public firms in LAC countries for which some accounting data are available.

Mexico and Peru, for a period between 1995 and 2014, although the number of observations for years before 2003 is low. It is clearly an unbalanced panel database.

The regression exercises also control for several macroeconomic variables. The major ones include several interest rates, the ratio between domestic credit and GDP and nominal exchange rates. The source for all these macro variables is the World Bank database.

2.2. Descriptive Statistics

Table 1 below shows descriptive statistics on two sets of selected variables of interest in the analysis performed below. Panel 1.A shows statistics for firm-level variables, while panel 1.B shows those for selected macro variables.

Table 1. Descriptive Statistics

A. Firm-Level Variables	*Sample Size*	*Mean*	*Std Dev*	*Min*	*Max*
Total foreign currency debt as a fraction of total debt	800	0.3853299	0.282964	0	0.9963806
Financial foreign currency debt as a fraction of total financial debt	1,097	0.5934901	0.3586222	0	1
Profits/Losses due to FEx valuations divided by assets	1,056	-0.0047374	0.0349708	-0.6957507	0.2005334
Gross Profits/Losses divided by assets	1,506	0.2004105	0.137723	-0.0812269	1,033,004
Fixed-Asset-Purchases-to-Fixed-Assets ratio	1,040	0.2844566	0.7138978	0	1,406,419
B. Macro Variables	*Sample Size*	*Mean*	*Std Dev*	*Min*	*Max*
Lending Domestic Interest Rate (%)	1,571	24.31135	20.21144	0	86.36333
Lending USA Interest Rate (%)	1,571	5.074818	2.101457	3.25	9.233333
Variation of the exchange rate	1,439	17	133	-388.46	573.61
Overnight Domestic Interest Rate (%)	1,434	8.971131	6.165316	1.40052	33.30327
Overnight USA Interest Rate (%)	1,369	1.569714	1.802737	0.09219	5.15859
Domestic-credit-to-GDP ratio (%)	1,571	37.13524	21	9	109

Source: Authors' calculations based on paper's database.

The first two variables in panel 1.A reflect the degree of dependence on foreign currency when borrowing funds. The first is the fraction of the total debt stock denominated in foreign currency. The second is the fraction of the total financial debt denominated in foreign currency. It is apparent that the latter is higher than the former. Indeed, average total debt in foreign currency is about 20 percentage points less than financial debt denominated in foreign currency. Two conjectures emerge here. The first is that part of this difference may be due to the currency denomination of trade debt, most of which may be denominated in domestic currency. The second conjecture is simply a lack of detailed information on total debt in foreign currency for a fraction of firms, as the difference of size between the two measures also suggests. In terms of

variability, the variation coefficient of the second foreign-currency debt measure is higher than that of the first variable. This suggests a higher heterogeneity of currency denomination in financial debt relative to total debt, although that difference may not be crucial.

The third and fourth variables of panel A refer to two performance variables. One is the term related to profits due to variations in the exchange rate, and the other is linked to global profits. The third variable presents the statistics of the ratio between the profits or losses coming from exchange rate variations and total assets. That average is generally slightly negative, although showing a very high variability, with a very wide range of possible values in this sample. The fourth variable refers to the average of the ratio between total profits / losses over total assets. The mean is undoubtedly positive, although the minimum value is also negative but smaller than the minimum of the other performance variable.

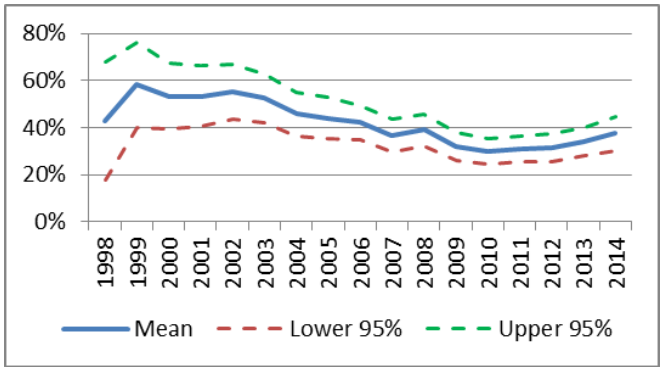
The fifth variable of panel A shows the ratio between the purchases of fixed assets as a fraction of the beginning-of-period total stock of fixed assets. It represents the gross increase rate of fixed assets per company. The average in this sample of this variable (about 28 percent) seems a bit higher when compared to macro estimates of this ratio. Of course, this average cannot be considered as representative of the typical economy in the region, since this sample only includes a subset of publicly listed firms, usually the biggest companies in these economies.

Finally, panel B presents some statistics of major macroeconomic variables used in regression analysis. These have been selected according to the literature studying determinants and consequences of currency composition of debt referred in the introduction.

2.3. Facts

This subsection presents first a set of figures describing the time evolution of some of the variable referred to in Table 1. The goal is to obtain an initial understanding of the behavior of those variables, including casual observations about the correlation between some of those variables through time. The figures below represent such statistics in time-series form to understand their yearly evolution, especially after the beginning of the twenty-first century.

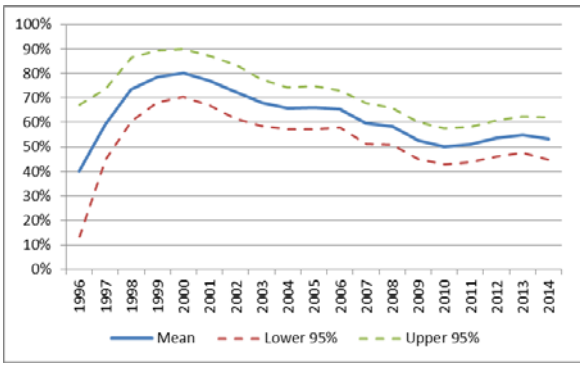
Figure 1. Time Evolution of Average Foreign Currency Debt



Source: Authors' calculations based on paper's database.

Figure 1 shows the time series for the period 1998-2014 of the firm-level mean as well as the 95 percent confidence intervals corresponding to the share of total debt issued in foreign currency (included in Table 1). Given the low number for firms included in the sample for the period previous to the year 2000, the most reliable portion of that figure corresponds to the observations after the beginning of the twenty-first century. Between 2000 and 2011, there is a clear trend towards a "de-dollarization" of total corporate debt, coinciding with the evidence from different sources in the literature sources.[10] However, the declining trend for foreign-currency debt seems to have partially reversed (or at least stopped) in 2012 (although the length of time considered is too short to interpret as a definitive change in the trend). Yet the values of the mean and median of this indicator are far from being considered low. Even the minimum for the mean registered in 2010 was just slightly below 30 percent, while for the year 2014 the mean is approximately 37.5 percent (slightly below the value in 2008).

Figure 2. Time Evolution of Average Financial Foreign-Currency Debt

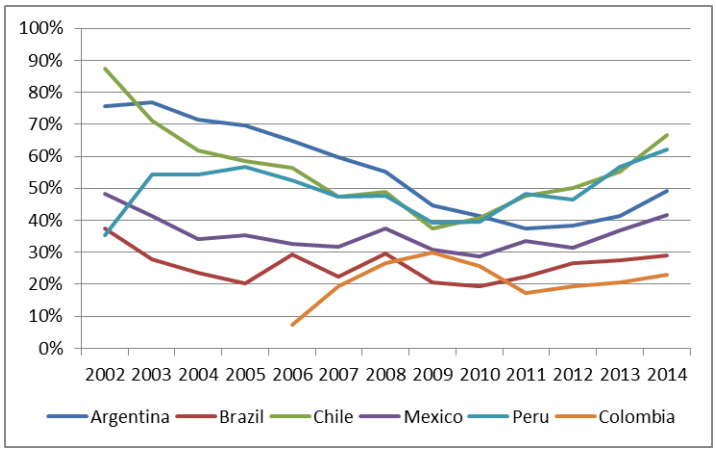


Source: Authors' calculations based on paper's database.

[10] See, e.g., García-Escribano and Sosa (2011).

Figure 2 above shows a similar pattern for the fraction of financial debt issued in foreign currency. Yet, the three curves clearly reflect higher values than those of the series in Figure 1. Indeed, values for the mean of this indicator are clearly above those of the share of total debt in foreign currency, confirming the description based on Table 1 above. The minimum values for this variable are also reached in 2010, and they never crossed the lower threshold of 50 percent. Again, as in the case of the share of total debt in foreign currency, the declining trend seems to have stopped and partially reversed since then, reaching a mean value of 53 percent in 2014.

Figure 3. Time Evolution of Mean Foreign-Currency Total Debt per Country



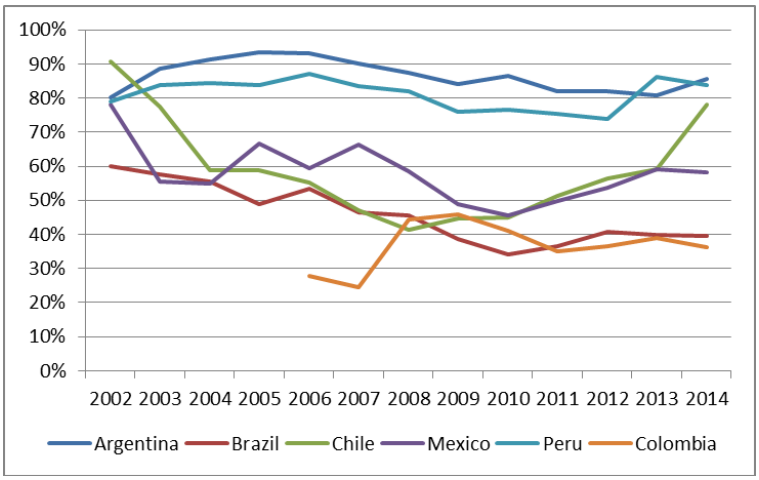
Source: Authors' calculations based on paper's database.

Figure 3 shows the evolution of the firm-level (cross-firm) mean of the fraction of foreign currency debt for each of the six LAC countries in the sample. In the first decade of the twenty-first century that average is clearly declining in four of those countries, with the exception of Brazil (the country with the smallest share of corporate debt dollarization in this sample) and Colombia.[11] Those declining curves are clearly reversing in those four countries. In the case of Chile, the share of debt in foreign currency starts to increase again starting in 2009. Mexico and Peru show a reversal of the declining trend in 2010, while Argentina's reversal begins in 2012. In any case, in the second decade of this century there is a common pattern across countries of partial reversal of the de-dollarization process displayed by major LAC companies in the first decade of the twenty-first century.[12]

[11] For this country the most reliable data on currency composition of debt were available from 2006 on. This is the reason why the time series for the mean value of financial debt in foreign currency of Colombian companies starts in that year.

[12] Panels in Figure A1 in the Appendix show each time series separately.

Figure 4. Time Evolution of Mean Financial Foreign-Currency Debt per Country



Source: Authors' calculations based on paper's database.

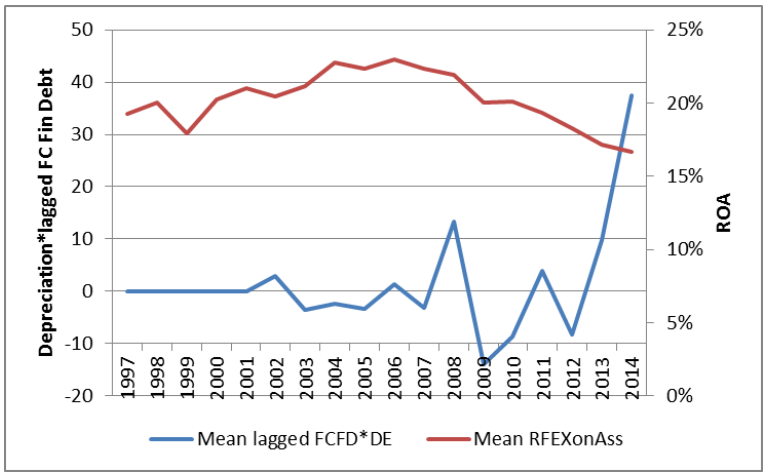
Figure 4 shows the time series for the per country average of the share of financial debt issued in foreign currency. The decline in such fraction is clearly present during the period 2001-2010 for Brazilian and Chilean public companies. Mexican firms also show a decrease in this share for the same period, but with higher volatility. Argentine and Peruvian firms show a sharp decrease in this share between 2001 and 2002 (coinciding with the end of the peg in December 2001 in Argentina) but showing a partial recovery between 2002 and 2006, leading to a later decline between 2006 and 2011. In the case of Colombian companies, the reversal seems much milder and shorter (only between 2011 and 2013). Thus, the six countries show some reversion of the decline in financial-debt dollarization after 2010, although with a high degree of heterogeneity, the reversal being stronger in the cases of Chile and Mexico.[13]

As a summary of basic facts, Figures 1 through 4 above then show a decline in firms' foreign-currency (milder for small firms) until 2011, but the decline seems to be reversing since 2012. The question is whether such behavior seems to be correlated to other variables, particularly economic performance and investment behavior. The reason is that the importance of the re-dollarization process of debt relies on its possible destabilizing effects on the companies themselves.

[13] In the Appendix, Figure A2 shows a very similar pattern for the fraction of total outstanding bonds issued in foreign currency relative to the pattern in figure 2. Indeed, the time evolution for the debt issued in the form of bonds seems to mimic that of the total financial debt in foreign currency. Both the mean and the median reach a minimum in 2010 after declining since 2000 to reverse partially towards an upward trend until 2014 (where the median of these bonds reached 80 percent in 2014).

Given the major goals of this paper, it seems informative to present basic facts about the possible co-movements between some of the foreign-currency debt indicators (probably interacted with some relevant macro variables) and the main performance or behavioral firm-level variables. Figure 5 below shows the time evolution of the profits of companies normalized by total assets (the traditional return-on-asset indicator) and also that of the interaction between the (first lag) of the share of financial debt in foreign currency and the year variation of the exchange rate (between the domestic currency and the U.S. dollar). The figure suggests a possible negative correlation between the two time series.[14]

Figure 5. Time Evolution of Cross-Country Means of Interaction between First-Lags of FC Financial Debt and Depreciation and Net ROA



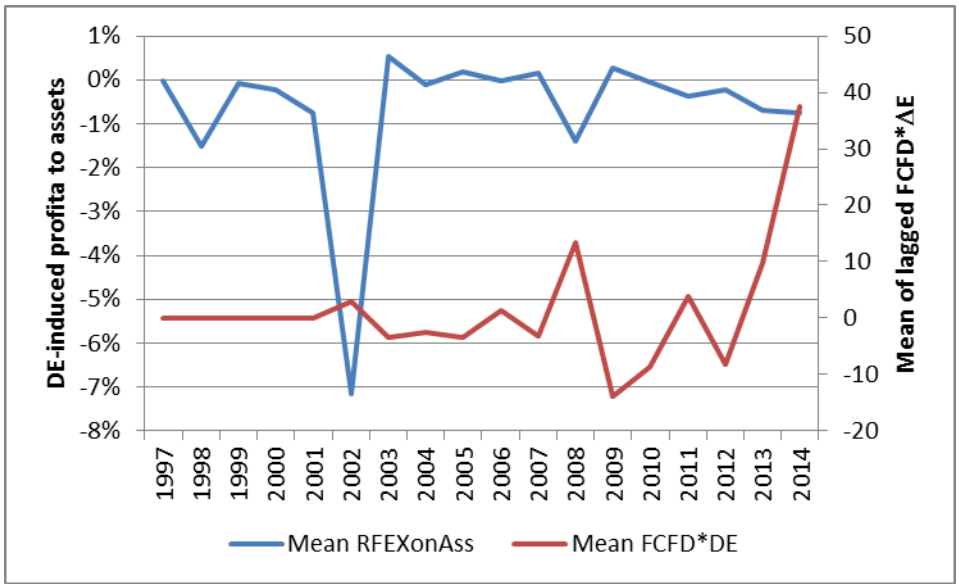
Source: Authors' calculations based on paper's database and WB database.

Of course, that correlation should really be evaluated through a more formal regression procedure. Yet, this figure suggests a basic intuition that larger depreciations of the domestic currency have more negative impacts on the profits of firms with higher foreign currency financial debt.

Figure 6 below shows a similar picture, but now applied to the cross-firm simple averages of the ratio between the profits (or losses) coming from the exchange rate variation instead of the normalized gross profits series.

[14] Indeed, the simple correlation coefficient between the two series for the 2002-2014 period equals -0.454816755.

Figure 6. Time Evolution of Cross-Country Mean of Interaction between the First-Lag of FC Financial Debt and Depreciation and the Ratio between Exchange Rate-Induced Profits and Assets



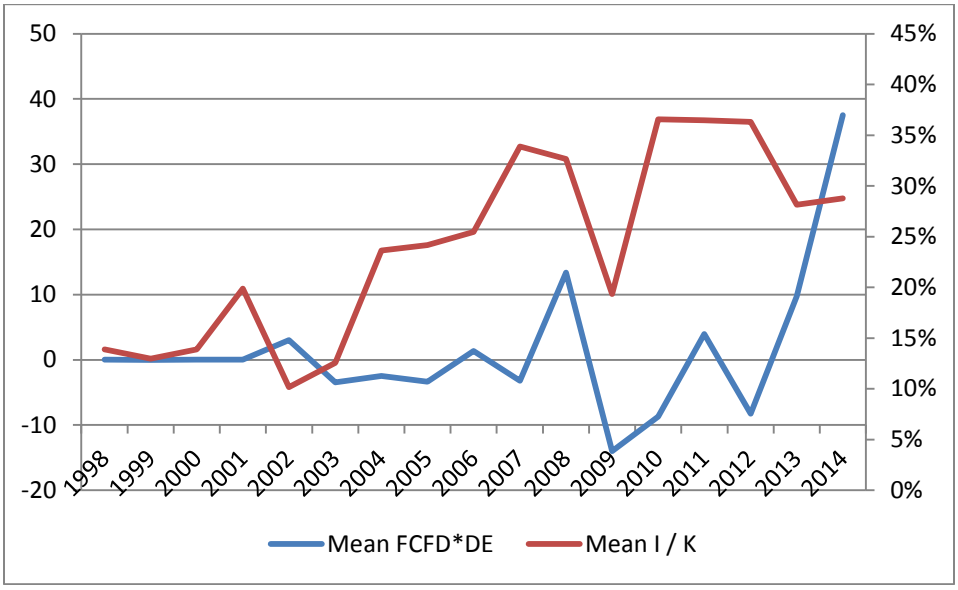
Source: Authors' calculations based on paper's database and WB database.

Figure 6 confirms a similar pattern to that of Figure 5, as expected. Even the degree of negative correlation between these two series seems to be stronger than that of the series in Figure 5.[15] This would not be that surprising, since the performance variable considered here precisely measures the possible negative consequences of domestic currency depreciations, isolated from other sources of profits or losses.

Figure 7 below presents a similar time-evolution comparison between the same interacted variable and the ratio between fixed-capital purchases and the beginning-of-period fixed-asset stock.

[15] Indeed, the simple correlation coefficient for these two series for 2002-2014 in this case is equal to -0.684981643.

Figure 7. Time Evolution of Mean of Interaction between First-Lags of FC Financial Debt and Depreciation and the Mean of Investment-to-Fixed-Assets



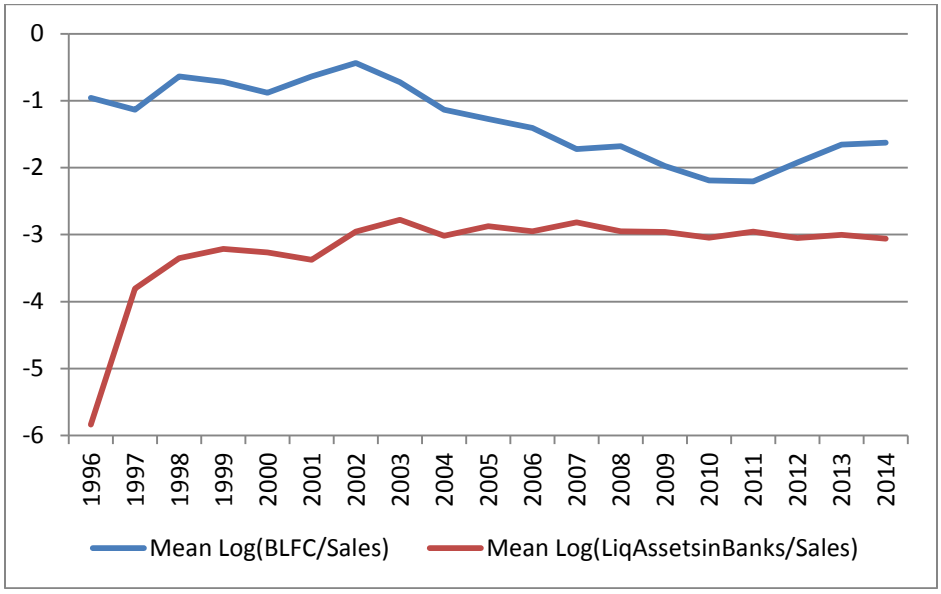
Source: Authors' calculations based on paper's database and WB database.

Unlike Figures 5 and 6, Figure 7 here does not suggest a negative correlation between the two series. Actually, their behavior suggests a positive (though mild) correlation between them.[16] This would suggest that domestic currency depreciations would induce higher investment rates for firms more indebted in foreign currency. If regression analysis confirms this, it would suggest that the firm's reaction to those depreciations would consist of increasing long-term investment and so decreasing long-term exposure to exchange rate movements. Yet, this apparent correlation and story may hide other effects that need to be more carefully studied through formal econometric exercises.

Yet, as stressed in the introduction, another potential use of funds borrowed abroad (or at least borrowed in foreign currency) may be the accumulation of liquid assets, e.g., bank deposits and other liquid-equivalent assets. Figure 8 below shows the time evolution of, on the one hand, the (natural) log of the sum of loans and bonds in foreign currency as a share of sales, and the log of total assets in banks, also as a share of sales, on the other.

[16] The simple correlation coefficient between these two series for the period 2003-2014 is equal to 0.137727795.

Figure 8. Time Evolution of Cross-Country Averages of Bond and Loans in Foreign Currency and Liquid Assets in Banks (normalized by sales, in logs)



Source: Authors' calculations based on paper's database.

The last figure also shows a positive correlation[17] between those two series, possibly stronger than that suggested in Figure 7.

Such facts only describe time behavior of averages or medians of selected variables. Yet, the database allows for a richer description of the behavior of such variables (especially that of foreign-currency debt) correlated to other variables. The following subsection analyzes this.

2.4. Foreign-Currency Debt: Correlation with Other Firm-Level and Macro Variables

As a last step to complete the data description, this subsection presents the results from OLS-based regressions applied to equations relating the currency composition of both total and financial debt with other firm-level variables, alone and interacted with some of the macro variables also included in Table 1. In performing such regressions it is important to recall the variables possibly underlying the time-series behavior described in Figures 1-8.

The existing literature on the determinants of foreign currency debt[18] provides an approximation through the regression equation that "explains" the fraction of foreign currency debt. The basic equation is

[17] The simple correlation coefficient between those two series for the 2002-2014 period is 0,412384602.

$$Y_{it} = \boldsymbol{\beta} \boldsymbol{X}_{i,t-1} + \boldsymbol{\gamma} \boldsymbol{X}_{i,t-1} d_i + \sum_{j \in M} \boldsymbol{\alpha}_j \boldsymbol{x}_{i,t-1} \boldsymbol{m}_{j,t-1} + \varepsilon_{i,t} \quad (1)$$

In equation (1) the dependent variable *Y* is alternatively equal to the share of total debt in foreign currency, in a first set of regressions, and equal to the share of total financial debt in foreign currency, in a second set of regressions. The right-hand side of equation 1 includes a vector **X** of firm-level control variables, part of which comes from the literature. These control variables include the natural log of assets, total leverage, the share of sales exported abroad, the annual rate of growth of total sales, the share of short-term debt and a dummy variable stating whether the firm is foreign owned or not.

The second term measures the effect of each of the firm-level control variables in **X** (excluding the dummy variable of foreign ownership) interacted with a dummy variable *d* on the corresponding dependent variable. The dummy *d* is alternatively one of three firm-specific dummies. The first dummy considers whether the firm is within the larger 50 percent of firms. The second dummy considers whether the firm exports or not.[19] The last dummy is the foreign-ownership variable that is already included in **X** in the first part of the right-hand side. Coefficients **γ** then measures how the influence of each control variable in **X** on the decision of borrowing in foreign currency (in the next year) depends on a firm characteristic.

The third term of the right-hand side shows the effect of a subset of the vector **X** including only the export-to-sales ratio, the log of assets and the foreign ownership dummy. This is the vector **x**. These three variables are interacted with a set of four macroeconomic (country-wise) variables, the four of which comprise the vector **m**. The macro variables are the following: the domestic (lending) interest rate in domestic currency, the spread between the latter and the U.S. interbank rate, and total domestic credit to the private sector as a share of GDP. It also includes year dummies.

Tables 2 and 3 below show the results corresponding to the OLS estimates of equation (1).[20] Table 2 takes the share of total debt in foreign currency as the dependent variable. Table 3 considers the share of total financial debt over total financial debt as the dependent variable.

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[18] See, e.g., Cowan, Hansen and Herrera (2005); Kamil (2009), Brown, Ongena and Yesin (2011); Gozzi et al. (2015); Mizen et al. (2012); and Mora, Neaime and Aintablian (2013), among others.

[19] In the interactions with this latter dummy variable we also consider multiplying this export dummy with another corresponding to the status of being a commodity exporter.

[20] Each table reports only a subset of the coefficients and standard deviation measures, corresponding mostly to statistically significant results, especially for the variables where the significance remains after adding all controls.

Table 2. Determinants of the Share of Total Debt in Foreign Currency

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagA	0.158***	0.0455	-0.0104	0.170***	0.151*	0.199***	0.159***	0.192
	(0.0206)	(0.0348)	(0.0179)	(0.0214)	(0.0693)	(0.0234)	(0.0252)	(0.102)
lagAHA	0.0689	0.107	-0.0185	-0.423***	-0.0330	-0.150	-0.453***	-0.111
	(0.0965)	(0.124)	(0.164)	(0.0892)	(0.140)	(0.243)	(0.103)	(0.0916)
lagZ	0.444	0.645**	1.303***	0.291	1.064**	1.529**	-1.072*	-0.985
	(0.302)	(0.264)	(0.467)	(0.358)	(0.395)	(0.480)	(0.422)	(0.992)
lagFO	-0.163	-0.0979	-0.0172	-0.415	-0.421***	-0.272	0.287	
	(0.0987)	(0.150)	(0.287)	(0.237)	(0.104)	(0.264)	(0.638)	
lagI_Z	0.00642	0.0314***	0.0392		-0.0125	-0.0477*	-0.0117	
	(0.00838)	(0.00863)	(0.0406)		(0.00749)	(0.0217)	(0.0290)	
lagI_FO	-0.0199*	-0.0187*	-0.0477	-0.00642	-0.0213*	-0.0172	-0.214	-0.0670
	(0.00792)	(0.0104)	(0.0325)	(0.00782)	(0.00846)	(0.0106)	(0.147)	(0.0670)
lagSpreadIR_Z	-0.0410	-0.0545***	-0.102***	-0.0441	-0.0323	-0.0371	0.0546	0.000422
	(0.0230)	(0.0144)	(0.0393)	(0.0276)	(0.0178)	(0.0222)	(0.0430)	(0.0772)
lagSpreadIR_FO	0.0271***	0.0288***	0.0571**	0.0237***	0.00958	0.0200	0.174	-0.0432
	(0.00413)	(0.00535)	(0.0233)	(0.00305)	(0.00828)	(0.0109)	(0.144)	(0.109)
lagCPS_GDP_A	-0.000243	-0.000166	-0.000109	-0.000300	0.000181	-0.000539**	-0.000388*	-8.55e-07
	(0.000156)	(0.000146)	(0.000253)	(0.000173)	(0.000590)	(0.000200)	(0.000188)	(0.000714)
lagCPS_GDP_Z	-0.0104	-0.00595**	-0.0133	0.136	-0.0428**	-0.0218***	0.00883	0.635***
	(0.00561)	(0.00264)	(0.0121)	(0.242)	(0.0136)	(0.00385)	(0.00686)	(0.0405)
lagCPS_GDP_FO	0.00357	0.00152	0.000798	0.00643	0.0217***	0.00567*	0.00321	0.0255*
	(0.00190)	(0.00174)	(0.00411)	(0.00342)	(0.00196)	(0.00228)	(0.0240)	(0.0104)
ExpFirm				1.918**				1.569
				(0.536)				(1.133)
lagAHA_ExpFirm				0.477***				0.209
				(0.114)				(0.998)
lagA_ExpFirm				-0.192**				-0.142
				(0.0478)				(0.100)
lagFO_ExpFirm				0.522**				0.0672
				(0.188)				(0.116)
lagI_Z_ExpFirm				0.0480*				0.0194
				(0.0209)				(0.0329)
lagI_FO_ExpFirm				-0.0376***				0.00275
				(0.00484)				(0.0261)
lagCPS_GDP_Z_ExpFirm				-0.148				-0.646***
				(0.235)				(0.0368)
lagI_A_ExpFirm_Com				0.0728**				0.106
				(0.0255)				(0.0681)
lagSpreadIR_A_ExpFirm_Com				-0.0708**				-0.105
				(0.0249)				(0.0674)
lagCPS_GDP_A_ExpFirm_Com				-0.00102				0.00802**
				(0.00937)				(0.00207)
lagCPS_GDP_FO_ExpFirm_Com				0.0164				-0.122**
				(0.156)				(0.0403)
lagSpreadIR_Z_Top50					0.0785*			0.143
					(0.0321)			(0.0891)
lagCPS_GDP_Z_Top50					0.0396**			0.0187
					(0.0148)			(0.0269)
lagCPS_GDP_FO_Top50					-0.0158***			-0.0205***
					(0.00237)			(0.00228)
Top50bycountry						0.594*		
						(0.276)		
lagA_Top50bycountry						-0.0561*		
						(0.0262)		
lagLeverageD_Top50bycountry						0.00879**	-0.105	-0.210*
						(0.00271)	(0.0568)	(0.103)
lagZ_Top50bycountry						-1.536**	-0.00987	0.720**
						(0.432)	(0.0599)	(0.245)
lagI_Z_Top50bycountry						0.0690**		
						(0.0228)		
lagCPS_GDP_A_Top50bycountry						0.000351**		
						(0.000109)		
lagCPS_GDP_Z_Top50bycountry						0.0163*		
						(0.00755)		
Foreignownership							-1.172**	0.383
							(0.415)	(1.020)
lagAHA_Foreignownership							0.628**	0.00505
							(0.201)	(0.859)

Table 2., continued

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagZ_FO							1.659**	1.392
							(0.554)	(0.863)
lagCPS_GDP_A_FO							0.000586**	0.00106***
							(0.000200)	(0.000223)
Constant	-1.755***	-0.0557	0.489***	-1.774***	-1.947**	-2.136***	-1.476***	-2.240*
	(0.132)	(0.454)	(0.0571)	(0.128)	(0.517)	(0.194)	(0.114)	(0.935)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	319	319	319	311	319	319	319	311
R-squared	0.362			0.426	0.457	0.410	0.424	0.524
Number of Firms	46	46	46	43	46	46	46	43

Source: Authors' calculations based on database.
Notes: This table contains the OLS-based results of the benchmark regression equation (1) in Section 2 for the dependent variable **share of total debt issued in foreign currency**. Variable **A** denotes the log of total assets, **AHA** denotes the share of foreign-owned assets over total assets, **LeverageD** denotes total leverage, **Z** denotes the export-to-sales ratio. **FO** is a dummy variable equal to 1 only for foreign-owned firms, **SG** denotes the annual growth rate of sales, **S** denotes the share of short-term debt. The acronym **I** denotes the domestic interest (lending) rate in domestic currency, **SpreadIR** denotes the interest rate spread between the dollar overnight rate in domestic currency and the overnight interest rate in the United States, while **CPS_GDP** denotes the credit-to-GDP ratio. The prefix **lag** refers to the first lag of the corresponding variable. Column 1 includes the regressors from the benchmark equation (1) in Section 3. All regressions include year fixed effects.
*** p<0.01, ** p<0.05, * p<0.1, robust (country-level clustered) standard errors in parentheses.

In the case of the share of total debt in foreign currency, the size effect (measured by the coefficient of lagged total assets) is clearly significant in almost all specifications. Another variable correlated with foreign-currency total debt is the fraction of sales abroad, which shows a positive correlation is most of the specifications except for that controlling for foreign ownership.

Firms that report exporting a share of their sales (although they do not necessarily report the share of those exported sales in all cases) also seem to display particular features regarding foreign-currency financial debt behavior. On average those firms borrow more in foreign currency than the average, even more the higher the stock of assets held abroad, or else if the firm is also foreign owned, but less the bigger their assets are.

An important characteristic that correlates to the debt-in-foreign-currency share is the foreign ownership dummy. The latter, both alone (lagged) and interacted with several other variables, appears to be statistically significant. For example, a firm that in the last year was foreign owned presents in this year a lower share of debt in foreign currency. The same type of firm seems to react more to variations in the interest rate spread than other types of firms.[21] This seems consistent with the trend observed during the first decade of the twenty-first century in

[21] This seems the case by looking at the positive coefficient of the interaction variable *lagSpreadIR_FO*, for example

which both interest rate spreads and foreign currency debt decreased. Yet, this effect may be mitigated by the effects of domestic interest rates (whose coefficient is positive in several specifications).

Regarding factors strongly correlated to the share of financial debt in foreign currency, Table 3 below shows the results of the OLS regression referred to in equation (1).

Table 3. Determinants of the Share of Financial Debt in Foreign Currency

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagA	0.0944***	0.0444	-0.0218**	0.0721**	0.0766*	0.0518*	0.102***	0.0741*
	(0.0181)	(0.0306)	(0.00981)	(0.0266)	(0.0304)	(0.0255)	(0.0245)	(0.0331)
lagAHA	0.398	0.275*	0.319**	-0.120*	0.532**	0.232*	-0.0942	-0.233
	(0.223)	(0.164)	(0.148)	(0.0522)	(0.206)	(0.111)	(0.116)	(0.204)
lagLeverageFD	0.0110**	0.00943***	-0.00585	0.0112***	0.0150***	0.00523**	0.0127***	0.0156***
	(0.00418)	(0.00157)	(0.0110)	(0.000809)	(0.00358)	(0.00192)	(0.00209)	(0.00301)
lagZ	0.217	0.317	0.822***	0.0413	0.227	0.0620	1.020**	
	(0.183)	(0.227)	(0.240)	(0.322)	(0.548)	(0.497)	(0.350)	
lagFO	0.0342	0.00774	0.262***	0.0692	-0.549	0.126	0.181	5.188
	(0.0385)	(0.0304)	(0.0387)	(0.0471)	(0.307)	(0.0633)	(0.394)	(2.643)
lagS	-0.149***	-0.146***	0.0193	-0.179**	-0.178***	-0.234*	-0.133	-0.199
	(0.0325)	(0.0163)	(0.0510)	(0.0685)	(0.0240)	(0.107)	(0.0714)	(0.141)
lagI_FO	-0.0333**	-0.0312***	-0.0532***	-0.0229**	-0.0180	-0.0216**	-0.0538	-0.417*
	(0.00887)	(0.0106)	(0.0129)	(0.00835)	(0.0103)	(0.00787)	(0.0604)	(0.198)
lagSpreadIR_Z	-0.0176	-0.0155	-0.0161	-0.0293	-0.0318***	-0.0317**	-0.0452	-0.0789**
	(0.0167)	(0.0205)	(0.0286)	(0.0217)	(0.00400)	(0.0101)	(0.0257)	(0.0280)
lagSpreadIR_FO	0.0305**	0.0280***	0.0415***	0.0209*	0.0236	0.0239**	0.0139	-0.151
	(0.00972)	(0.0108)	(0.0114)	(0.00935)	(0.0159)	(0.00855)	(0.0334)	(0.102)
lagCPS_GDP_A	9.61e-06	4.72e-05	-0.000178***	7.14e-05	-0.00142*	0.000536*	-0.000116	-0.00127*
	(0.000132)	(0.000110)	(6.59e-05)	(0.000222)	(0.000659)	(0.000253)	(0.000197)	(0.000598)
lagCPS_GDP_Z	-0.00552	-0.00198	-0.00334	-0.977	-0.00245	-0.00386	-0.0163*	-0.339
	(0.00548)	(0.00387)	(0.00668)	(0.919)	(0.0147)	(0.00945)	(0.00791)	(1.063)
lagCPS_GDP_FO	0.00328***	0.00333***	0.00110	0.00265***	0.0290	-0.00297	0.00522	-0.0849
	(0.000684)	(0.000586)	(0.00150)	(0.000617)	(0.0148)	(0.00189)	(0.00873)	(0.0489)
ExpFirm				-1.417***				-1.475***
				(0.283)				(0.176)
lagAHA_ExpFirm				0.547**				0.972***
				(0.169)				(0.114)
lagA_ExpFirm				0.0821				0.107**
				(0.0522)				(0.0377)
lagI_FO_ExpFirm				-0.0558***				-0.00611
				(0.0132)				(0.0348)
lagSpreadIR_FO_ExpFirm				0.0407**				0.00863
				(0.0136)				(0.0376)
lagSG_ExpFirm_Com				0.276				0.853*
				(0.144)				(0.373)
lagI_A_ExpFirm_Com				-0.267***				0.514
				(0.0615)				(0.533)
lagI_FO_ExpFirm_Com				5.017***				-9.276
				(1.149)				(9.806)
lagSpreadIR_A_ExpFirm_Com				0.254***				-0.630
				(0.0625)				(0.595)
lagSpreadIR_FO_ExpFirm_Com				-4.816***				11.07
				(1.164)				(10.75)
Top50					-1.279			-1.225*
					(0.711)			(0.545)

Table 3., continued

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagAHA_Top50					-0.366			-0.805**
					(0.194)			(0.250)
lagFO_Top50					0.509			1.799***
					(0.329)			(0.328)
lagS_Top50					0.215***			0.227*
					(0.0423)			(0.0902)
lagI_Z_Top50					0.0630**			0.121**
					(0.0173)			(0.0420)
lagI_FO_Top50					-0.0116			-0.0889***
					(0.0153)			(0.0187)
lagCPS_GDP_A_Top50					0.00135*			0.00114*
					(0.000654)			(0.000535)
lagCPS_GDP_FO_Top50					-0.0245			-0.0324**
					(0.0145)			(0.0110)
lagLeverageD_Top50bycountry						0.0212***		
						(0.00210)		
lagI_A_Top50bycountry						0.00174*		
						(0.000721)		
lagI_Z_Top50bycountry						-0.0520**		
						(0.0190)		
lagSpreadIR_A_Top50bycountry						-0.00279***		
						(0.000328)		
lagCPS_GDP_A_Top50bycountry						-0.000686*		
						(0.000268)		
lagCPS_GDP_FO_Top50bycountry						0.0109***		
						(0.00169)		
lagAHA_Foreignownership							0.619**	0.0138
							(0.160)	(0.256)
lagA_FO							-0.0560*	-0.178***
							(0.0273)	(0.0208)
lagZ_FO							-0.839**	0.990
							(0.236)	(0.814)
lagSG_FO							0.0122	-0.140**
							(0.0480)	(0.0512)
lagI_A_FO							0.00501	0.00696**
							(0.00531)	(0.00219)
lagSpreadIR_Z_FO							0.0346*	0.0433
							(0.0162)	(0.0473)
lagCPS_GDP_A_FO							0.000820**	0.00220***
							(0.000245)	(0.000314)
Constant	-0.933**	0.164	0.622***	-0.428	-0.287	-0.494**	-1.011***	-1.190
	(0.272)	(0.367)	(0.131)	(0.547)	(0.519)	(0.149)	(0.240)	(0.788)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	493	493	493	484	493	493	493	484
R-squared	0.350			0.444	0.414	0.422	0.371	0.525
Number of Firms	70	70	70	66	70	70	70	66

Source: Authors' calculations based on database

Notes: This table contains the OLS-based results for the benchmark regression equation (1) in Section 2. The dependent variable is the **share of financial debt issued in foreign currency**. Variable **A** denotes the log of total assets, **AHA** denotes the share of foreign-owned assets over total assets, **LeverageD** denotes total leverage, **LeverageFD** denotes leverage in foreign currency, **FO** is a dummy variable equal to 1 only for foreign-owned firms, **SG** denotes the annual growth rate of sales, **S** denotes the share of short-term debt. The acronym **I** denotes the domestic interest (lending) rate in domestic currency, **SpreadIR** denotes the interest rate spread between the overnight rate in domestic markets and the U.S. overnight interest rate, CPS_GDP denotes the credit-to-GDP ratio. The term **lag** refers to the first lag of the corresponding variable. All regressions include year fixed effects. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

As in the case of total debt in foreign currency, Table 3 shows that size measured by the log of assets is still a key variable correlated to the dependent variable here. Unlike in the case of total debt in foreign currency, the first lag of financial leverage is strongly correlated to the financial debt in foreign currency share. This may be read as a mechanical result. Yet, the same variable was not correlated to total debt in foreign currency. This suggests that a firm with higher levels of financial debt may need to refinance part of that debt in foreign currency, hence generating the positive correlation. The share of sales exported abroad in this case appears to be significant when interacted with the share of short-term debt of last period.

Foreign-ownership status seems again significant when interacted with several macro variables, especially, overnight interest rate spreads and domestic interest rates (with the same signs as the coefficients of the regression in Table 2). Export status also remains statistically relevant both alone as well as interacted with macro variables. Note that, on average, exporters present *lower* financial debt in foreign currency than non-exporters (given the negative coefficient). This contrasts with the coefficient of that same dummy variable for the total debt in foreign currency regression. In addition, commodity exporters also seem to react to some macro variables regarding financial debt currency composition in a significantly different way than the other firms.

The scope of the paper does not include an in-depth analysis of possible determinants of the currency composition of debt. Thus, we do not further stress other significant coefficients arising from those two tables. Yet, one may build a rough picture on the factors behind figures as those shown in Subsection 2.3. Given the decrease in the spreads in the first decade of the new century, the positive coefficients of this variable when interacted with firm status like being exporters or foreign owned may help interpreting the debt de-dollarization trend observed in Figures 1 and 2.

3. The Consequences of Debt Currency Composition for Profits, Investment and Liquid Assets: Basic Results

After presenting descriptive facts on foreign currency debt, the paper turns to the goal of evaluating possible effects of the share of the last-period foreign currency debt on firm performance and firm behavior. This section presents the equations and the results from OLS estimates of equations where the goal is to analyze the influence of currency composition of debt on the two main firm performance variables presented in Section 2 and the behavior variable fixed-asset purchases. The following subsection presents the econometric specifications.

3.1. Consequences of Debt Composition: Benchmark Econometric Specifications

The exchange rate exposure literature and related[22] provides a specification as follows.

$$Per_{it} = a_i + \mu_{it} + FC_{it-1}(\alpha + \beta\,\Delta\, e_t) + \boldsymbol{\delta\chi_{i,t-1}} + u_{it} \qquad (2)$$

In equation (2) the dependent variable is one of three possible firm performance variables. The first is the total profits/losses generated from foreign-exchange variations normalized by total assets. The second is the PPP-value of total gross-of-tax profits/losses from the accounting data, while the third is the latter normalized by total assets (the traditional return-on-assets variable). Of course, using normalized performance variables allows a closer comparability of the results here with part of the exchange-rate-exposure literature, which uses the stock return rate as the performance variable. The vector **X** of equation (1) includes controls such as the sales growth rate and the share of short-term debt. Dummies *D* correspond to exporting firm, a firm in the 50 percent with larger asset size, and foreign-owned status.

The next specification corresponds to the behavior of the firm's investment (as a fraction of productive capital). One important effect of the currency-debt composition is the decision on purchases of fixed assets (investment). One possible hypothesis is that the currency composition of debt may either constrain or ease a process of investment by the firm depending on the type of fixed assets purchased through the foreign currency debt. Part of the performance literature

[22] See the traditional literature on exchange rate exposure as in, e.g., Dominguez and Tesar (2006), Bartram, Brown and Minton (2010) and the survey by Muller and Verschoor (2006b), where the dependent variable is the market return, and also similar studies using a different performance variable such as Bartram (2008) and Allayanis, Lel and Miller (2012).

focuses more on such behavioral variable rather than economic or financial results.[23] For this goal there are two specific specification equations. The first is

$$\frac{I_{i,t}}{K_{i,t-1}} = \left(\xi \frac{FC_{i,t-1}}{K_{i,t-1}} \Delta e_t + \theta \frac{FC_{i,t-1}}{K_{i,t-1}}\right)(1 + \delta_{bc} D_{it}) + \rho \frac{I_{i,t-1}}{K_{i,t-1}} + \lambda_i + \tau_t + v_{it} \qquad (3)$$

The dependent variable in equation (3) is the ratio between fixed asset purchases in period *t* divided by the stock of fixed assets in period *t-1*. The regressors include last-period foreign-currency financial debt normalized by fixed assets, appearing alone and also interacted with the realized variation in the domestic currency exchange rate, together with an autoregressive term, a firm fixed effect and a year fixed effect. Equation (3) also controls for other factors that may facilitate the financing of fixed-asset purchases such as the increase in the long-term debt stock.

A variant of this second specification adds a credit constraint term and other controls.

$$\frac{I_{i,t}}{K_{i,t-1}} = \frac{NW_{i,t-1}}{K_{i,t-1}}\left(\eta + \varphi FC_{i,t-1}\right)(1 + \delta_{bc} D_{it}) + \varrho \frac{I_{i,t-1}}{K_{i,t-2}} + \vartheta \frac{PE_{i,t-1}}{K_{i,t-1}} + \kappa \frac{SG_{i,t-1}}{K_{i,t-1}} + \bar{\lambda}_i + \bar{\tau}_t + w_{it} \qquad (4)$$

Equation (4) includes a regressor that measures some form of credit constraints. In principle, the traditional measure is the ratio of cash flows to fixed assets in the last period, suggested by the well-known literature based on Fazzari, Hubbard and Petersen (1988), both alone and interacted with the foreign-currency debt measure, also in the previous period. Yet, the more recent literature on dynamic endogenous credit constraints[24] states that such an interpretation of the dependence of investment to cash flows as credit constraints may be misleading. This paper uses an alternative credit-constraint measure different from that in specification (4), which is a normalized net worth variable.

Before presenting the results, we emphasize that the tables below only report the coefficients that are relevant to the analysis (those related to the fraction of foreign-currency debt) as well as some robust controls. Thus, a significant amount of non-significant regressors have been excluded to keep focus on the main effects to be analyzed.

[23] Examples in the literature are Cowan, Hansen and Herrera (2005), Bleakley and Cowan (2008) and Gozzi et al. (2015).
[24] See Hayashi (1982) and, especially, Whited (1992) and Whited and Wu (2006).

3.2. Foreign-Currency Debt and Exchange-Rate Induced Profits (Losses)

Table 4 below shows the results of the OLS estimates of equation (3) when the dependent variable is the ratio between exchange-rate-variations-induced profits/losses and total assets.

Table 4. Foreign-Currency Financial Debt and Firm's Profits Due to FX Valuations

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagshareFCFD	-0.00367	-0.00460**	-0.00594**	-0.00742	7.03e-06	-0.00117	-0.00601	0.00260
	(0.00290)	(0.00231)	(0.00273)	(0.00707)	(0.00637)	(0.00552)	(0.00383)	(0.00305)
lagshareFCFD_XR	3.01e-05	1.77e-05	2.58e-05	0.000193	-3.25e-05**	1.05e-05	-8.17e-06	-0.0113
	(2.99e-05)	(3.32e-05)	(3.73e-05)	(0.000111)	(8.42e-06)	(6.39e-05)	(1.37e-05)	(0.00661)
lagLeverageD	0.000781	-5.57e-05	0.000488	-0.00158*	-0.00168	-0.00113	0.000193	-0.00164
	(0.000863)	(0.000357)	(0.000708)	(0.000715)	(0.000974)	(0.000758)	(0.000543)	(0.000913)
lagSG	5.31e-06	8.57e-07	9.44e-06	-0.0266**	0.00198	3.16e-06	-8.90e-07	-0.00977
	(9.32e-06)	(7.95e-06)	(6.04e-06)	(0.00891)	(0.00877)	(1.33e-05)	(7.33e-06)	(0.0118)
lagS	0.0148**	0.00873**	0.00898*	0.0117	0.0328*	0.0141**	0.0194***	0.0227
	(0.00529)	(0.00394)	(0.00482)	(0.0141)	(0.0151)	(0.00472)	(0.00296)	(0.0185)
lagshareFCFD_XR_ExpFirm_Com				0.0279**				0.0266*
				(0.00871)				(0.0109)
lagLeverageD_ExpFirm_Com				0.0117***				0.0116***
				(0.00240)				(0.00195)
lagshareFCFD_XR_Top50					7.68e-05*			0.0117
					(3.56e-05)			(0.00628)
lagshareFCFD_XR_FO							0.000131***	-3.35e-05
							(3.03e-05)	(0.000108)
Constant	0.000575	-0.00688**	-0.00955	-0.0363	-0.0149	-0.00312	0.000995	-0.0477
	(0.00334)	(0.00335)	(0.00620)	(0.0520)	(0.0112)	(0.00688)	(0.00574)	(0.0681)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	568	568	568	402	568	568	568	402
R-squared	0.144			0.144	0.183	0.172	0.152	0.208
Number of Firm	77	77	77	56	77	77	77	56

Source: Authors' calculations based on paper's database.

Notes: This table contains the OLS-based results for the benchmark regression equation (2) in Section 3. The dependent variable is the ratio between **total profits/losses due to foreign-exchange valuations and assets.** Variable **FCFD** denotes total the share of foreign-currency financial debt, **XR** is the year variation in the nominal exchange rate, **SG** denotes the annual growth rate of sales, **S** denotes the share of short-term debt, **Expfirm** denotes the dummy variable taking the value of 1 for exporters, **Comm** is the dummy variable taking the value of 1 for firms exporting commodities and 0 otherwise, **Top-50** is the dummy taking value of 1 for firms at the top 50 percent of the distribution of assets and **FO** denotes the dummy of foreign ownership. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 1 through 3 report the results from the benchmark specification including only country, firm or country-firm fixed effects. Column 4 includes export and commodity dummies. Column 5 includes the Top-50 dummy variable and column 6 includes the **Top-50-per-country** dummy. Column 7 includes the Foreign-ownership dummy and column 8 includes a full specification using **Top-50** as the size dummy. All regressions include year fixed-effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A first relevant result here is that the coefficient of the interaction term between the share of financial debt in foreign currency and the nominal exchange rate variation is not significant in general, except for the specification that controls for the status of companies belonging to the larger 50 percent of firms. In this last case, for the smaller 50 percent of firms, domestic currency depreciations yield negative exchange-rate induced profits the bigger is the share of foreign currency debt. This means that Figure 6 shown above does not capture a strong negative correlation between the two variables.

In fact, for firms that are either commodity exporters or that belong to the larger 50 percent of companies, depreciations of domestic currency induce positive gains to such firms, being the bigger these gains when higher the foreign-currency-debt share. The first effect is not surprising, of course, since it states that commodity exporters generate foreign-currency linked revenues compensating the foreign currency denomination of their liabilities. The second result is less obvious, although it suggests that bigger firms may hedge their revenues in terms of currency risk in a more advantageous way than smaller ones.

Incidentally, on average, firms with a higher fraction of short-run debt present gains from domestic currency depreciations. The possible meaning for this positive coefficient remains to be more precisely addressed. One possible conjecture is that firms with higher short-run debt may be involved in higher-frequency trading in different currency markets. In this way, depreciations in the domestic currency can be more actively "hedged" for these firms than for those with longer maturities in their liabilities. Yet, this conjecture needs proper testing, which is left for further research.

3.3. Foreign-Currency Debt and Total Profits: Exchange Rate Exposure

Table 5 below shows the results from the OLS estimates of equation (2) above when taking the PPP-adjusted level of gross profits or losses as the dependent variable. Table 6 shows the results of a similar regression but taking as the dependent variable the normalized value of such gross profits divided by total assets. The coefficients on the interaction between the variation of the exchange rate and the lagged value of the foreign-currency share of financial debt may be interpreted as a measure of exchange rate exposure dependent precisely on the level of foreign currency financial debt.

Table 5. Consequences of Foreign-Currency Debt for Profits/Losses (controlling for FX valuations)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagshareFCFD	-0.414	-0.398	-0.421	-0.158	-0.0865	-0.615	-0.333	0.0924
	(0.261)	(0.254)	(0.272)	(0.248)	(0.164)	(0.383)	(0.314)	(0.231)
lagshareFCFD_XR	0.000726	0.000646	0.000728	-0.00189*	0.00182***	0.000681	0.00133	-0.0165
	(0.000814)	(0.000801)	(0.000840)	(0.000889)	(0.000213)	(0.00193)	(0.000824)	(0.0243)
PE_Assets	0.781*	0.798**	0.787**	1.174	0.806	1.022	0.966**	1.363**
	(0.373)	(0.389)	(0.387)	(1.077)	(0.943)	(0.812)	(0.336)	(0.507)
lagSG	0.00984***	0.00988***	0.00984***	0.241***	0.296***	0.00978***	0.0101***	0.231***
	(0.000279)	(0.000269)	(0.000289)	(0.0366)	(0.0357)	(0.000407)	(0.000311)	(0.0391)
lagS	0.147	0.130*	0.148*	0.324	0.208	0.306	0.289	0.436*
	(0.0869)	(0.0770)	(0.0882)	(0.321)	(0.108)	(0.190)	(0.163)	(0.178)
lagshareFCFD_XR_ExpFirm				0.00240***				-0.000923
				(0.000415)				(0.00125)
lagshareFCFD_ExpFirm_Com				0.648				1.132**
				(0.434)				(0.310)
lagshareFCFD_XR_ExpFirm_Com				-0.413**				-0.392**
				(0.104)				(0.112)
lagSG_ExpFirm_Com				-0.372**				-0.403***
				(0.0991)				(0.0861)
lagS_ExpFirm_Com				-1.854***				-2.046***
				(0.103)				(0.504)
Top50					1.147*			0.943***
					(0.454)			(0.216)
lagshareFCFD_Top50					-0.574			-0.642*
					(0.339)			(0.268)
lagshareFCFD_XR_FO							-0.00205*	-0.00385**
							(0.000961)	(0.00138)
Constant	13.12***	12.02***	11.25***	12.48***	12.49***	13.00***	12.91***	11.76***
	(0.258)	(0.178)	(1.935)	(0.186)	(0.148)	(0.257)	(0.210)	(0.204)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	567	567	567	402	567	567	567	402
R-squared	0.293			0.284	0.389	0.324	0.310	0.449
Number of Firm	77	77	77	56	77	77	77	56

Source: Authors' calculations based on paper's database.
Notes: This table contains the results of the benchmark regression equation (2) in Section 3 for the dependent variable **Pr (Gross Profits in levels)** Variable **FCFD** denotes total the share of foreign-currency financial debt, **XR** is the year variation in the nominal exchange rate, **PE_Assets** denotes the fraction of profits/losses due to exchange rate variations as a fraction of assets, **SG** denotes the annual growth rate of sales, **S** denotes the share of short-term debt, **Expfirm** denotes the dummy variable taking the value of 1 for exporters, **Top50** is the dummy variable taking the value of 1 for firms being in the 50 percent larger asset size group and **FO** denotes the dummy of foreign ownership. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 1 through 3 report the results from the benchmark specification including only country, firm or country-firm fixed effects. Column 4 includes export and commodity dummies. Column 5 includes the **Top-50** dummy variable and column 6 includes the **Top-50-per-country** dummy. Column 7 includes the Foreign-ownership dummy and column 8 includes a full specification using **Top-50** as the size dummy. Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The main basic result from Table 5 is that, for almost all specifications (except for the one in the last column, including all controls together), the correlation between the above-mentioned dependent variable and the interaction between the lagged share of financial debt in foreign currency and the exchange rate variation tends to be non-significant but positive. Except for the last specification, the only significant negative coefficient is that controlling for export

status. Indeed, in column 4 the coefficient for exporters of this interaction is significantly positive, being negative then for non-exporters, which is very intuitive.

A more surprising result from Table 5 is the negative coefficient on commodity exporters. Moreover, foreign-owned companies also present a negative correlation. These two results may be linked to possible special effects of depreciations on the costs of commodity exporters or the foreign-owned firms that are absent in the other group of companies, although this is only a conjecture at this stage.

Things change quite a bit when normalizing gross profits by total assets. Actually, that dependent variable may be interpreted as a proxy for a typical before-tax return-on-assets measure of profitability. Table 6 below presents the results of that exercise.

Table 6. Foreign-Currency Financial Debt and Normalized Gross Profits/Losses

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagshareFCFD	0.0229	0.00931	0.0190	0.00299	0.0208	-0.00578	-0.00393	0.0483
	(0.0322)	(0.0345)	(0.0322)	(0.0313)	(0.0173)	(0.0281)	(0.0364)	(0.0251)
lagshareFCFD_XR	2.46e-05	-3.98e-06	1.09e-05	0.000835**	1.83e-05	0.000174*	5.29e-05	-0.00790
	(3.84e-05)	(4.27e-05)	(3.95e-05)	(0.000279)	(3.94e-05)	(6.78e-05)	(3.19e-05)	(0.0120)
PE_Assets	0.0621	0.0820	0.0802	-0.0740	-0.0641	-0.0262	0.0172	-0.192
	(0.0617)	(0.0859)	(0.0832)	(0.0747)	(0.324)	(0.201)	(0.0896)	(0.281)
lagLeverageD	-0.00779*	-0.00730**	-0.00739**	-0.00238***	-0.00218***	-0.00349	-0.00589	-0.00304***
	(0.00318)	(0.00309)	(0.00330)	(0.000390)	(0.000482)	(0.00210)	(0.00310)	(0.000605)
lagSG	0.000245***	0.000254***	0.000251***	0.0353***	0.0396***	0.000268***	0.000236***	0.0439***
	(3.27e-05)	(3.13e-05)	(3.19e-05)	(0.00743)	(0.00494)	(3.00e-05)	(3.22e-05)	(0.00487)
lagshareFCFD_XR_ExpFirm				-0.000798**				-0.00131***
				(0.000248)				(0.000210)
lagshareFCFD_ExpFirm_Com				0.118***				0.183***
				(0.0259)				(0.0291)
lagSG_ExpFirm_Com				-0.109***				-0.126***
				(0.0160)				(0.0206)
lagshareFCFD_Top50					-0.0191			-0.0955***
					(0.0310)			(0.0211)
lagshareFCFD_XR_Top50bycountry						-0.000167**		
						(4.35e-05)		
Constant	0.170***	0.208***	0.239***	0.0920	0.201***	0.190***	0.196***	0.0926
	(0.0155)	(0.0132)	(0.0151)	(0.0540)	(0.0224)	(0.0122)	(0.0138)	(0.0490)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	568	568	568	402	568	568	568	402
R-squared	0.149			0.174	0.257	0.244	0.188	0.254
Number of Firm	77	77	77	56	77	77	77	56

Source: Authors' calculations based on paper's database.

Notes: This table contains the results of the benchmark regression equation (2) in Section 3 when the dependent variable is the ratio between **Pr (Total Profits in levels)** and **assets.** Variable **FCFD** denotes total the share of foreign-currency financial debt, **XR** is the year variation in the nominal exchange rate, **SG** denotes the annual growth rate of sales, **S** denotes the share of short-term debt, **Expfirm** denotes the dummy variable taking the value of 1 for exporters, **Top50** is the dummy variable taking the value of 1 for firms being in the 50 percent larger asset size group and **FO** denotes the dummy of foreign ownership. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 1 through 3 report the results from the benchmark specification including only country, firm or country-firm fixed effects. Column 4 includes export and commodity dummies. Column 5 includes the **Top-50** dummy variable and column 6 includes the **Top-50-per-country** dummy. Column 7 includes the Foreign-ownership dummy and column 8 includes a full specification using **Top-50** as the size dummy. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In this case the coefficients on the interaction term between the lagged share of financial debt in foreign currency and the exchange rate variation become positive in almost all specifications but still weak in terms of statistical significance. Particularly notable is the significantly positive coefficient of this term in column 4 and the negative coefficient on the exporters. This result suggests that the positive effect found in Table 5 for exporters' profits is more than compensated by increases in the value of asset holdings. This does not bring any inconsistency between the two results as long as the increase in total level of profits from the domestic currency depreciation may induce a decision by the firm to further increase some components of the asset.

More puzzling is the positive coefficient on the commodity exporters. Table 5 above showed a negative coefficient of the interaction between exchange rate changes and foreign currency financial debt when taking total profits in levels as the dependent variable. Thus, the positive coefficient here suggests that a depreciation of the domestic currency induces a *decrease* not only in profits but also (and even more intensely) in assets. This is somehow quite counterintuitive and needs further thought for a deeper understanding of these two coefficients.

3.4. Foreign-Currency Debt and Decisions on Fixed Asset Purchases (Investment)

Table 7 below shows the results of OLS estimates of equation (4) corresponding to the effects of foreign-currency debt on investment decisions.

Table 7. Debt Composition and Fixed-Capital Investment Decisions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagshareFCD_K_XR	-29.37	335.3	287.4**	309.8***	-56.24	-52.63	-337.8***	-165.5
	(82.07)	(217.2)	(144.0)	(66.15)	(97.76)	(89.49)	(36.55)	(173.7)
lagshareFCD_K	777.7***	505.6	45.15	215.8*	819.6***	813.8***	-1,160	471.2
	(125.5)	(323.8)	(196.9)	(104.2)	(163.1)	(150.3)	(870.0)	(577.6)
lagI_over_K	0.0368***	0.479***	0.0809	0.000297	0.0363**	0.0356***	0.0358*	-0.00286
	(0.00872)	(0.0183)	(0.0643)	(0.0141)	(0.0136)	(0.00722)	(0.0153)	(0.0167)
lagshareFCD_K_XR_ExpFirm				-309.1***				-351.0***
				(31.93)				(47.52)
lagshareFCD_K_Top50					66,228			-552,640**
					(266,367)			(154,259)
lagshareFCD_K_XR_FO							417.7***	501.2***
							(24.71)	(119.2)
lagshareFCD_K_FO							1,770*	-309.8
							(839.1)	(704.6)
Constant	0.252***	0.106***	0.0957	0.349***	0.324***	0.254***	0.354***	0.282***
	(0.0221)	(0.0157)	(0.0668)	(0.0520)	(0.0719)	(0.0251)	(0.0628)	(0.0519)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	620	620	620	443	620	620	620	443
R-squared	0.031			0.037	0.037	0.032	0.037	0.043
Number of Firm	83	83	83	58	83	83	83	58

Source: Authors' calculations based on paper's database.
Notes: This table contains the OLS-based results of the benchmark regression equation (3) in Section 3. The dependent variable is the ratio between **fixed-capital purchases** and **last-period fixed assets (K).** Variable **FCD** denotes total the share of foreign-currency debt, **XR** is the year variation in the nominal exchange rate, **Expfirm** denotes the dummy variable taking the value of 1 for exporters, **Top50** is the dummy variable taking the value of 1 for firms being in the 50 percent larger asset size group and **FO** denotes the dummy of foreign ownership. All specifications include year fixed-effects. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 1 through 3 report the results from the benchmark specification without fixed effects, only country fixed-effects and firm fixed-effects. Column 4 includes export and commodity dummies. Column 5 includes the **Top-50** dummy variable and column 6 includes the **Top-50-per-country** dummy. Column 7 includes the Foreign-ownership dummy and column 8 includes a full specification using **Top-50** as the size dummy. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The main result from this table is the presence of a positive effect of the (first lag of) foreign-currency financial debt share on investment of the average firm. This suggests that one possible destination of the receipts from increasing foreign-currency borrowing may be fixed-capital investment. Yet the effect is not always statistically significant. Besides, when interacting with the variation in the exchange rate, the sign of the coefficient switches to negative under some specifications.[25]

Of special interest are the results of the specification in column 7. Recall that the latter emphasizes possible differential behavior by foreign-owned companies. In this case the coefficient of both non-interacted and interacted coefficients of the lagged foreign-currency financial debt both become negative, while the interacted coefficient of foreign-owned companies is strictly positive and higher in absolute value. Overall, this case suggests that what

[25] Of course, this decrease of statistical significance may be due to a drop in the degrees of freedom when introducing additional regressors, the latter showing the somewhat low number of firms in the sample.

is present in the positive coefficients in the other specifications is the behavior of foreign-owned firms. That is, the latter may be the only ones showing a positive sensitivity of foreign-currency financial debt to fixed investment when domestic currency depreciates. Still, this suggested interpretation merits further work, probably using using a wider dataset.

On the other hand, Table 8 below shows the results of the OLS estimates of equation (5), including the credit-constraint effect measured by normalized net worth.

Table 8. Debt Composition, Credit Constraints and Investment Decisions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagnetworth_K	0.0309***	0.0296***	0.0310***	0.0282***	0.0602***	0.0307***	0.0252***	0.0695***
	(0.00648)	(0.00433)	(0.00377)	(0.00588)	(0.0104)	(0.00613)	(0.00132)	(0.00587)
lagnetworth_FC_K	-4.37e-05	-1.09e-05	-4.05e-05	0.0437	-0.00110**	-0.000243	-0.000136*	-0.0508
	(5.50e-05)	(5.61e-05)	(5.76e-05)	(0.0473)	(0.000311)	(0.000289)	(6.06e-05)	(0.0703)
lagI_over_K	0.0466**	0.125***	0.0586***	0.0539	0.0430***	0.0360*	0.0360	0.0536**
	(0.0167)	(0.00770)	(0.0178)	(0.0344)	(0.00442)	(0.0176)	(0.0244)	(0.0178)
lagG_K	495.6**	832.2***	349.2*	611.5**	-133.3	485.1**	1,664***	-1,235**
	(154.2)	(273.0)	(199.5)	(174.7)	(218.1)	(150.5)	(167.0)	(454.9)
lag2shareFCD_XR	-0.000414	-0.000420**	-0.000386	-0.0276	0.00179	-0.000121	-0.000270	0.0346
	(0.000231)	(0.000210)	(0.000238)	(0.0309)	(0.00149)	(0.000277)	(0.000398)	(0.0481)
D_Longtermdebt	0.0348*	0.0288**	0.0324*	0.0258	0.0116	0.0564*	0.0260	0.0184
	(0.0162)	(0.0141)	(0.0166)	(0.0327)	(0.0134)	(0.0243)	(0.0210)	(0.0227)
lag2shareFCD_XRExpFirmCom				0.190**				0.218
				(0.0680)				(0.268)
D_LongtermdebtExpFirmCom				0.142***				0.145**
				(0.0282)				(0.0504)
lagnetworth_FC_KTop50					0.00120**			0.0479
					(0.000326)			(0.0262)
lagnetworth_FC_KFO							0.000165*	0.00145
							(7.18e-05)	(0.00132)
lag2shareFCD_XRFO							-0.000185	-0.00418*
							(0.000210)	(0.00195)
Constant	0.0522	0.168***	0.113***	0.174**	-0.0160	0.0587*	0.0824	0.0143
	(0.0402)	(0.0265)	(0.0339)	(0.0602)	(0.0497)	(0.0284)	(0.0513)	(0.0800)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	603	603	603	431	603	603	603	431
R-squared	0.330			0.342	0.508	0.337	0.363	0.566
Number of Firm	80	80	80	56	80	80	80	56

Source: Authors' calculations based on paper's database.
Notes: This table contains the OLS-based results of the benchmark regression equation (4) in Section 3. The dependent variable is the ratio between **investment** (**capital expenditures**) and **last-period fixed assets**. The regressors include the variable **FCD** (total share of foreign-currency debt) normalized by fixed-assets, both alone and interacted with lagged **net-worth (networth) normalized by fixed-assets**, **XR** (the year variation in the nominal exchange rate), **G_K** (the growth-sales-to-fixed-assets ratio), and the dummies **Expfirm** (taking the value of 1 for exporters), **Top50** (taking the value of 1 for firms being in the 50 percent larger asset size group) and **FO** (the dummy of foreign ownership). All specifications include year fixed-effects. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 2 through 4 includes firm-specific dummy variables (being in the 50 percent of larger firms, being an exporter or being foreign owned) interacted with several other regressors. Column 5 includes all the three dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The first obvious feature from the first row of Table 8 is that the coefficient on the lagged value of normalized net worth is not only positive but also significant in all specifications. This emphasizes that the average firm always faces some degree of borrowing constraint. On the other hand, the interaction term of net worth with (lagged) foreign financial currency debt is always

negative but only significant in two specifications. This contrasts with the positive sign for that regressor in Table 7. This suggests that what seemed a positive relationship between higher shares of foreign-currency financial debt and fixed investment hides in fact an effect more properly linked to borrowing constraints. An exception for this may be the foreign-owned companies or the larger 50 percent of companies, which present positive coefficients.

Yet, the general lesson from the last two tables is that the evidence of how currency composition of financial debt influences fixed capital investment is far from definitive. Except for foreign-owned bigger companies the evidence tends to be more consistent. For the rest of firms this link is far from obvious and subject to possible lack of precision due to sample size issues.

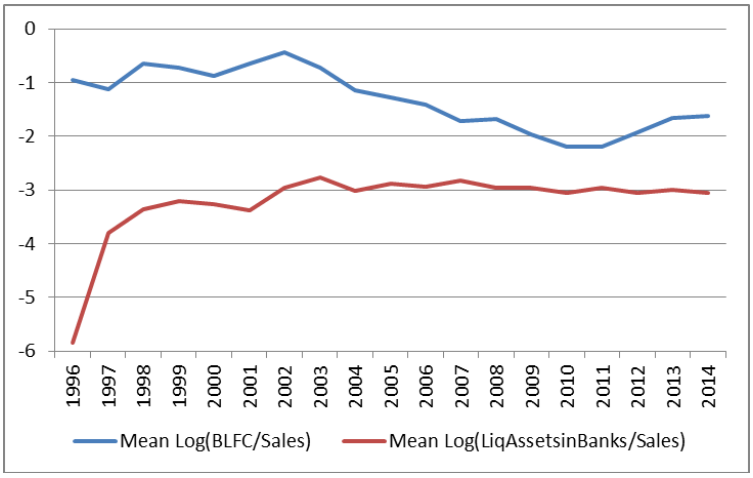
3.5. Non-Financial Firms as Financial Intermediaries? Results from OLS Estimates

The finding of mixed correlations of foreign currency financial debt on fixed asset purchases may entail several explanations. Among all the possible ones, a recent literature emphasizing the financial-intermediation role of non-financial companies in Emerging Market countries may help in finding a possible rationale for such weak effect. In particular, Shin and Zhao (2013), Bruno and Shin (2015) and Caballero, Panizza and Powell (2015), among others, find evidence that several non-financial publicly listed companies of EM countries have been issuing foreign-currency debt in global markets during the first 15 years of the current century to get involved in some form of carry-trade behavior, depositing a big fraction of the receipts of such bond issues in the local banking system.

Shin and Zhao (2013) probably present the more elementary exercise to show whether non-financial firms behave as *de-facto* branches of the local financial system. They correlate the log of liquid assets normalized by sales against the log of financial liabilities also normalized by assets, plus other controls. They apply such regression analysis to firms in Asian countries such as China, India, Korea and Indonesia, finding a strong positive correlation in most cases. A similar exercise is proposed here.

First, Figure 8 below shows the time pattern of two measures similar to those in Shin and Zhao (2013). One is the natural log of liquid assets in banks normalized by sales, and the other is the log of the sum of loans and bonds in foreign currency, also normalized by sales.

Figure 8. Time Evolution of Cross-Country Averages of Bonds and Loans in Foreign Currency and Liquid Assets in Banks (normalized by sales, in logs)

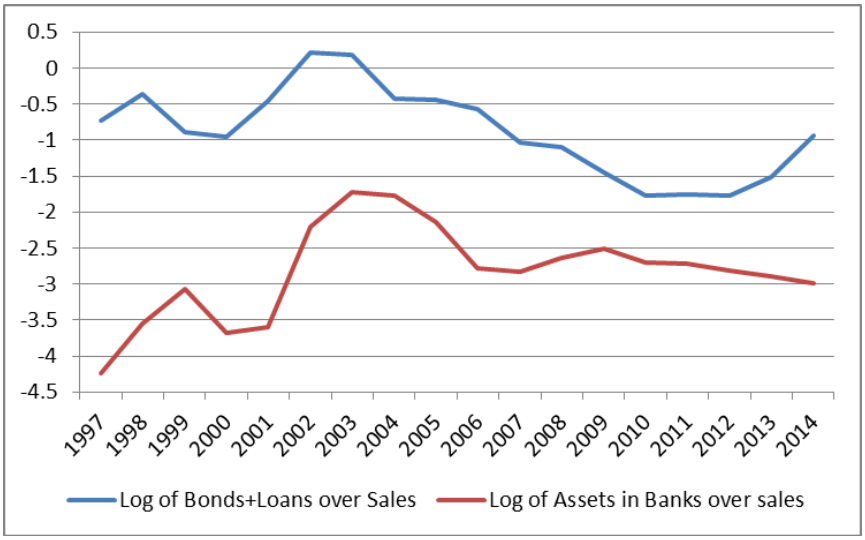


Source: Authors' calculations based on paper's database.

Figure 9 suggests some positive correlation between the two series.[26] When separating by country, this positive correlation appears stronger in some cases.

Figure 9. Time Evolution of Cross-Country Averages of Bond and Loans in Foreign Currency and Liquid Assets in Banks (normalized by sales, in logs)

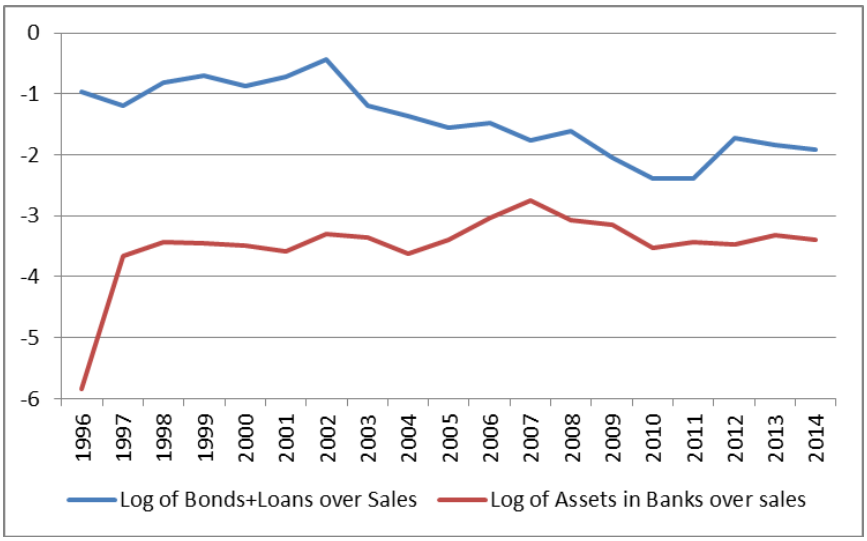
A. Argentina



[26] The simple correlation coefficient for the 2002-2014 period is 0.412384602.

Figure 9., continued

B. Brazil



C. Chile

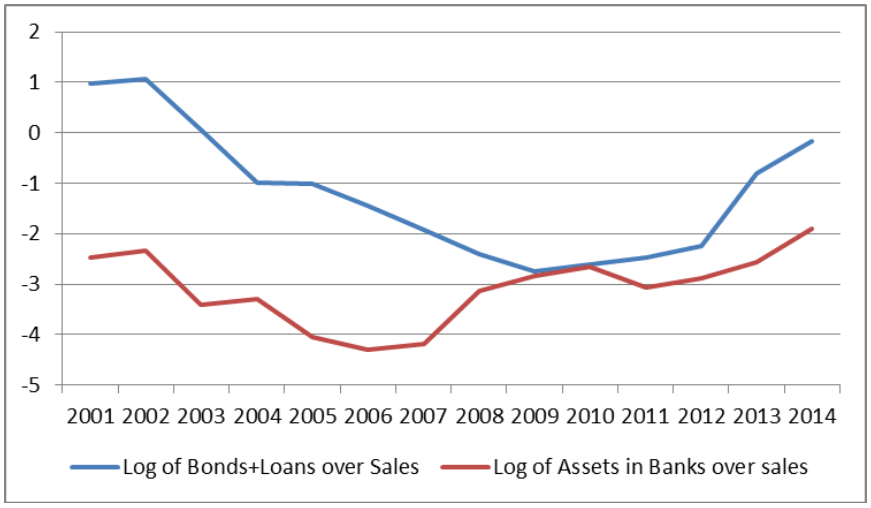
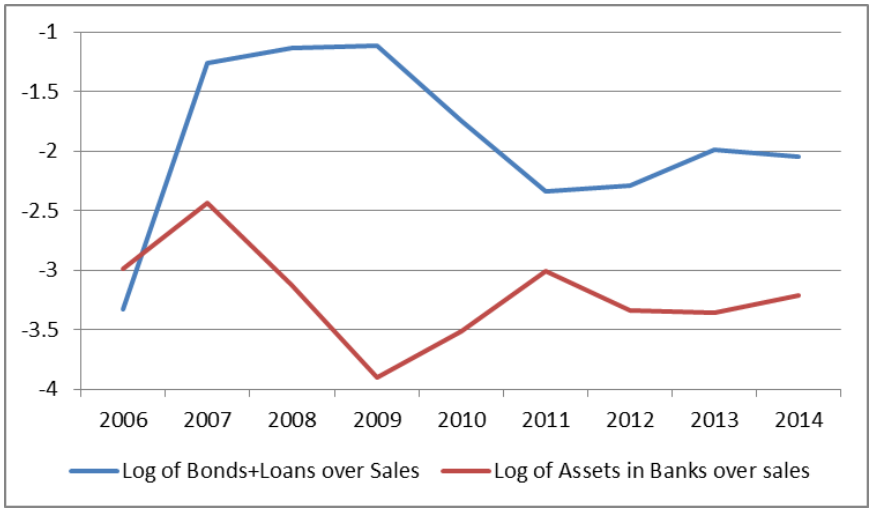
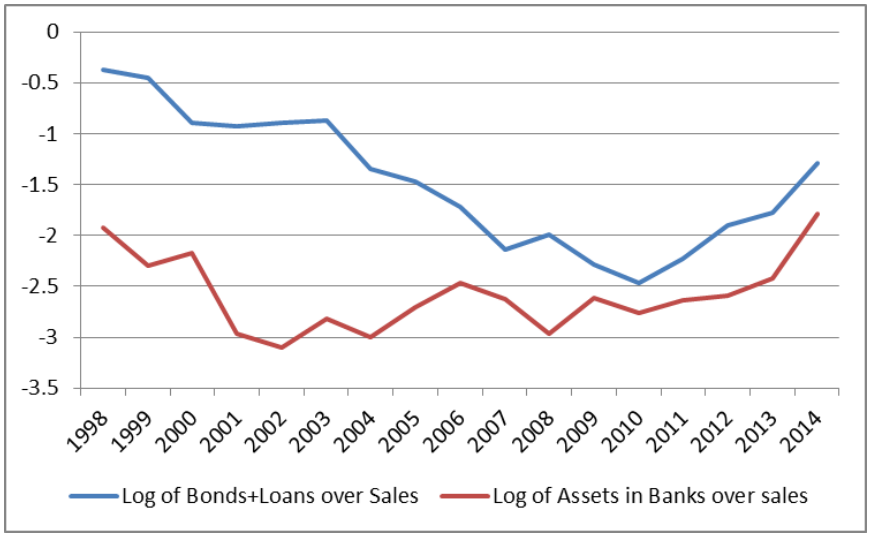


Figure 9., continued

D. Colombia



E. Mexico



Source: Authors' calculations based on paper's database.

Figure 9.A above shows a similar picture for Argentine firms. This case shows more clearly a positive correlation between those two series. Panel B in Figure 9 shows that for Brazilian firms the correlation is weaker but it is still positive. The same occurs for panels C (Chilean firms), D (Mexican firms) and E (Peruvian firms). Overall, the per-country figure

suggests a positive correlation between the stock of loans and bonds in foreign currency and the stock of liquid assets in banks, suggesting a possible "financial intermediation channel" in LAC firms that may be behind the weak correlation with foreign-currency financial debt.

The last figure suggests a more formal regression analysis based on the following equation:

$$log\left(\frac{Assets\ in\ banks}{Sales}\right) = \psi_0 + \psi_1 log\left(\frac{Loans\ in\ FC + Bonds\ in\ FC}{Sales}\right) + \boldsymbol{\psi}^z \mathbf{z} + u \qquad (5)$$

Equation (5) is similar to the regressions performed in Shin and Zhao (2013), adding some interactions with the firm-level dummy variables export status, larger 50 percent status and foreign ownership. It also includes several controls in the vector **z**, including the natural log of sales, financial leverage and their interactions with the dummy firm-level variables.

Table 9 below shows the results based on OLS estimates of equation (5).

Table 9. Non-Financial Firms as Financial Intermediaries in LAC

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln_BLFC_sales	0.0705	0.0835**	0.0974	0.106	0.0298	0.0365	0.142	0.164
	(0.0517)	(0.0352)	(0.0678)	(0.0731)	(0.0870)	(0.105)	(0.0983)	(0.236)
ln_Sales	-0.714**	-0.454**	-0.346***	-0.483*	-0.682***	-0.764**	-0.745**	-0.388**
	(0.258)	(0.227)	(0.0999)	(0.208)	(0.101)	(0.276)	(0.213)	(0.126)
LeverageFD	0.0179	0.0165	0.0146	0.00914	-0.00741	-0.00422	0.00472	-0.000812
	(0.0229)	(0.0239)	(0.0233)	(0.00971)	(0.0109)	(0.00951)	(0.0141)	(0.00630)
ln_BLFC_salesExpFirm				-0.200*				-0.131
				(0.0978)				(0.129)
LeverageFDExpFirm				-0.0468***				-0.564**
				(0.00879)				(0.149)
LeverageFDTop50					0.0849***			0.591***
					(0.0106)			(0.0967)
LeverageFDTop50bycountry						0.0883***		
						(0.0168)		
ln_SalesFO							0.192***	0.132***
							(0.0358)	(0.0311)
LeverageFDFO							0.0681**	-0.0387
							(0.0235)	(0.102)
Constant	6.202	3.044	1.588	2.838	5.635***	6.824	6.509*	1.398
	(3.425)	(2.846)	(1.696)	(2.795)	(1.350)	(3.607)	(2.747)	(1.467)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	828	828	828	619	828	828	828	619
R-squared	0.166			0.081	0.197	0.180	0.193	0.120
Number of Firm	93	93	93	73	93	93	93	73

Source: Authors' calculations based on paper's database.

Notes: This table contains the OLS-based results of the benchmark regression equation (5) in Section 3, based on Shin and Zhao (2013). The dependent variable is the natural log of the ratio between **liquid assets in banks** and **total sales**. The regressors include the natural log of the sum of bond and loans in foreign currency **BLFC** normalized by **total sales**, **the natural log of total sales**, **LeverageFD** (leverage in foreign currency), and the dummies **Expfirm** (taking the value of 1 for exporters), **Top50** (taking the value of 1 for firms being in the 50 percent larger asset size group) and **FO** (the dummy of foreign ownership). All specifications include year fixed-effects. All specifications include year fixed-effects. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 2 through 4 includes firm-specific dummy variables (being in the 50 percent larger firms, being an exporter or being foreign owned) interacted with several other regressors. Column 5 includes all three dummies. Robust standard errors are in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

The basic results can be seen in the first line. The coefficient on the natural log of loans and bonds in foreign currency is always positive, also being statistically significant in one specification (the one adding only country fixed effects). For the other specifications that coefficient loses significance. Yet the sign of the coefficient never changes, suggesting that, although somehow weak, the correlation between those two variables may be positive.

This is at least consistent with the idea of non-financial firms carrying funds obtained abroad to financial intermediaries (either locally or internationally, since the assets-in-banks item may include an aggregate of both types of banks deposits depending on the company's disaggregation report policy). Note also that no interaction of the loans-and-bonds variable with firm-level dummies is statistically significant (justifying the absence of such results in Table 10).

Yet, as Caballero, Panizza and Powell (2015) find, other macro variables since capital controls may affect the significance of such coefficient. The reason is that the role of non-financial firms as financial intermediaries may strongly depend on the capability of banks to borrow abroad. In a country without controls and with a soft regulation banks may be able to borrow abroad even in better conditions than non-financial firms, being the opposite in countries with heavy regulations and/or capital controls. We did not include capital control measures in the regressions, the reason being that the country and time coverage in this paper seems too limited to find enough variability in that macro variable.

4. The Role of Derivatives

The introduction section emphasized that the new century witnessed increasing activity by non-financial firms in financial derivative markets. Given the evidence obtained from the benchmark regressions in Section 3 the next question is to know whether trading in financial derivatives plays a role in enhancing or ameliorating some of the effects found there. This section deals with the answer to this question using the information on derivatives available in the dataset of this paper.

The database in this paper has information on different types of derivatives that are explicitly reported in their financial statements. Those financial derivatives include currency and interest rate swaps, foreign currency forwards and commodity forwards. Most of these derivatives are either market-valued (when derivatives are publicly traded) or otherwise they are valued at "fare" prices, that is, using well-known valuation formulas when applicable, in the case

of derivatives that may be registered separately from the original loan contract. In most cases such derivatives appear as part of either the asset or the liabilities side.

The next subsection presents first some facts about the data on derivatives. Next, the paper presents the regression equations to be estimated. The final part of this section presents the results from those estimates.

4.1. Descriptive Statistics and Facts about Derivatives Holdings by LAC Non-Financial Firms

Table 10, panels A through D below, presents some basic descriptive statistics for the financial derivatives available in our dataset.

Table 10. Financial Derivatives: Descriptive Statistics

Panel A. Net financial derivatives normalized by sales					
Countries	**Obs N×T**	**Mean**	**Std. Dev.**	**Min**	**Max**
All	976	-0.000169	0.0614552	-0.521826	0.8165964
Argentina	183	-0.0020834	0.0362794	-0.3596125	0.094746
Brazil	307	-0.0059029	0.0563594	-0.521826	0.1983194
Chile	87	-0.0012877	0.0361485	-0.2220859	0.1295672
Colombia	69	0.0319531	0.107943	-0.0299438	0.517813
Mexico	235	0.0041443	0.0660712	-0.2563922	0.8165964
Peru	95	-0.0109277	0.0689713	-0.4784519	0.1389147
Panel B. Net financial derivatives normalized by assets					
Countries	**Obs N×T**	**Mean**	**Std. Dev.**	**Min**	**Max**
All	994	0.000478	0.0306041	-0.2584573	0.3721217
Argentina	183	-0.0001625	0.0165218	-0.1065907	0.070002
Brazil	322	-0.0017327	0.0244814	-0.2162004	0.1694948
Chile	87	0.0009654	0.0129678	-0.040439	0.0579574
Colombia	69	0.0204499	0.0751671	-0.0133578	0.3721217
Mexico	235	-0.0008299	0.0287392	-0.2584573	0.2397577
Peru	98	-0.0024209	0.0260114	-0.1265886	0.1285736
Panel C. Total financial derivatives normalized by sales					
Countries	**Obs N×T**	**Mean**	**Std. Dev.**	**Min**	**Max**
All	978	0.032332	0.1133546	0	1.921362
Argentina	183	0.0151966	0.0368201	0	0.3596125
Brazil	307	0.0420481	0.1084019	0	0.9560468
Chile	87	0.0772517	0.2660544	0	1.921362
Colombia	71	0.0340442	0.1057734	0	0.517813
Mexico	235	0.0201874	0.0690625	0	0.8434398
Peru	95	0.0215676	0.0668686	0	0.4784519

Table 10., continued

Panel D. Total financial derivatives normalized by assets					
Countries	**Obs N×T**	**Mean**	**Std. Dev.**	**Min**	**Max**
All	996	0.0166745	0.0521485	0	0.7127958
Argentina	183	0.0075905	0.0178744	0	0.10847
Brazil	322	0.0233137	0.0586826	0	0.3961047
Chile	87	0.0303864	0.0968224	0	0.7127958
Colombia	71	0.0213458	0.0738115	0	0.3721217
Mexico	235	0.0113269	0.031777	0	0.2657202
Peru	98	0.0090889	0.0246367	0	0.1285736

Source: Authors' calculations based on paper's database.
Notes: The panels of this table show descriptive statistics (mean, standard deviation, minimum and maximum values) for four different indicators of financial derivative holdings, both for the pooled sample as well as discriminated by country. The first panel shows the statistics for the net derivative holdings normalized by total annual sales, while the second panel shows the same statistics but for the net derivative variable normalized by assets. The third and fourth panels shows the descriptive statistics for each normalization type applied to total derivatives (the sum of asset and liability-position derivatives).

Panels A and B of Table 10 present basic statistics for the net financial derivatives position as fractions of total sales and total assets respectively. The net financial derivatives indicator signals the direction of derivatives trading. Both panels emphasize the negative average position in derivatives for the cases of Argentina, Brazil and Peru. The data for Colombian firms consistently show an average asset position of derivatives, while the cases of Chile and Mexico are mixed, depending on how net derivatives are normalized. Although this is not obvious, a typical conjecture that arises when seeing consistent negative net positions in derivatives is that firms may be speculating in derivatives rather than hedging. Yet, looking at that sign is obviously insufficient to make such a statement. The international literature specifies more precise tests for this purpose, tests that are clearly beyond the scope of this paper.[27]

Panels C and D of Table 10 present the statistics for the total financial derivatives positions, also as shares of sales and total assets. The variable total financial derivatives, defined as the sum of absolute values of asset and liability derivative positions, measures the intensity of the use of those instruments by non-financial firms in our sample. A salient feature from these panels is that the maximum value for Argentina and Peru is consistently lower than for the other

[27] See, e.g., Chernenko and Faulkender (2012).

countries (more markedly so for the Argentine firms). This suggests not only within-country heterogeneity in the intensity of use of derivatives, but also heterogeneity across countries.

Figures 10 through 15 below present basic facts concerning financial derivative holdings according to the database in this paper. The first fact is shown in Figures 10A and 10B.

Figure 10.A. Per Year Mean, Minimum and Maximum Net Derivatives Normalized by Sales

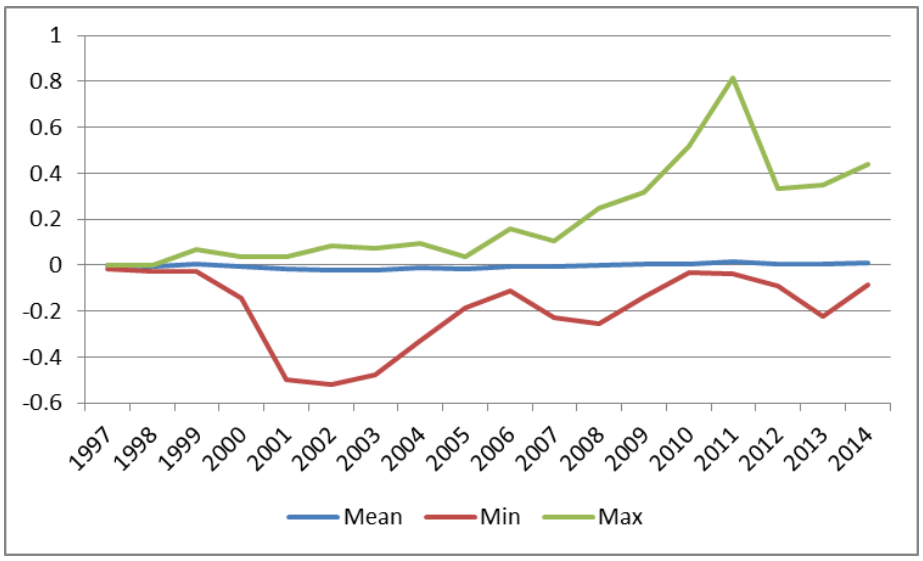


Figure 10.B. Per Year Mean, Minimum and Maximum Net Derivatives Normalized by Assets

Source: Authors' calculations based on paper's database.

Figure 10.A shows the per-year mean, minimum and maximum values of the ratio between net financial derivatives normalized by sales between 1997 and 2014. Figure 10.B presents a similar graph for the time series of the same net financial derivatives but normalized by assets. The common pattern shown in both figures is that by the years 2002 and 2008 the lower bound of these variables are far left from the mean (and the maximum), suggesting that most of the firms in the database would tend to be on the asset side of derivatives during those crisis years. This suggests a hedging behavior by the non-financial firms against the possible negative consequences of such crises. The inverse is shown in the aftermath of the subprime 2008 crisis, where the upper bound of these net financial derivatives indicators lie far to the right of the mean, suggesting a stronger tendency to be on the liability side.

Figure 11.A: Per Year Mean and Maximum Total Derivatives Holdings Normalized by Sales

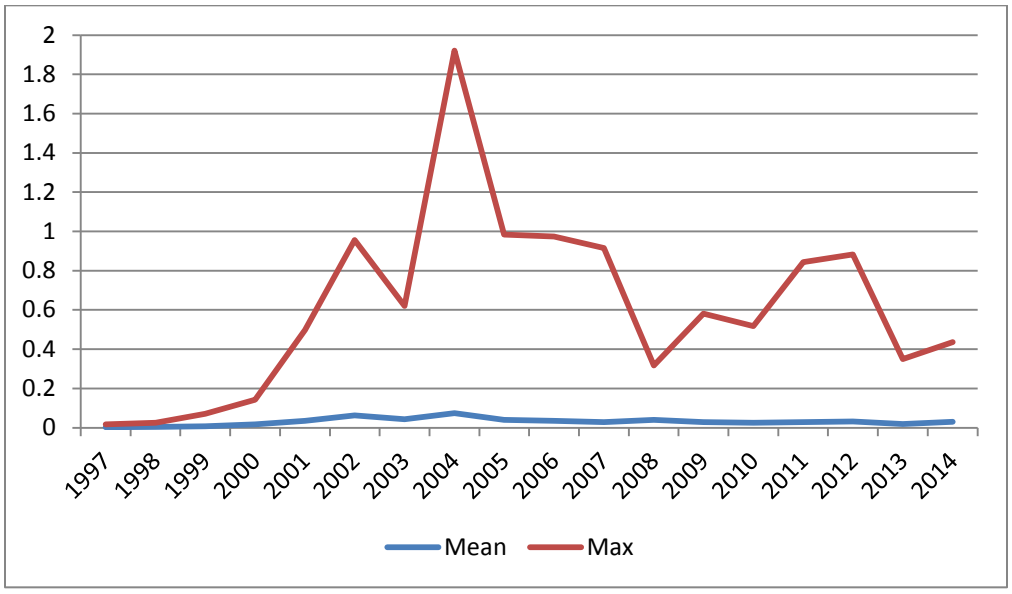
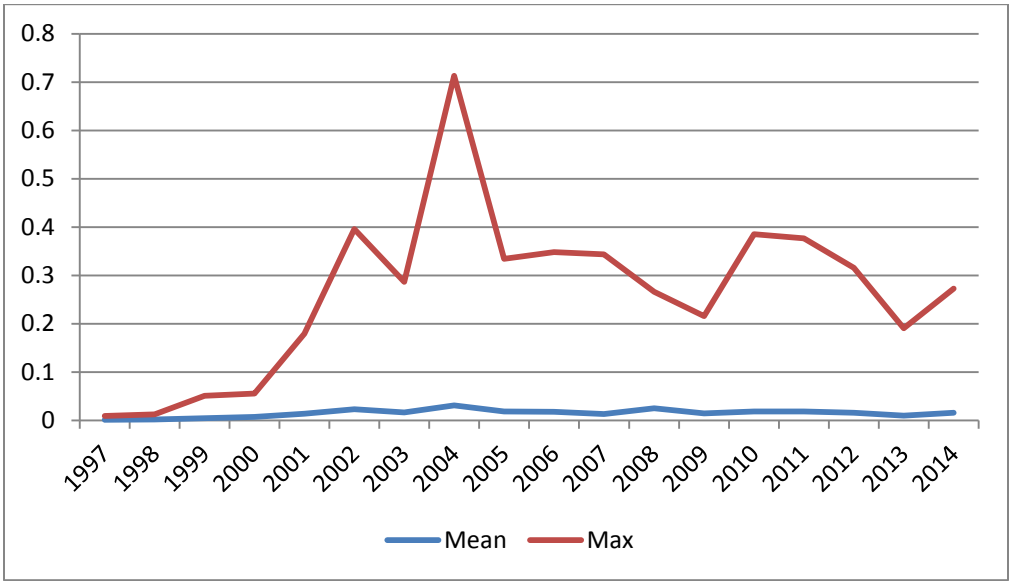


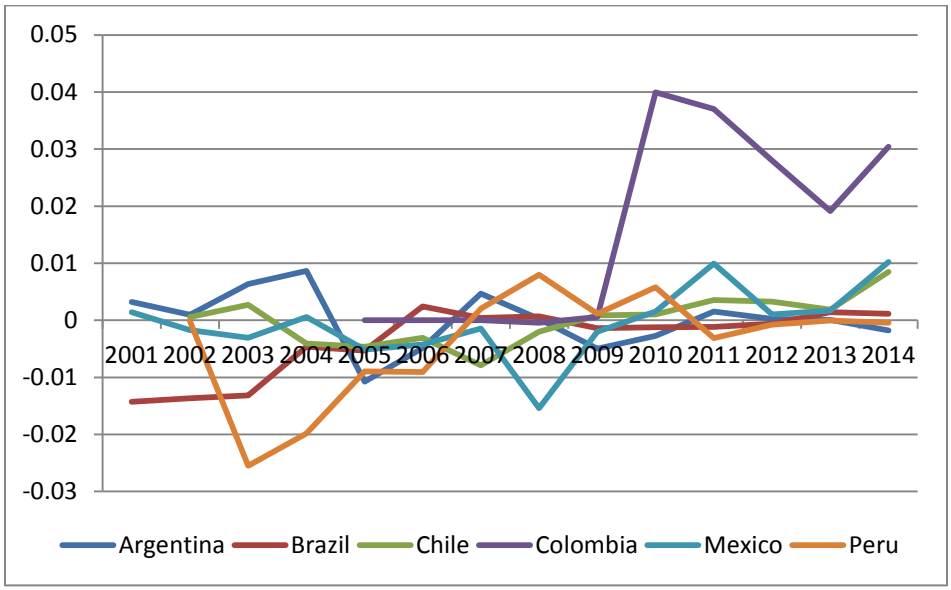
Figure 11.B. Per Year Mean and Maximum Total Derivatives Holdings Normalized by Assets



Source: Authors' calculations based on paper's database.

Both Figures 11.A and 11.B present the per-year time series for the average and maximum fraction of total derivatives over sales and assets respectively. A common salient feature is the abrupt increase of the maximum values in 2002, 2004 and 2010-11. Yet the mean does not increase proportionally so for those years. This would suggest an abrupt increase in the heterogeneity of derivatives holdings in the aftermath of financial crises, or at least in the extreme behaviors.

Figure 12.A. Per Year Mean Net Derivatives Holdings Normalized by Sales by Country



Source: Authors' calculations based on paper's database.

Figures 12A and 12B show the per-country yearly time series for the mean of both the net and total derivatives as a fraction of total assets. Looking at individual countries may help explaining the extremes of the patterns observed in the average country time series shown above. The most prominent fact from Figure 12A is the peak of the mean for Colombia in 2010, explaining part of the pattern in Figure 10B. The salient feature from Figure 12B is the peak in the case of Chile in 2004 (which also explains the peak in Figure 11A and 11B).

The major interest of including derivatives information in this study clearly goes beyond describing some facts. The goal is to understand whether they play some role in the correlations found in the results from the estimates of the benchmark equations in Section 3. To check whether simple correlations of derivatives and the explained variables in those regressions arise, the following figures present some scatter plots to provide a rough picture of that correlation.

Figure 13.A. Scatter Plot between Net-Derivatives-to-Assets and Profits-to-Assets

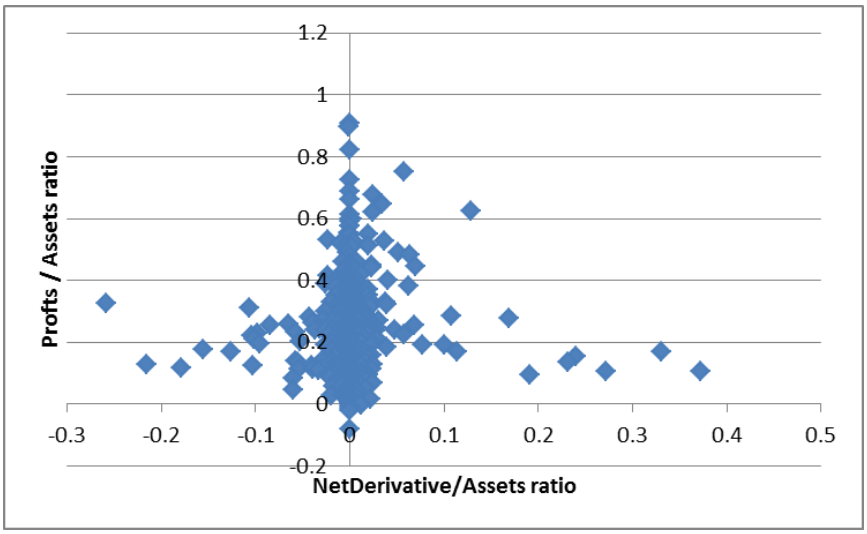
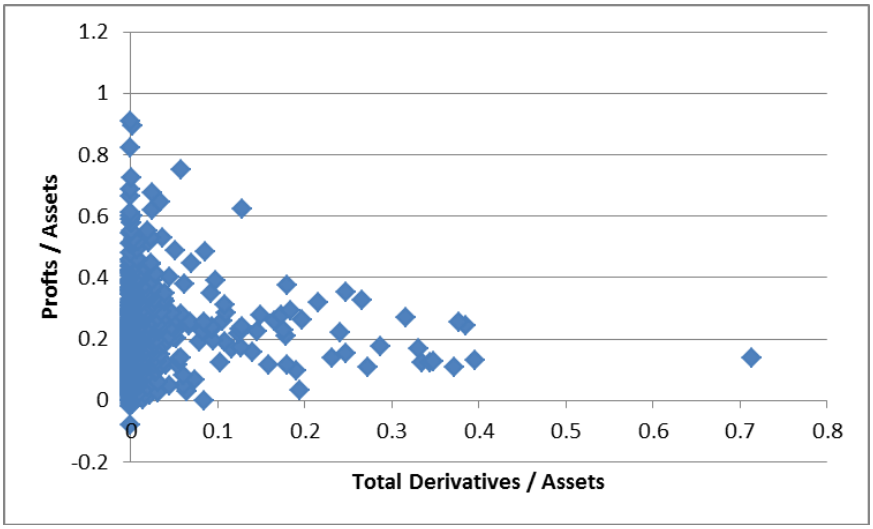


Figure 13.B. Scatter Plot between Total-Derivatives-to-Assets and Profits-to-Assets



Source: Authors' calculations based on paper's database.

Figures 13A and 13B show the scatter plots of total derivatives (respectively normalized by sales and assets) and the ratio of profits over assets. There is no clear positive pattern in those figures, although for the total-derivatives-to-assets ratio the correlation is weakly positive (about 3.4 percent).

Figure 14.A. Scatter Plot between Net-Derivatives-to-Assets and Investment-to-Fixed-Assets

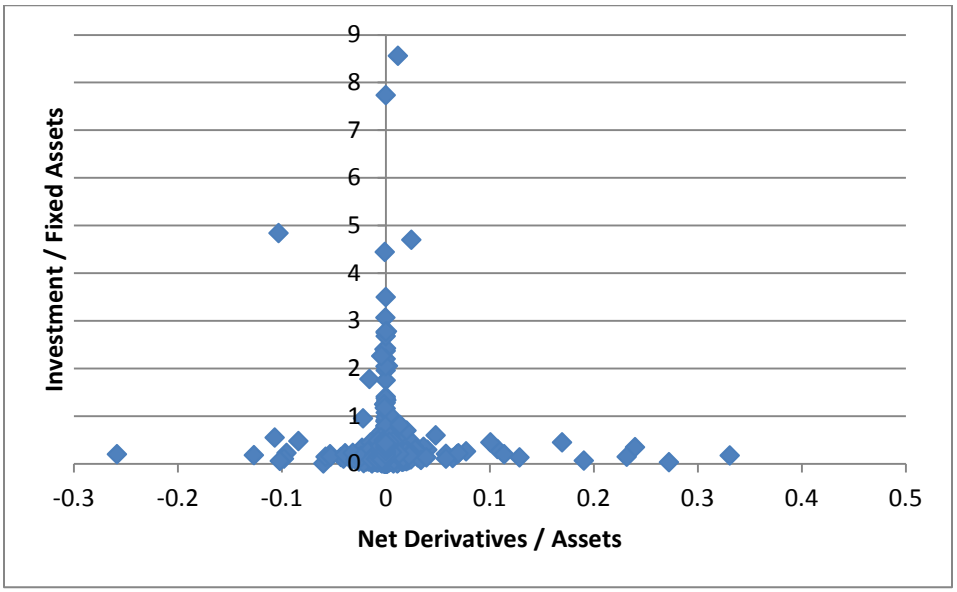
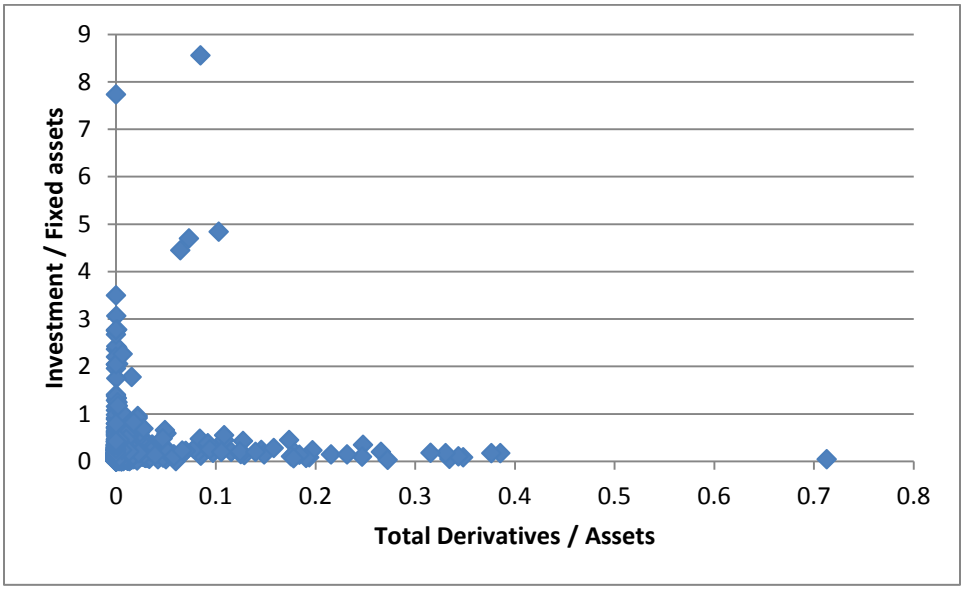


Figure 14.B. Scatter Plot between Total-Derivatives-to-Assets and Investment-to-Fixed-Assets



Source: Authors' calculations based on paper's database.

Figures 14A and 14B show the scatter plots of the same total derivatives ratios when linked to the lag of investment-to-fixed-assets ratio. Again, the same very noisy pattern arises in both figures, where the simple correlation coefficient between the derivatives-to-assets ratio with the investment indicator is also weakly positive (about 2.8 percent).

Figure 15.A. Scatter Plot between Net-Derivatives-to-Assets and the Log of Bank Assets Divided by Sales

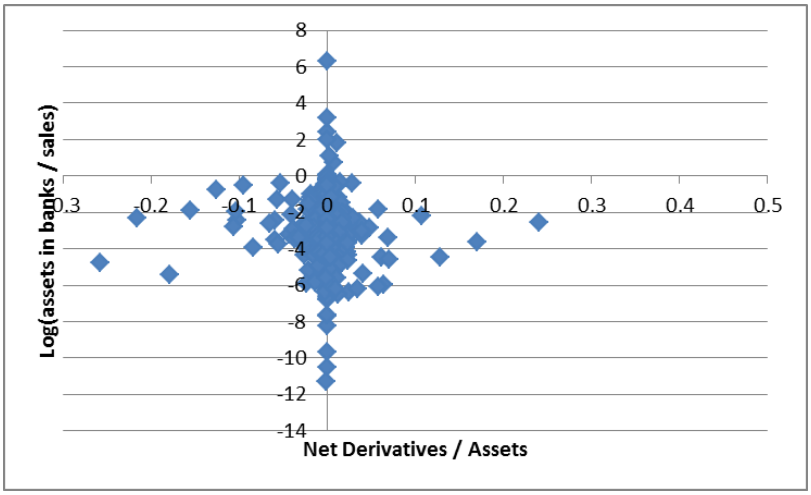
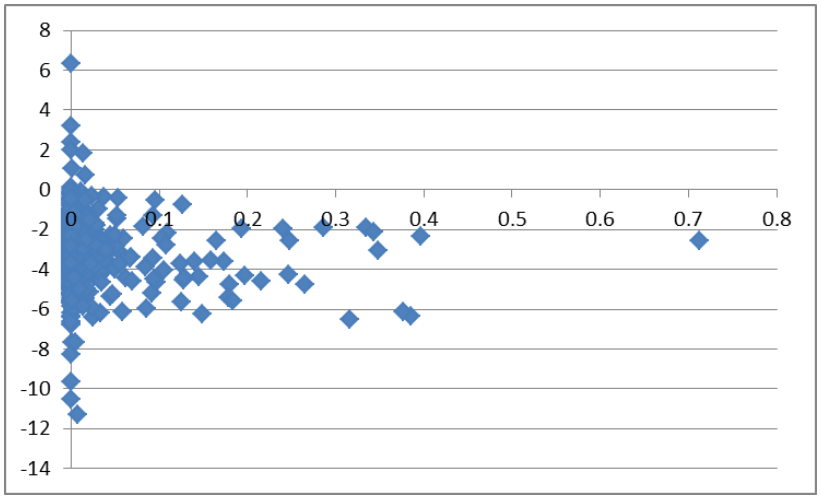


Figure 15.B. Scattered-plot between total-derivatives-to-assets and the log of bank assets divided by sales



Source: Authors' calculations based on paper's database.

Finally, Figures 15A and 15B show the scattered plots between the same total derivatives ratios and the log of assets in banks normalized by sales. Even though the same level of noise is the most salient features in these figures as well, the sign of the simple correlation coefficients entailed in these graphs is negative. For example, the correlation between the derivatives-to-assets ratio and the log of the normalized liquid assets in banks is about equal to -0.113. This negative correlation may have some implications when introducing derivatives to the estimation

of the correlation between foreign-currency loans plus bonds and the liquid assets in banks indicator, as Subsection 4.3 below shows.

4.2. Regression Equations and Discussion on Estimation Methods

When including financial derivatives one must recall that such variable is as endogenous as the performance or behavioral firm variables. Indeed, trading activities in financial derivatives can perfectly affect the profits that any firm can obtain in a certain year. Thus, any derivatives variable must enter contemporaneously with respect to the dependent variables in the regressions performed in Section 3. Then, the inclusion of this variable to the regressions above forces us to explicitly recognize the endogeneity of derivatives in the regression.

Then, equation (2) is now modified to the following pair of equations:

$$Per_{it} = a_i + \mu_{it} + FC_{it-1}(\alpha + \beta\,\Delta\, e_t) + \boldsymbol{\delta \chi_{i,t-1}} + \gamma_{rd} d_{it} + u_{it} \qquad (6a)$$

$$d_{it} = m + \omega_{it} + FC_{it-1}(\eta + \nu\,\Delta\, e_t) + \boldsymbol{\Theta x^{d}_{i,t-1}} + \gamma_{dr} per_{it} + v_{it} \qquad (6b)$$

The idea is that the derivative variable affects firm performance but also firm performance drives decisions on derivatives. Yet, the latter can be also affected by certain controls (that are specified below) as well as the lagged foreign currency debt. On the other hand, fixed capital investment equation (3) above would lead now to the pair of equations:

$$\frac{I_{i,t}}{K_{i,t-1}} = \xi \frac{FC_{i,t-1}}{K_{i,t-1}}\,\Delta\, e_t + \theta \frac{FC_{i,t-1}}{K_{i,t-1}} + \rho \frac{I_{i,t-1}}{K_{i,t-1}} + \gamma_{Id} d_{it} + \lambda_i + \tau_t + v_{it} \qquad (7a)$$

$$d_{it} = \rho_d d_{i,t-1} + \boldsymbol{\Theta^{dI} x^{d}_{i,t-1}} + \gamma_{dI} \frac{I_{i,t}}{K_{i,t-1}} + v_{it} \qquad (7b)$$

As above, the assumption here is that derivatives holding decisions may affect the fixed capital investment decisions but, at the same time, the latter may also drive derivatives decisions.

Similarly, the borrowing-constrained version of (7a)-(7b) is

$$\frac{I_{i,t}}{K_{i,t-1}} = \frac{NW_{i,t-1}}{K_{i,t-1}}\left(\eta + \varphi FC_{i,t-1}\right) + \varrho \frac{I_{i,t-1}}{K_{i,t-2}} + \vartheta \frac{PE_{i,t-1}}{K_{i,t-1}} + \kappa \frac{SG_{i,t-1}}{K_{i,t-1}} + \zeta FC_{i,t-1} + \sigma_{IB,d} d_{i,t} + \bar{\lambda}_i + \bar{\tau}_t + w_{it} \qquad (8a)$$

$$d_{it} = \rho_{bd} d_{i,t-1} + \boldsymbol{\Theta^{bdI} x^{d}_{i,t-1}} + \gamma_{bdI} \frac{I_{i,t}}{K_{i,t-1}} + v_{it} \qquad (8b)$$

Recall that the variable *net-worth* interacted with the lagged foreign-currency debt effect represents the possibility that borrowing constraints affects the link between the last variable and fixed investment. As mentioned in Section 3, the alternative variable to capture the effect of

borrowing constraint is net worth. Last, the set of equations concerning possible carry-trade behavior is

$$\left(\frac{Assetbanks_{it}}{Sales_{it}}\right) = \psi_{0a} + \psi_{1a} log\left(\frac{FindebtFC_{it}}{Sales_{it}}\right) + \boldsymbol{\psi}^{za}\mathbf{z} + \boldsymbol{\Psi}_{\mathbf{ad}} d_{it} + u_{it}^{a} \quad (9a)$$

$$log\left(\frac{FindebtFC_{it}}{Sales_{it}}\right) = \psi_{0f} + \boldsymbol{\psi}^{\mathbf{FCx}} X_{i,t-1}^{FC,c} + \boldsymbol{\Psi}_{\mathbf{fc,d}} d_{it} + u_{it}^{f} \quad (9b)$$

$$d_{it} = \rho_{ctd} d_{i,t-1} + \boldsymbol{\Theta}^{\mathbf{ct,d}} \boldsymbol{x}_{\boldsymbol{i,t-1}}^{\boldsymbol{d}} + \gamma_{fc,d} log\left(\frac{FindebtFC_{it}}{Sales_{it}}\right) + v_{it} \quad (9c)$$

Equations (9a) and (9b) are modified versions of equation (5). The reason for the split of one equation into two is the explicit recognition of the endogeneity of both normalized financial debt in foreign currency and bank deposits. Equation (9c) is the equation with derivative holdings as the dependent variable as in the other specifications above.

Indeed, the equations that consider the derivatives measure as the dependent variable are based on the international literature on the empirical determinants of risk management policies at the firm level. More precisely, this equation is based on papers analyzing the use of derivatives in hedging both currency- and interest-rate-risks.[28] In particular, this paper borrows most of the control variables from Beber and Fabbri (2012).[29] Indeed, these controls include export-to-sales ratio, log of sales (as a size proxy), growth of sales and the lagged ratio of liquid assets over total assets.[30]

Yet, it is clear that the benchmark estimation method applied to these modified regression equations cannot be based on OLS given all the obvious endogeneity problems. Equations (6a)-(6b) and (9a)-(9c) can be estimated by IV (through standard 2SLS) methods, using as instruments the estimated derivatives variables from the equation that take the latter as dependent variables. This 2SLS method cannot be used for the other two groups of equations, though. The

[28] This literature includes Faulkender (2005); Brown, Crabb and Haushalter (2006), who study the risk management behavior of 44 gold-mining firms in the United States and Canada; Haushalter, Klasa and Maxwell (2007), who find that predation risk matters in explaining the use of currency derivatives; Vickery (2008); Purnanandam (2008), who finds a U-shaped curve between derivatives usage and debt issue; and Cornaggia (2013), who analyzes the correlation between risk management and productivity in U.S. agricultural firms.

[29] That paper, while focusing on how CEO and CFO characteristics shape the decisions to use financial derivatives for a sample of US public firms, introduces several controls in their derivatives regressions from which we borrow for this paper.

[30] For Emerging Markets, Gatopoulos and Loubergé (2013) use a panel database of 103 publicly-traded firms with ADRs in the period 2000-2002 to analyze the determinants of derivatives usage by those firms. They conclude that the aggregate exposure of a country to a crisis is a key determinant of the level of derivative securities. Yet the last variable was not included in the controls since the period covered in this paper includes no crisis for LAC economies.

reason is the presence of the lag of the investment-to-fixed-assets ratio as a regressor of the first equation. For these cases the alternative method is the GMM-based one by Blundell and Bond (1998) that explicitly recognizes the endogeneity of that lag.

4.3. Results

This subsection presents the results of the regressions performed under the methodology discussed above. In each case, the paper reports only the results corresponding to the estimates of the original regression equation adding the instrumented estimate of financial derivatives.

Table 11. Foreign-Currency Financial Debt and Normalized Gross Profits/Losses When Considering Financial Derivatives

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Deriv_Assets	0.618	0.618	0.618	0.272	0.259	0.0772	0.514	-0.487
	(0.716)	(0.716)	(0.716)	(0.549)	(0.420)	(0.483)	(0.791)	(0.569)
lagshareFCFD	-0.0310	-0.0310	-0.0310	-0.0143	-0.00234	-0.0153	-0.0189	0.00353
	(0.0234)	(0.0234)	(0.0234)	(0.0229)	(0.0143)	(0.0147)	(0.0234)	(0.0192)
lagshareFCFD_XR	0.000160	0.000160	0.000160	0.00102	-0.0199*	-0.000128	2.23e-05	-0.000123
	(0.000220)	(0.000220)	(0.000220)	(0.00172)	(0.0121)	(0.000234)	(0.000206)	(0.0141)
lagSG	-0.00888	-0.00888	-0.00888	-0.0263**	0.0141	-0.0271***	-0.0114	-0.00882
	(0.0119)	(0.0119)	(0.0119)	(0.0117)	(0.0125)	(0.00993)	(0.0118)	(0.0166)
lagSG_ExpFirm				0.0420**				0.0768***
				(0.0180)				(0.0239)
lagshareFCFD_XR_Top50					0.0200*			-0.000797
					(0.0121)			(0.0155)
lagSG_Top50					-0.0518***			-0.0712***
					(0.0157)			(0.0179)
lagS_Top50					-0.0394			-0.148*
					(0.0519)			(0.0787)
lagSG_Top50bycountry						0.0467**		
						(0.0187)		
Foreignownership							0.0158	0.0637**
							(0.0267)	(0.0306)
Constant	5.03e-05	5.03e-05	5.03e-05	-0.00935	-0.0107	-0.00864	-0.00554	-0.0109
	(0.0137)	(0.0137)	(0.0137)	(0.0280)	(0.0165)	(0.0150)	(0.0169)	(0.0385)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	383	383	383	373	383	383	383	373
Number of Firm	58	58	58	55	58	58	58	55

Source: Authors' calculations based on paper's database.
Notes: This table contains the IV-based results for the benchmark regression equation (6a) in Section 4. The dependent variable is the ratio between **total profits/losses due to foreign-exchange valuations and assets.** The regressors are as in Table 4 with the addition of the ratio between total derivative holdings to assets. The estimation method is based on instrumenting the latter on a set of controls described in Subsection 4.2. All regressions include year fixed-effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11 reports the results for different specifications of the 2SLS-estimates of the coefficients in equation (6a) when taking the profits-to-assets ratio as the explained variable. Although the coefficient on the instrumented derivatives-to-assets ratio is not significant, some changes relative to Table 4 are observed. For example, the coefficient of the interaction between foreign-currency financial debt and variations of the exchange rate for the larger 50 percent of

firms increased when taking the derivatives into account. This suggests that, the positive effect of a depreciation in the domestic currency on those firms in the larger 50 percent that are more highly indebted in foreign currency is even economically stronger for those using derivatives (which are the ones included in the sample of Table 11, clearly smaller than that in Table 4).

Table 12. Debt Composition, Fixed-Capital Investment Decisions and Financial Derivatives

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.I_over_K	0.673***	0.598***	0.240***	0.761***	0.728***	0.697***	0.697***	0.761***
	(0.00440)	(0.0119)	(0.0199)	(0.0213)	(0.00817)	(0.00832)	(0.0198)	(0.0992)
L2.I_over_K	-0.282***	-0.263***	-0.192***	-0.157***	-0.103***	-0.117***	-0.104***	-0.170***
	(0.00193)	(0.00486)	(0.00700)	(0.0153)	(0.00681)	(0.00617)	(0.00562)	(0.0291)
L3.I_over_K	0.162***	0.134***	-0.0202**	0.0808***	0.0747***	0.0701***	0.0637***	0.0630*
	(0.000965)	(0.00341)	(0.00798)	(0.0180)	(0.00777)	(0.00585)	(0.00944)	(0.0366)
Deriv_Assets	-0.0791	-0.0669	-0.308	0.502	0.209	-0.0398	-0.414*	0.592
	(0.212)	(0.242)	(0.333)	(0.368)	(0.193)	(0.223)	(0.248)	(1.268)
L.Deriv_Assets	-0.00227	-0.0738	0.0521	1.065**	0.215	-0.163	0.317*	0.215
	(0.143)	(0.155)	(0.282)	(0.513)	(0.196)	(0.210)	(0.189)	(0.903)
lagshareFCD_K_XR	25.89	-64.38	395.1***	254.8	-116.0	79.26	440.9***	-164.3
	(87.28)	(123.3)	(44.82)	(238.5)	(89.80)	(113.5)	(12.81)	(750.6)
lagshareFCD_K	583.1***	763.7***	0	235.2	912.0***	619.0***	0	902.8
	(151.9)	(209.6)	(0)	(429.9)	(154.0)	(205.4)	(0)	(1,126)
D_Longtermdebt	0.0426***	0.0321***	0.00434	0.0139**	0.0282***	0.0482***	0.0284***	-0.00250
	(0.00439)	(0.00527)	(0.00977)	(0.00616)	(0.00674)	(0.00635)	(0.00718)	(0.0167)
lagshareFCFD_XR_ExpFirm				0.000949***				-0.00382
				(0.000282)				(0.00577)
lagLeverageD_ExpFirm				-0.00438**				0.0136
				(0.00210)				(0.0380)
lagshareFCFD_XR_ExpFirm_Com				0.203**				0.0520
				(0.0987)				(0.177)
lagLeverageD_ExpFirm_Com				-0.200*				-0.0859
				(0.120)				(0.167)
lagshareFCFD_Top50					-0.0882***			-0.0765
					(0.0232)			(0.145)
lagLeverageD_Top50					-0.0144***			0.00412
					(0.00164)			(0.0259)
Top50bycountry						0.0687***		
						(0.0184)		
lagshareFCFD_Top50bycountry						-0.0855***		
						(0.0254)		
lagshareFCFD_XR_Top50bycountry						1.26e-05		
						(0.000319)		
lagLeverageD_Top50bycountry						-0.00846***		
						(0.00258)		
lagSG_Top50bycountry						-0.114**		
						(0.0522)		
lagS_Top50bycountry						-0.0828***		
						(0.0278)		
lagshareFCFD_XR_FO							-0.000588**	-0.00328
							(0.000274)	(0.00309)
lagSG_FO							-0.195***	-0.336
							(0.0382)	(0.417)
Constant	-2.245	0.0935	0.865*	-0.0560	-0.0788**	0.00875	-0.00621	0.324
	(2.679)	(0.0775)	(0.442)	(0.102)	(0.0328)	(0.0577)	(0.0410)	(0.379)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	427	427	427	322	404	404	404	322
Number of Firm	66	66	66	53	65	65	65	53

Source: Authors' calculations based on paper's database.

Notes: This table contains the GMM-based results of the regression equation (7a) in Section 4. The variables are the same as in Table 7. All specifications include year fixed-effects. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 1 through 3 report the results from the benchmark specification without fixed effects, only country fixed-effects and firm fixed-effects. Column 4 includes export and commodity dummies. Column 5 includes the **Top-50** dummy variable and column 6 includes the **Top-50-per-country** dummy. Column 7 includes the Foreign-ownership dummy and column 8 includes a full specification using **Top-50** as the size dummy. Robust standard errors in parentheses. (Note: *** p<0.01, ** p<0.05, * p<0.1)

Table 12 reports the results of specifications of the Blundell-Bond (1998) GMM-based estimates of the coefficients of equation (7a). The positive coefficients of the share of foreign-currency financial debt in this case reinforce the effects found when ignoring derivatives in Table 7. Yet, one non-trivial difference is that the coefficient on the interaction of foreign-currency debt and exchange rate variation becomes positive and significant for two specifications, one including country fixed effects and the other considering the foreign ownership dummy. This suggests that for a subset of firms trading in derivatives (for example, those not foreign owned) the depreciation of a foreign currency induces these firms with higher foreign-currency financial debt share to increase fixed investment. Yet, such results are clearly subject to possible criticisms based on sample size issues.

Table 13. Debt Composition and Investment Decisions under Credit Constraints and Derivatives

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.I_over_K	0.576***	0.555***	0.316***	0.477***	0.491***	0.482***	0.476***	0.513***
	(0.00453)	(0.0153)	(0.0213)	(0.0503)	(0.0118)	(0.0113)	(0.00886)	(0.173)
L2.I_over_K	-0.235***	-0.232***	-0.222***	-0.212***	-0.231***	-0.246***	-0.233***	-0.138**
	(0.00241)	(0.00741)	(0.00827)	(0.0345)	(0.00621)	(0.00685)	(0.00744)	(0.0540)
L3.I_over_K	0.132***	0.124***	0.00348	0.000812	0.0515***	0.0312***	0.0283***	-0.0168
	(0.00110)	(0.00355)	(0.0103)	(0.0281)	(0.00534)	(0.00745)	(0.00448)	(0.0941)
Deriv_Assets	-0.157	-0.334	-0.373	-0.0724	0.112	-0.220	0.0682	-0.442
	(0.145)	(0.206)	(0.348)	(0.353)	(0.232)	(0.218)	(0.144)	(4.166)
L.Deriv_Assets	0.0738	-0.0967	-0.0391	1.333**	0.244	0.218	-0.00731	1.613
	(0.0823)	(0.174)	(0.224)	(0.604)	(0.234)	(0.168)	(0.136)	(1.928)
lagnetworth_K	0.0213***	0.0190***	0.0191***	0.0194***	0.0264***	0.0265***	0.0260***	0.0187***
	(0.000312)	(0.000412)	(0.000869)	(0.00148)	(0.000650)	(0.000478)	(0.000473)	(0.00610)
lagnetworth_FC_K	-0.000140	-0.000147	-0.000148	-0.000664**	0.000332	-7.62e-05	2.92e-05	-0.000666
	(0.000183)	(0.000196)	(0.000219)	(0.000339)	(0.000235)	(0.000173)	(0.000214)	(0.000615)
lagG_K	-2,022***	-2,307***	-941.6	-1,188*	-2,496***	-2,094***	-1,849***	-1,184
	(354.1)	(355.6)	(817.4)	(674.4)	(473.7)	(270.9)	(205.9)	(1,460)
lag2shareFCD_XR	-0.000252	-0.000126	-4.82e-07	0.00157*	-0.000798*	-0.000174	-0.000504	0.00150
	(0.000404)	(0.000384)	(0.000391)	(0.000906)	(0.000440)	(0.000370)	(0.000427)	(0.00126)
D_Longtermdebt	0.0312***	0.0266***	0.0209**	0.00962	0.0270***	0.0353***	0.0281***	-0.0143
	(0.00314)	(0.00575)	(0.00876)	(0.00603)	(0.00627)	(0.00681)	(0.00736)	(0.0293)
ExpFirm				-0.888**				-0.497
				(0.435)				(1.009)
lagLeverageD_ExpFirm				-0.0160*				-0.0313
				(0.00943)				(0.0666)
Top50					-0.144***			-0.0472
					(0.0468)			(0.391)
lagLeverageD_Top50					-0.0113***			0.0158
					(0.00244)			(0.0880)
lagSG_Top50					-0.0618**			-0.295
					(0.0293)			(0.202)
lagS_Top50					0.247***			0.0351
					(0.0682)			(0.310)
lagLeverageD_Top50bycountry						-0.00600***		
						(0.00199)		
Foreignownership							-0.117***	-0.0750
							(0.0389)	(0.213)

Table 13, continued

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lagshareFCFD_FO							0.0722***	0.447
							(0.0242)	(0.452)
lagshareFCFD_XR_FO							-0.000753***	-0.00196
							(0.000256)	(0.00325)
lagLeverageD_FO							-0.00621***	-0.0224
							(0.00177)	(0.105)
lagSG_FO							-0.0881***	-0.488
							(0.0274)	(0.693)
lagS_FO							0.130*	-0.0484
							(0.0690)	(0.515)
Constant	0.173***	0.244	0.624**	0.345**	0.0366	0.0695	0.0103	0.159
	(0.0456)	(0.260)	(0.248)	(0.164)	(0.0413)	(0.0564)	(0.0433)	(0.624)
Country fixed-effects	NO	YES	NO	NO	NO	NO	NO	NO
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO	NO
Observations	428	428	428	314	395	395	395	314
Number of Firm	66	66	66	52	64	64	64	52

Source: Authors' calculations based on paper's database.
Notes: This table contains the GMM-based results (Blundell and Bond, 1998) of the regression equation (8a) in Section 4. Variables are as in Table 8. All specifications include year fixed-effects. Column 1 includes the regressors from the benchmark equation (1) in Section 3. Columns 2 through 4 includes firm-specific dummy variables (being in the 50 percent larger firms, being an exporter or being foreign owned) interacted with several other regressors. Column 5 includes all the three dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 13 above presents the Blundell-Bond (1998) GMM-based estimates of the coefficients of different specifications of equation (8a). Some differences with respect to Table 8 include that the negative coefficient of the interaction between net worth and foreign-currency financial debt becomes significant for the specification distinguishing between exporters and non-exporters. That is, non-exporters more highly indebted in foreign currency invest even less when facing depreciations in domestic currency that occur when they are trading in derivatives. This seems a bit counterintuitive, but again sample size issues may be behind such results.

Table 14. Non-Financial Firms as Financial Intermediaries in LAC and Financial derivatives

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln_BLFC_sales	-0.145	-0.444**	-0.864	0.262	-8.941	-0.950*	-1.176
	(0.201)	(0.226)	(0.590)	(1.202)	(18.88)	(0.535)	(1.402)
ln_Sales	-0.849***	-1.015***	-0.0577	-0.739	-6.484	-1.411***	-0.248
	(0.144)	(0.157)	(0.349)	(0.625)	(11.88)	(0.342)	(0.570)
LeverageFD	0.111**	0.172***	0.173	0.0334	1.677	0.262**	0.214
	(0.0488)	(0.0542)	(0.117)	(0.242)	(3.393)	(0.113)	(0.199)
Deriv_Assets	-0.849	-0.428	-0.566	-0.388	2.291	0.246	-2.504
	(1.318)	(1.347)	(1.864)	(1.460)	(12.05)	(1.993)	(3.455)
lagS_ExpFirm_Com			-4.555				-8.484*
			(3.697)				(4.625)
lagLeverageD_FO						0.154*	0.301
						(0.0930)	(0.267)
Constant	9.496***	11.47***	-3.161	7.643	76.41	15.82***	-1.604
	(1.899)	(2.068)	(5.761)	(7.043)	(141.5)	(4.156)	(10.13)
Country-Firm fixed-effects	NO	NO	YES	NO	NO	NO	NO
Observations	631	648	360	455	455	455	360
Number of Firm	82	82	51	60	60	60	51

Source: Authors' calculations based on paper's database.
Notes: This table contains the IV-based results of the regression equation (9a) in section 4, which is the one based on Shin and Zhao (2013) augmented by the presence of total derivatives as a fraction of total assets. The rest of the variables are as in table 9. The derivatives-to-assets ratio was instrumented with the controls as described in equation (9c) in section 4. All specifications include year dummies. Column 1 is the reslt of instrumenting derivatives with the first lag of the log of assets-in-banks-to-sales ratio, while column 2 does not include that variables to instrument derivatives. Column 3 includes firm-country fixed-effects. Column 4 includes the export status dummies. Column 6 includes the foreign owned dummy while column 7 include the Top-50-by-country status. (Note: *** p<0.01, ** p<0.05, * p<0.1)

Finally, Table 14 above presents the estimates of equation (9a), which corresponds to the estimates of the extension of equation (5) including instrumented financial derivatives. The most striking result is the change in the sign of the coefficient between the log of foreign-currency loans and bonds normalized by sales and the log of normalized assets in banks. Now all coefficients are negative except for one specification and become significant in two of them (in the benchmark case where the lag of banks assets does not instrument derivatives and where the status of being foreign owned is taken separately). Although these cannot be qualified as robust results, this change in sign together with the results in Table 12 and the scattered plots in Figures 15A and 15B above suggest that for firms trading in derivatives the major destination of new receipts from increases in foreign currency borrowing may be more strongly destined to physical investment and less to liquid asset holdings. In all cases, more complete datasets should be able to confirm that suggestion in the future.

5. Robustness Checks for Benchmark Regressions

A message from the results in Section 4 is that switching to non-linear IV-based estimation methods applied to the major regression equations may change some of the results formerly obtained by simple OLS. Indeed, the use of OLS may entail several problems when making inference. First, as Section 4 stresses, even when including lagged values of firm-level variables as regressors there could be some remaining endogeneity problems given that the error term may be serially correlated. The latter would create a non-zero covariance between the regressors and the error term. To tackle this issue, the idea would be to introduce the first lag of the dependent variable on the right-hand side of the regression equation. Yet, this introduction may lead to spurious serial correlation in the residuals. The latter is clearly present when dealing with dynamic unbalanced panel databases, as is the case in this paper.

To address those endogeneity problems, the typical way out of the literature has been the application of the GMM-based methods by Arellano and Bond (1991) further extended in Blundell and Bond (1998). Recent corporate finance literature, however, stresses that some other non-linear methods may lead to better estimates when using dynamic unbalanced panels. In particular, a recent paper by Flannery and Watson Hatkins (2013), through Monte Carlo simulations, compare the statistical properties (mainly, through the root-mean-squared-error criterion) of the estimates of seven methods, including OLS, plain fixed-effects, Arellano and Bond (1991), Blundell and Bond (1998) and a dummy-variable fixed-effect method developed by Bruno (2005a, 2005b), extending the method in Kiviet (1995) and Bun and Kiviet (2003). Both the Blundell and Bond (1998) and Bruno (2005a, 2005b) methods seem to present better properties for unbalanced panels with missing observations (under certain assumptions) than the other approaches. Indeed, Flannery and Watson Hatkins (2013) find that for unbalanced panels and panels with missing data the estimates from Bruno outperform those of Arellano and Bond and Blundell and Bond, under the condition that the level of endogeneity and its persistence through time are low.

From the result by Flannery and Watson Hatkins (2013) we choose to re-estimate a subset of the regression equations whose OLS estimates appear in Tables 4 through 10 using Bruno's

method. The subsection here presents results from re-estimating a selection of the regressions from Tables 4 through 10 using the above-mentioned method.[31]

Table 15. Foreign-Currency Financial Debt and Firm's Profits Due to FEx Variations (based on Bruno, 2005)

VARIABLES	(1)	(2)	(3)	(4)
L.PE_Assets	-0.0184	-0.0308	-0.0196	-0.0237
	(0.0485)	(0.0493)	(0.0479)	(0.0489)
lagshareFCFD	-0.00410	0.00186	-0.000701	-0.00511
	(0.00890)	(0.0119)	(0.0112)	(0.0122)
lagshareFCFD_XR	2.90e-05	-3.22e-05	7.37e-06	-8.70e-06
	(5.35e-05)	(0.000124)	(9.67e-05)	(6.19e-05)
lagLeverageD	0.000713	-0.00166*	-0.00104	0.000147
	(0.000648)	(0.000952)	(0.000922)	(0.000785)
lagSG	6.86e-06	0.00638	5.63e-06	1.61e-06
	(6.51e-05)	(0.0107)	(6.77e-05)	(6.59e-05)
lagS	0.0159	0.0370***	0.0164	0.0202
	(0.0107)	(0.0141)	(0.0139)	(0.0142)
lagLeverageD_Top50		0.00508***		
		(0.00133)		
lagLeverageD_Top50bycountry			0.00398***	
			(0.00137)	
Observations	567	567	567	567
Number of Firm	77	77	77	77

Source: Authors' calculations based on paper's database.
Notes: This table contains the results for the benchmark regression equation (2) in Section 4 using the method by Bruno (2005). Variables are the same as in Table 4. All specifications include year fixed-effects as regressors. Column 1 report the results from the basic specification. Column 2 includes export and commodity dummies. Column 3 includes the **Top-50** dummy variable and column 4 includes a full specification using **Top-50** as the size dummy. Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 15 above re-estimates the equation (2) where the dependent variable is the ratio between foreign-exchange induced profits and assets. At the bottom of that table it is easy to see that the number of observations dropped a bit. The reason is that this method requires that, for each observation to be included, there must be another one immediately before. Thus, completely isolated observations are dropped out. Yet the decrease in such sample size does not seem too

[31] Tables A2 and A3 reestimate equation (1) from Section 2 using Bruno's method. Given the focus of the paper, the results are not discussed here.

severe. In any case, the most important result is the loss of all statistical significance of all coefficients concerning the foreign-currency financial debt. Even those interacted with any firm-level dummy variable are now non-significant.

Table 16. Foreign-Currency Financial Debt and Total Gross Profits/Losses

VARIABLES	(1)	(2)	(3)	(4)
L.PR	0.710***	0.630***	0.726***	0.704***
	(0.0480)	(0.0462)	(0.0480)	(0.0479)
lagshareFCFD	-0.179	-0.00259	-0.235	-0.204
	(0.132)	(0.170)	(0.156)	(0.186)
lagshareFCFD_XR	0.000936	0.00154	0.000468	0.00111
	(0.000738)	(0.00183)	(0.00132)	(0.000864)
lagSG	0.00305***	0.0488	0.00288***	0.00313***
	(0.000950)	(0.138)	(0.000947)	(0.000979)
lagshareFCFD_Top50		-0.375*		
		(0.215)		
lagSG_Top50bycountry			-0.209***	
			(0.0641)	
lagS_Top50bycountry			-0.649**	
			(0.271)	
Observations	567	567	567	567
Number of Firm	77	77	77	77

Source: Authors' calculations based on paper's database.
Notes: This table contains the results for the benchmark regression equation (2) in Section 4 using the method by Bruno (2005). Variables are the same as in Table 5. All specifications include year fixed-effects as regressors. Column 1 report the results from the basic specification. Column 2 includes export and commodity dummies. Column 3 includes the **Top-50** dummy variable and column 4 includes the **Top-50-per-country** dummy. Column 5 includes the Foreign-ownership dummy and column 6 includes a full specification using **Top-50** as the size dummy.

Table 16 re-estimates equation (2) where the dependent variable is equal to the PPP value of the level of profits and losses. Relative to Table 5, all coefficients involving the share of foreign-currency financial debt lose statistical significance. Actually, the coefficient of the interaction with the size dummy Top-50 (either for the whole sample or country-wise) becomes negative and significant at the 10 percent confidence level. This result suggests just that the endogeneity issues included in the OLS estimates may be severe enough to reverse some of the effects originally found in Table 5.

Table 17. Foreign-Currency Financial Debt and Normalized Gross Profits/Losses

VARIABLES	(1)	(2)	(3)	(4)
L.PR_Assets	0.673***	0.631***	0.640***	0.664***
	(0.0435)	(0.0438)	(0.0439)	(0.0452)
lagshareFCFD	0.00863	0.0273*	0.00717	0.00523
	(0.0127)	(0.0162)	(0.0157)	(0.0191)
lagshareFCFD_XR	8.30e-05	6.70e-06	0.000138	4.52e-05
	(8.41e-05)	(0.000217)	(0.000177)	(9.06e-05)
lagLeverageD	-0.00174*	-0.00126	-0.000757	-0.00138
	(0.00105)	(0.00152)	(0.00149)	(0.00124)
lagshareFCFD_Top50		-0.0452*		
		(0.0230)		
lagLeverageD_Top50bycountry			-0.00380*	
			(0.00228)	
Observations	568	568	568	568
Number of Firm	77	77	77	77

Source: Authors' calculations based on paper's database.
Notes: This table contains the results for the benchmark regression equation (2) in Section 4 using the method by Bruno (2005). Variables are the same as in Table 6. All specifications include year fixed-effects as regressors. Column 1 report the results from the basic specification. Column 2 includes export and commodity dummies. Column 3 includes the **Top-50 by country** dummy variable and column 4 includes a full specification. Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 17 above re-estimates equation (2) taking the ratio of gross profits over assets as the dependent variable. Again, most of the effects of foreign-currency debt that appeared to be significant in table 6 become now non-significant. The only exception is the interaction between the foreign-currency financial debt share and the size dummy Top-50 and foreign ownership. Yet that coefficient is only significant at 10 percent (under OLS one of the two coefficients was not even significant). This result suggests that a more robust way of measuring the consequences of currency denomination of debt on performance demands measuring the latter through a normalized profit indicator.

Table 18. Debt Composition and Investment by Bruno (2005)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
L.I_over_K	0.175***	0.144**	0.176***	0.176***	0.181***	0.143**
	(0.0476)	(0.0620)	(0.0480)	(0.0474)	(0.0484)	(0.0620)
lagshareFCD_K_XR	-39.79	361.5	-67.55	-61.55	-378.3	-135.2
	(372.6)	(948.4)	(376.6)	(375.8)	(670.2)	(3,741)
lagshareFCD_K	734.4	60.19	777.5	768.3	-919.5	393.1
	(646.5)	(1,683)	(659.1)	(652.8)	(4,612)	(6,324)
Observations	620	443	620	620	620	443
Number of Firm	83	58	83	83	83	58

Source: Authors' calculations based on paper's database.
Notes: This table contains the results for the regression equation (4) in Section 4 using the method by Bruno (2005), Variables are the same as in Table 7. All specifications include fixed-effects as regressors. Column 1 reports the results from the basic specification, Column 2 includes export and commodity dummies, Column 3 includes the Top-50 dummy variable and column 4 includes the Top-50-per-country dummy, Column 5 includes the Foreign-ownership dummy and column 6 includes a full specification using Top-50 as the size dummy. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 18 shows that the Bruno (2005a, 2005b) method, applied to equation (3), implies the disappearance of any significance of the coefficient of the share of foreign currency financial debt on the fixed-investment decision. This astonishing result shows that what appeared to be a mixed relationship between investment and foreign currency debt using OLS became convincingly not relevant at all when using this other estimation method. This last result brings a big word of caution regarding the validity of the analysis about the correlation between the currency denomination of debt and fixed-capital investment decisions obtained both using OLS and GMM when including derivatives. Under those estimation methods there were concrete cases of significantly positive correlation between these variables of interest. When an alternative method is applied that deals with both issues of endogeneity and panel-data unbalancedness, that statistical significance was lost. In principle, this may be solved again with a wider-coverage database, but this still remains as a robustness check for future research.

Table 19. Debt Composition, Credit Constraints and Investment by Bruno (2005)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
L.I_over_K	0.0703***	0.0869***	0.0626***	0.0615***	0.0641***	0.0801***
	(0.0195)	(0.0264)	(0.0173)	(0.0205)	(0.0220)	(0.0241)
lagnetworth_K	0.0302***	0.0273***	0.0593***	0.0300***	0.0247***	0.0687***
	(0.00280)	(0.00332)	(0.00386)	(0.00285)	(0.00288)	(0.00665)
lagnetworth_FC_K	-4.22e-05	0.0453	-0.00105	-0.000236	-0.000131	-0.0478
	(0.000226)	(0.0628)	(0.000932)	(0.000531)	(0.000325)	(0.0759)
lagG_K	517.6**	651.9***	-111.6	510.5**	1,632***	-1,241**
	(202.9)	(243.2)	(193.9)	(205.0)	(336.2)	(541.2)
lag2shareFCD_XR	-0.000408	-0.0286	0.00153	-0.000150	-0.000293	0.0334
	(0.000610)	(0.0410)	(0.00423)	(0.00131)	(0.00105)	(0.0596)
D_Longtermdebt	0.0336***	0.0254	0.00961	0.0529***	0.0247**	0.0180
	(0.0102)	(0.0184)	(0.0126)	(0.0152)	(0.0122)	(0.0191)
lagI_over_K_Top50			0.122**			0.215**
			(0.0495)			(0.0971)
lagnetworth_KTop50			-0.0307***			-0.0388***
			(0.00258)			(0.00430)
lagnetworth_KFO					0.0456***	-0.00694
					(0.0165)	(0.0436)
Observations	603	431	603	603	603	431
Number of Firm	80	56	80	80	80	56

Source: Authors' calculations based on paper's database.
Notes: This table contains the results for the regression equation (4) in Section 4 using the method by Bruno (2005), Variables are the same as in Table 8. All specifications include fixed-effects as regressors, Column 1 report the results from the basic specification, Column 2 includes export and commodity dummies, Column 3 includes the Top-50 dummy variable and column 4 includes the Top-50-per-country dummy, Column 5 includes the Foreign-ownership dummy and column 6 includes a full specification using Top-50 as the size dummy. Robust standard errors in parentheses. Note: *** p<0.01, ** p<0.05, * p<0.1

Table 19 re-estimates equation (4) using Bruno's method and net worth as the credit constraint measure. Once again, the cases of statistically significant coefficients on net worth interacted with foreign-currency financial debt disappears with this estimation method, relative to results in Table 9. A similar disclaimer as that of Table 18 applies here.

Table 20.Non-Financial Firms as Financial Intermediaries in LAC Based on Bruno (2005)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
L.ln_assetsinbank_sales	0.425***	0.459***	0.408***	0.412***	0.402***	0.437***
	(0.0460)	(0.0544)	(0.0453)	(0.0462)	(0.0457)	(0.0529)
ln_BLFC_sales	0.0421	0.0697	-0.0711	0.0295	0.0987*	0.00719
	(0.0396)	(0.0637)	(0.0898)	(0.0663)	(0.0591)	(0.121)
ln_Sales	-0.551***	-0.261	-0.528***	-0.592***	-0.582***	-0.103
	(0.0885)	(0.217)	(0.188)	(0.0994)	(0.0917)	(0.293)
LeverageFDTop50			0.0688*			0.385**
			(0.0359)			(0.183)
ln_BLFC_salesFO					-0.141*	0.00232
					(0.0781)	(0.120)
Observations	757	576	757	757	757	576
Number of Firm	93	73	93	93	93	73

Source: Authors' calculations based on paper's database.
Notes: This table contains the results of the regression equation (5) in Section 4, based on Shin and Zhao (2013), using the method by Bruno. Variables are as in Table 10. All specifications include fixed-effects as regressors, Column 1 reports the results from the basic specification, Column 2 includes export and commodity dummies, Column 3 includes the Top-50 dummy variable and column 4 includes the Top-50-per-country dummy, Column 5 includes the Foreign-ownership dummy and column 6 includes a full specification using Top-50 as the size dummy. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Finally, table 20 re-estimates equation (5) based on Shin and Zhao (2013) but using Bruno's method. Interestingly, there is one specification (albeit different from that under OLS estimation) where the correlation between normalized assets in banks (in logs) and the normalized sum of bonds and loans in foreign currency is not only positive (which is still true here in all specifications) but also significant. It is the case where the foreign ownership status is explicitly individualized. In this specification, non-foreign owned firms are the ones showing a positive correlation between foreign-currency financial debt and liquid assets in banks.

6. Concluding Remarks

This paper has focused on the possible effects of the increasing share of debt denominated in foreign currency on economic performance and investment behavior by non-financial firms in

LAC. The type of evidence found here cannot be taken as definitive, but some of the results seem quite robust when several methods are applied.

First, the influence of foreign-currency debt on exchange-rate induced profits is far from being clear. Some of the OLS-based coefficients have the sign opposite to the expected one. Derivatives may be a possible factor to be included in regression analysis in the near future to clarify the channel that leads to a positive impact of depreciations in domestic currency on exchange-rate-induced economic performance. This hypothesis should be confirmed in future research. In addition, the effect on gross profits likewise seems far from obvious. For the average firm the effect seems to be either negligible or weakly positive, although for several types of firms the sign seems to be more consistent with previous intuition.

In terms of investment behavior, the major lesson is that the effect of foreign currency debt (either when controlling for credit constraints measures or when not doing so) is mixed and possibly weak when endogeneity is explicitly addressed. In the case of exporting firms, foreign-owned companies or large there is some effect, but those are not clear enough to be robust, at least in terms of the methodology. Also there is mixed evidence in favor of the hypothesis of non-financial firms acting as financial intermediaries, at least using the basic specifications from Shin and Zhao (2013). Yet more robust exercises need to be performed to dig deeper into the (financial and fixed-asset) investment decisions of these firms and how they fund such decisions.

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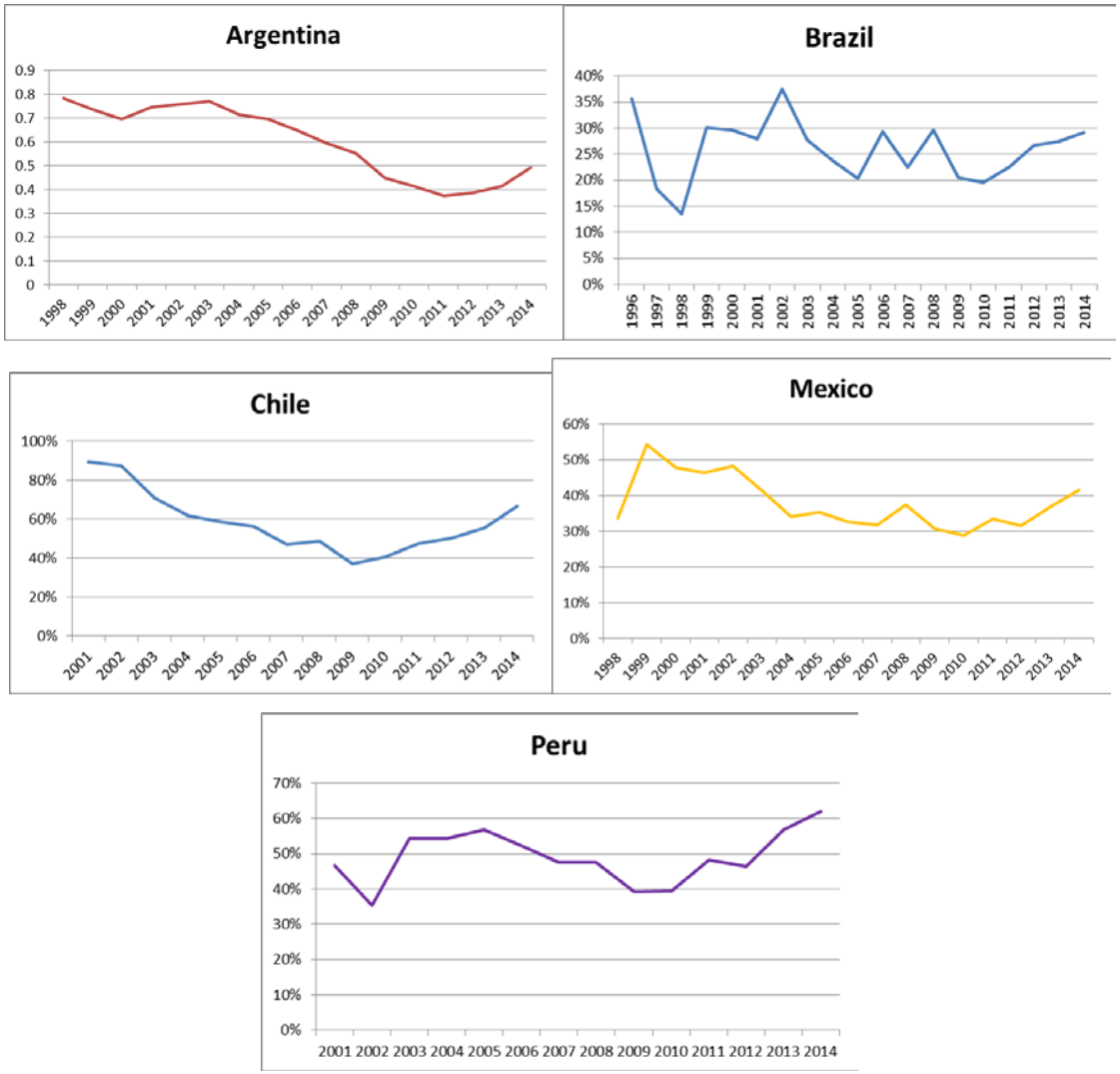
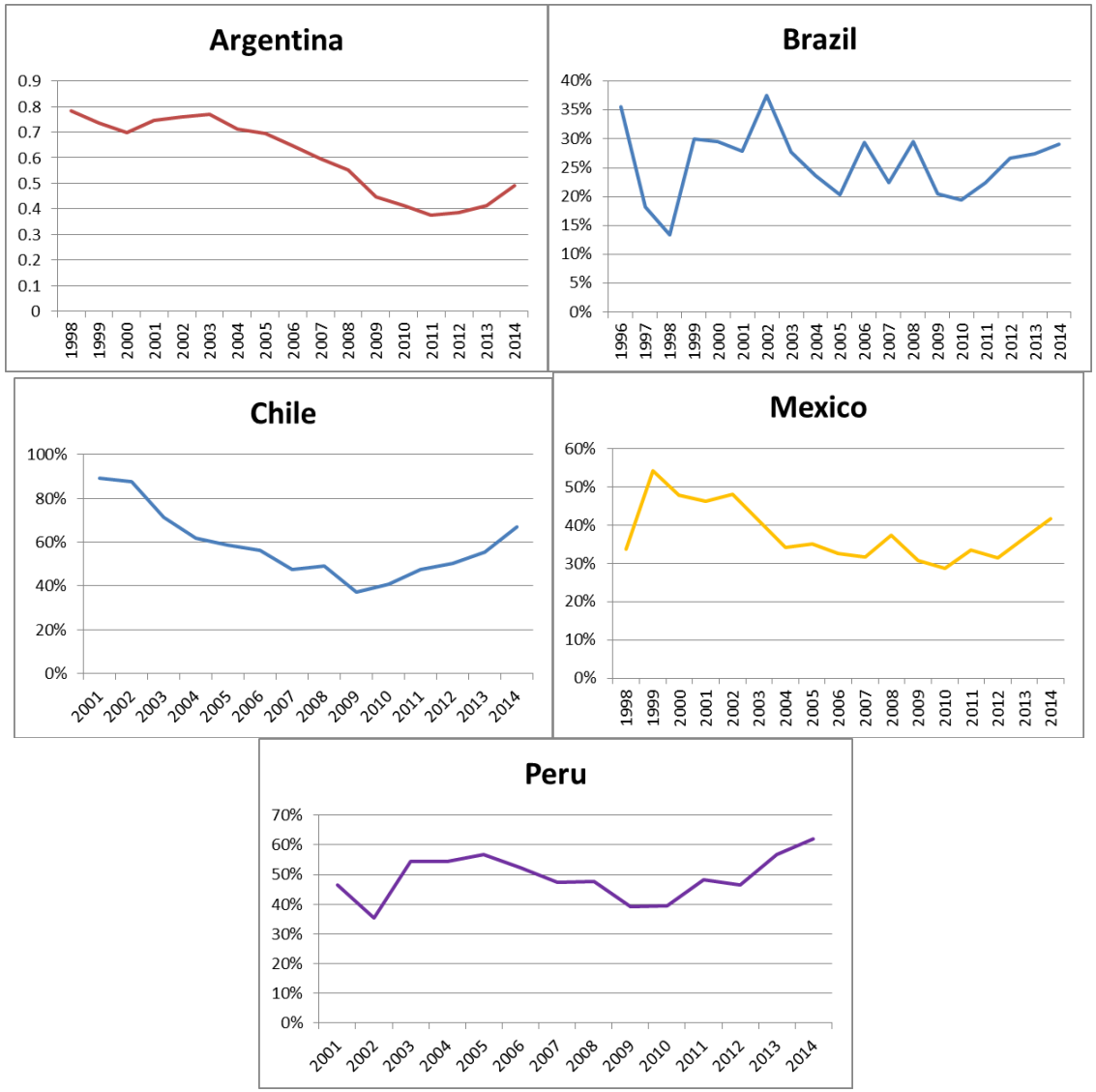
Appendix: Additional Figures

Figure A.1. Foreign-Currency Debt per Country and Year (averages)



Source: Authors' calculations based on paper's database.

Figure A.2. Foreign-currency debt per country and year (averages)



Source: Authors' calculations based on paper's database.