The Boom of Corporate Debt in Latin America: Carry Trade or Investment? *

José De Gregorio**

Nicolás García***

Mauricio Jara ****

Draft July 06, 2017.

Abstract

Previous research shows that due to a decline in international yields following the recent global crises corporations in emerging markets are issuing more debt in the international markets (offshore debt). Some evidence suggests that lower international rates encourage firms to abnormally accumulate cash holdings as a means to increase carry trade activities rather than to accumulate precautionary savings. Using a sample of nonfinancial listed firms for six Latin American countries, we analyze the relation between aggregated offshore debt, cash holdings, and investment. We find evidence in line with prior research that companies accumulate more cash when carry trade is more favorable. However, we also find that this cash holding anomaly is consistent with the precautionary savings argument. Offshore debt impacts next-period investment significantly. This result is robust and heterogeneous. We include other country-specific variables and check the robustness of our findings, and the main results hold.

Keywords: Emerging Markets, Latin America, Offshore Debt, Carry Trade, Precautionary Savings.

JEL codes: E4, G00 and G30

* Jara thanks FEN-UChile II Research Grant for funding. We thank Francisco Marcet, Carlos Pombo and Félix López Iturriaga for their valuable comments and suggestions.
** School of Economics and Business, Universidad de Chile, Chile; Email: jdegregorio@fen.uchile.cl
*** School of Economics and Business, Universidad de Chile, Chile; Email: mgarciaz@fen.uchile.cl
**** School of Economics and Business, Universidad de Chile, Chile; Email: mjarab@fen.uchile.cl

1. Introduction

In the last decade, corporations have become more active on the international bond markets. In fact, since the global financial crisis, foreign currency corporate bonds issuance in emerging markets has increased threefold (Caballero *et al.* 2015). This phenomenon has been caused by the implementation of quantitative easing (QE) in major central banks around the world in an environment of very low monetary policy interest rates in major advanced economies. QE has reduced yields and substantially increased the demand for fixed income. Policymakers and researchers have been interested in understanding and quantifying the effects of these central banks programs on international financial markets due to spillover effects. This period has been called the "second phase of global liquidity" referring to the increasing importance of the international corporate bonds market.[1]

Shin (2014) shows that since 2010 the main source of funding among emerging economies has shifted from banks to the bond market.[2] Feyen et al. (2015) suggest that this development has been mostly driven by push factors, such as global liquidity shocks, rather than pull factors, such as firm-level investment opportunities. Duca et al. (2016) find that QE strongly affected the increase of corporate bond issuances across advanced and emerging market economies. Despite the large increase in bond issuance, bank loans remain the largest fraction of private corporate debt. However, the increased relevance of bond debt flows is a concern from a financial stability point of view (IMF 2015).

The rapid growth of corporate bonds markets is to some extent the result of spillover effects from global financial conditions. In emerging market economies, spillover affects the

[1] The first phase of global liquidity refers to the 2003–2008 period during which the global credit growth was mainly driven by banks. During that period the depreciation of the U.S. dollar coincided with a banking lending boom until 2008 (Shin 2014).
[2] Shin (2014) also finds that consolidated firms issue offshore debt using their filial relationships, leading to currency mismatch and hedge strategies.

volume of capital inflows. For example, Burns et al. (2014) and Lim et al. (2014) estimate that capital inflows to emerging economies increased by approximately 5% of GDP as result of QE. Barroso *et al.* (2013) report that QE increased capital inflows, induced an exchange rate appreciation, and fostered stock market and credit booms. Specifically, they find an increase between 2.1% and 4.2% of the accumulated gross capital inflows to Brazil.

Naturally, the decline in yields have moved corporations to raise more debt in international markets (Fawley & Neely 2013; Duca *et al.* 2016). However, recent studies also show that firms that issue bonds also have abnormal increases in cash holdings (Shin & Zhao 2013).

Why are corporations tapping international financial markets? Why are they accumulating cash holdings along with increased indebtedness? What are the implications of such behavior on financial stability? The answers to these questions are all relevant for understanding firms' financial behavior in recent years and have important policy implications. Therefore, this paper focuses on corporations' motives for accessing the international bonds markets.

Two main arguments can explain the positive correlation between cash holdings and indebtedness. First, as suggested by Bruno and Shin (2017), firms can raise funds to engage in carry trade activities. In other words, nonfinancial firms issue offshore hard currency corporate bonds to arbitrage interest rate spreads and increase their cash holdings rather than their investment. Caballero et al. (2015), Caballero et al. (2014), Chung et al. (2015) Acharya et al. (2015), and Shin and Zhao (2013) also support this argument. Indeed, Shin and Zhao argue that this behavior makes corporations to look like financial intermediaries: They borrow to lend. Thus, they simultaneously increase financial assets and liabilities. In contrast, nonfinancial firms

borrow to invest. They finance investment by cash holdings and by issuing financial liabilities—debt in this case. Therefore, the correlation between financial assets (cash) and financial liabilities (debt) should be negative. The fact that the correlation is positive allows firms to take advantage of carry trading acting as intermediaries. We refer to this explanation as the "carry trade motive."

The second argument to explain the accumulation of cash holding and debt issue abroad comes from the corporate finance literature. Favorable offshore debt conditions allows firms to enjoy lower interest rates and accumulate cash as precautionary savings to finance future investment. Almeida *et al.* (2004) argue that firms tend to save cash out of their incremental cash flow to secure future financing. They suggest that firms are more likely to save cash if external financing costs are expected to become much more expensive than internal funds. During periods when international financing cost are low, firms can issue offshore debt for precautionary reasons because the wedge between internal and external funding costs is lower. Following this argument, Denis and Sibilkov (2010) show that when financing costs are expected to increase, firms are more prone to save cash to have funds available for investment needs. Indeed, they report that cash holdings are associated with higher investment spending. This evidence supports the precautionary savings hypothesis by showing that cash holdings are used to invest directly or to prepare higher levels of investment, according to the firm' strategy (i.e., acquisition or diversification decisions). Even if financing cost are not expected to rise, increased cash holdings financed by offshore hard currency debt issuances can be the result of the growing role of nonfinancial corporations, which often maintain cross border operations and investment as they consolidate subsidiaries across different countries (Pinkowitz *et al.* 2015). We refer to this explanation the "precautionary savings motive."

In other words, the effect of lower funding costs can allow firms to avoid underinvestment problems and to cheaply fund investment. Bengt and Jean (1998) show that firms tap international markets as a means of liquidity insurance to mitigate underinvestment problems. Lins *et al.* (2010) find that managers use lower funding costs (as credit lines) to finance future investment opportunities when they expect costs to be higher. This effect on cash holdings and future investment may even be higher if firms anticipate new episodes of global financial distress and credit restrictions (Pinkowitz *et al.* 2015), which is particularly relevant to firms in emerging market economies. Indeed, under the precautionary savings hypothesis, more than carry trade activities, firms take advantage of interest rate spreads by issuing hard currency offshore debt (with lower yields in international markets) to finance future investment.

This paper empirically evaluates the two motives for the increased issuance of foreign currency debt. If the reason is to conduct carry trade, nonfinancial corporations would be heavily exposed to foreign currency fluctuations and, hence, financially vulnerable. This vulnerability can have a major effect on financial stability. In contrast, if the reason is related to finance investment, firms are presumably doing what is expected when financial conditions are favorable. However, due to the currency exposure of assets and liabilities, this motive does not rule out increased financial vulnerability. Also, we cannot exclude the possibility of foreign borrowing to finance non-tradable domestic investment. This issue has been at the center of the main financial crisis in emerging market economies. Although firms would not be using their balance sheet to arbitrage interest rate differentials, such action can still increase financial fragility.

To examine this issue, we use a sample of Latin American nonfinancial firms that issued hard currency and local currency bonds between 2001 and 2014. We confirm the positive

relation between debt issuance in foreign markets and cash holdings, as expected under both the carry trade and precautionary savings motives. Our results suggest that higher spreads between local interest rates and the United States' Moody's Baa corporate bonds yields increases the effect of aggregate hard currency bond issuances on cash holdings and investment. Specifically, we find that higher spreads increase cash holdings when firms issue hard currency bonds. This finding is consistent with both the carry trade and the precautionary savings arguments. However, we also find that a 26 basis points increase in spreads results in almost 50 basis points of increase in next-period investment intensity for firms with hard currency debt. This result is consistent with precautionary savings motive and financial constraints literature but not with the carry trade motive. This result is robust and heterogeneous. We include other country-specific variables and check the robustness of our findings, and the main results hold.

We analyze interest rate spreads as an exogenous channel that influences corporate investment. Prior studies that emphasize the carry trade motive focus only on the positive correlation of foreign currency borrowing and cash holdings. However, we argue that increase use of the international markets can also be interpreted based on firms' desire to prepare for future investment needs. Thus, we study the behavior of cash accumulation together with investment, which allows us to identify the two potential explanations for offshore borrowing.

Our study contributes to the literature on cash holdings and investment and has implications for the behavior of nonfinancial corporations under changing global financial conditions. Periods of high global liquidity can encourage the issuance of offshore bonds. This activity can have other spillovers because firms may be forced to overengage in hedging strategies, which can dry up market liquidity due to the risk of currency mismatch.

The remainder of the paper is organized as follows. Section 2 presents our data and methodology. Section 3 presents our baseline estimates. Section 4 provides robustness checks and extensions to basic estimations. Finally, Section 5 concludes.

2. Data sources and variables

Our data set comprises bond-level issuance information from the SDC Platinum module of Thomson Reuters Eikon, firm-level Information from Standard & Poor's Capital IQ, and country-level information from the World Bank. Our raw data consist of 215 Latin American issuing firms and 3,029 observations of annual financial information from 2000 to 2014. Because we focus only on nonfinancial corporations, we exclude firms from industry SIC code over 6000 (financial firms and real estate). We manually merge issuance information from subsidiaries to parent companies. We then eliminate firms with less than three years coverage and firms with missing values for capital expenditures, cash holdings, sales, assets, debt, cash flow, and stock prices. Finally, we drop outliers in the top and bottom 1% of each variable. The final sample is an unbalanced firm-level data panel of 1,584 observations from 188 quoted nonfinancial firms from Argentina, Brazil, Chile, Colombia, Mexico and Peru. Appendix A provides the definition of each variable considered in the empirical analysis.

Firm-level variables including investment and cash flow are defined in the standard way and scaled by lagged total assets (Hadlock & Pierce 2010; Pindado *et al.* 2011; Chen & Chen 2012; Kuo & Hung 2012; Lima-Crisóstomo *et al.* 2014). Following Bates *et al.* (2009), the cash holding variable is also measured over total assets. To compute hard currency bond issuance and domestic currency bond issuance,[3] we sum each type of issuance within a fiscal period and then

[3] Hard currency issuances are referred to U.S. dollar, euro, British pound sterling, Japanese yen and Swiss franc.

scale up to lagged total assets to exclude current issuance from assets.[4] Figure 1 plots domestic and hard currency issuances across the sample years. Total issuance of hard currency bonds increases significantly, especially in comparison to bonds issued in local currency, which fall. In fact, since 2010, hard currency bonds issuances surpass the amount issued in local currency. Total issuance of corporate debt also grows throughout this period. Figure 1 shows the contrast between the first and the second phase of global liquidity. In the first phase, while banks increased foreign lending, figure 1 shows that nonfinancial firms issue large amounts of domestic debt. During this second phase, following the global financial crisis, nonfinancial corporation borrow directly in international markets.

[FIGURE 1 ABOUT HERE]

Figure 1 suggests that companies shifted their composition of debt from local debt to foreign debt, taking advantage of global liquidity and the decline in international interest rates. This shift, however, does not necessarily imply that firms are exploiting carry trade. If companies engage in carry trade activities, offshore issuances would increase without a reduction of local debt issuances and companies would be more leveraged temporally during periods of lower international corporate yields. However, in the postcrisis period local debt issuances decline significantly whereas leverage increases. This finding may indicate that firms borrow offshore for debt restructuring or to invest. However, given the growth in cash holdings during this period, we cannot rule out carry trade activities.

[4] This sum excludes current issuance from total assets. We also define issuance variables scaled by total assets. Results are basically the same and are available upon request.

To calculate our measures of spread, we obtain the from World Bank the country-level deposit or borrowing interest rates and the Baa Moody's seasonally adjusted corporate bond yield in the United States. Thus, we use two measures of spreads defined as the differences between deposit or borrowing interest rates and the Baa Moody's yield.

Table 1 provides a description of the sample by country. Overall investment over assets is about 5.8%, with lower values for Argentina and Mexico (5.1%) and higher values for Peru (7.6%). Cash holdings are, on average, 9.2%. Brazilian and Peruvian firms hold the most and least cash, respectively. The sample average of cash flows from operations to total assets is about 9.9%. Operating cash flow is relative higher for Brazilian and Peruvian firms and lower for Colombian firms. In general, the stock of cash holdings is similar to the yearly cash flow from operations. Figure 2 provides the evolution of the sample firm's cash ratio and investment ratio. Panels A and B shows that both cash holding and investment increase following the global financial crisis. However, in 2014 investment declines, which is consistent with the global deceleration of emerging markets and the decline of investment in Latin America (World Bank 2017).

[TABLE 1 ABOUT HERE]

[FIGURE 2 ABOUT HERE]

The descriptive statistics in Table 1 also show that the countries with the highest and lowest incentives to engage in cash accumulation, due to the magnitude of spreads, are Brazil (5.1%) and Mexico (–3.6%). In terms of the three types of capital controls, Argentina is the closest economy and Peru is the most open.

Finally, to examine the main purposes of the hard currency issuances, Appendix B illustrates the main objective of the hard currency bond issuances for a random sampling of firms. The appendix shows that in most cases the main declared purpose of the issuances is to invest or to restructure debt.

To test the ability of the our hypotheses, the carry trade and precautionary motives, to explain large cash accumulation, we estimate two models. First, we estimate a dynamic version of the cash model proposed by Bates *et al.* (2009). We follow Caballero *et al.* (2015) and include the issuances measure and the interaction of this variable with the spread. This method allows us to see how the spread affects the impact of hard currency issuances on cash holdings. The empirical model is

$$Cash_{i,t} = \beta_1\, Cash_{i,t-1} + \beta_2\, FXBHA_{i,t} + \beta_3\, FXBHA_{i,t} * Spread_{c,t}$$
$$+\beta_4\, CFO_{i,t} + CV_{i,t} + I_i + yc_t + u_{i,t}, \qquad (1)$$

where $Cash_{i,t}$ is cash and short-term investment scaled by total assets of firm *i* in year *t*; $FXBHA_{i,t}$ is the aggregate hard currency bond issuance scaled to total assets at the beginning of the period;[5] $Spread_{c,t}$ is the spread between the domestic currency deposit rate (Spread1) or borrowing rate (Spread2) and borrowing costs in the United States proxied by Moody's BAA yield; CFO_{it} is the operating cash flow of firm *i* in year *t*; $CV_{i,t}$ is a set of control variables, defined in Appendix A. In addition, we include a set of fixed effects at different aggregation levels to control for unobservable time-invariant and time-variant fixed effects. In particular, fixed effects are included at the industry level (I_i) and country-year level (y_{ct}). This fixed effect captures country time-variant variables, such as GDP growth and inflation.

[5] We include in the *CV* variables the aggregate domestic currency bond issuances within a period (DCB) as a control variable.

As previously mentioned, hard currency issuances *FXBHA* is expected to have a positive coefficient (β_2). Given the dynamics of the investment decisions, an increase in hard currency debt issuance should increase cash holdings for precautionary reasons. More important, because a positive spread gives more incentives to borrow abroad, we introduce an interaction variable between hard currency issuances and the spread of local deposit (borrowing) and the Baa Moody's yield (*FXBHA*Spread*).

As previously discussed, two main hypotheses characterize the relation between hard currency issuances, spreads, and cash holdings. According to the precautionary motive, the more traditional view, firms take advantage of low international interest rates to borrow cheaply and accumulate cash for precautionary reasons. In so doing, they avoid potential financial constraints to meet future investment needs (Almeida *et al.* 2004). A high spread also incentivizes firms to anticipate borrowing to take advantage of carry trade while preparing for investment because the cost of borrowing abroad is lower. The positive relation between foreign borrowing and cash holdings comes from the lag that it takes to invest. The other view, the carry trade motive, is that nonfinancial corporations engage in interest rates arbitrage to generate additional cash flows (Shin & Zhao 2013; Caballero *et al.* 2015; Bruno & Shin 2017). In this case, firms behave as financial intermediaries. Both hypotheses predict a positive sign of the interacted term (β_3); that is, a larger spread increases the effect of hard currency borrowing over cash holdings. We investigate which of the two hypotheses is more plausible to explain the positive correlation between foreign currency issuance and cash holdings. For this purpose, in a second stage, we estimate investment equations.

We estimate an extended version of investment model of Fazzari *et al.* (1988). This model assumes the existence of a wedge in financing cost between internal and external sources

of funds, and hence the higher the wedge of funding cost, the more financially constrained the firms are and the more dependent they are on internal cash flow to satisfy investment opportunities. However, Kaplan and Zingales (1997) suggest that the investment–cash flow sensitivity regressions cannot capture financial constraints. Despite this unresolved issue,[6] we do not need to identify financially constrained firms because we use a sample of firms that that have access to international financial markets. Our focus is on the effects of hard currency bonds issuances over next-period investment level and the increasing effect of the spread. Because investment decisions follow a dynamic pattern, we follow the tradition of Euler equations for investment including the lagged investment variable (Aivazian *et al.* 2005). We extend this model by introducing the lagged variable of the aggregate hard currency bonds issuances and the interaction with the lagged spread. The empirical model is

$$Inv_{i,t} = \beta_1\, Inv_{i,t-1} + \beta_2\, FXBHA_{i,t-1} + \beta_3\, FXB_{i,t-1} * Spread_{c,t-1} + \beta_4\, CFO_{i,t} + CV_{i,t-1} + I_i + yc_t + u_{i,t}, \quad (2)$$

where Inv_{it} is capital investment of firm *i* in year *t*; and $FXBH_{i,t-1}$ is aggregate hard currency bond issuance, both scaled to total assets at the beginning of the period; $Spread_{c,t-1}$ is the difference between the domestic currency deposit (borrowing) rate and borrowing costs in the United States proxied by Moody's BAA yield; and $CV_{i,t-1}$ is the set of control variables defined in Appendix A. As in Equation (1), we include a set of fixed effects at different aggregation levels to control for unobservable time-invariant and time-variant fixed effects. To check the consistency of our results, we substitute the country-year fixed effects by including separately a

[6] See, for example, Cleary *et al.* (2007), Kaplan and Zingales (2000), Fazzari *et al.* (2000), and Hadlock and Pierce (2010).

year fixed effect and a country fixed effect and, hence, introducing several country-level time-variant factors as additional covariates. See Table 3 for the results.

Because hard currency bond issuances can serve as a vehicle to increase cash for precautionary reasons and to prepare next period investment, we expect the coefficient in the lagged variable of hard currency bond issuance (β_2) to be positive. In addition, we presume that the precautionary motive are more pronounced when spreads are high because firms can borrow relatively cheap. Thus, we expect the coefficient on the interaction term between the spread and the aggregate hard currency bond issuances to be positive (β_2).

Due to endogeneity problems in dynamic panel data, ordinary least squares estimators can provide biased coefficients. Therefore, we use Blundell and Bond's (1998) generalized method of moments (GMM). The GMM system estimator deals with the endogeneity issues in the relation between investment and cash, among others. In general, all of the right-hand variables are potentially endogenous (Pindado *et al.* 2011). Importantly, GMM controls for the endogeneity of all firm-level variables by introducing lagged variables of the right hand-side as instruments. Specifically, we introduce all right-hand side variables lagged from *t*–1 to *t*–3 as instruments in the Equation (1) and from *t*–2 to *t*–4 in the Equation (2). (In the investment model we introduce lagged variables in the right-hand side of the models.) In this way, the GMM system estimator presents some advantages over others dynamic panel models that are regularly used in corporate finance research (Flannery & Hankins 2013).

The consistency of the estimates depends on the absence of second-order serial autocorrelation in the residuals and on the validity of the instruments (Arellano & Bond 1991). Accordingly, we report *p*-values of the first- and second-order autocorrelation test. To test the validity of the instruments, we use the Hansen test of overidentifying constraints, which tests for

the absence of correlation between the instruments and the error term and, therefore, checks the validity of the selected instruments.

3. Main Results

The purpose of the estimations is to test whether hard currency issuances affect cash holdings and investment decisions. Table 2 presents the results of the baseline estimations introducing country-year and industry fixed effects. Columns 1, 2, and 6 shows the results of the estimations for cash holding (Equation (1)), and columns 3, 4, 5, and 7 shows the results of estimations for investment (Equation (2)). To deal with the potential attrition problem, we include in our estimations only surviving firms—that is, only those that remain in operation in 2014.

[TABLE 2 ABOUT HERE]

The evidence across columns 1 and 2 of Table 2 indicates that aggregate hard currency bonds issuances are positively associated with cash holdings. This evidence is consistent with the expected effect of issuances over cash, in line with the findings of Shin and Zhao (2013) and Caballero *et al.* (2015). Our result is robust for the QE period of 2008–2014 in column 6, during which most hard currency bonds are issued. In columns 1, 2, and 6, the coefficients of *FXBHA* are positive and statistically significant at the 1% level, with values of 0.110, 0.139 and 0.122, respectively.

Regarding the increasing effect of spread over cash holding, columns 2 and 6 of Table 2 show that the parameter for the interaction $FXBHA_{i,t} * Spread1_{c,t}$ is positive and statistically significant. For example, in column 2 the marginal effect of hard currency issuances on the cash

ratio is 0.139 + 3.344*$Spread$. Evaluated at 26 basis points, the sample average of the spread between the domestic currency deposit rate and borrowing costs in the United States, proxied by Moody's BAA yield (Spread1), implies a marginal effect of 0.148. Therefore, for the spread is equal to the sample average: About 15% of foreign issuance is held as cash. Quantitatively, the effect of the spread is of the second order compared to the direct effect of foreign borrowing on cash holdings.

Regarding the effects of aggregate hard currency issuances (*FXBHA*) on investment, columns 3 to 5 of Table 2 indicate that the lagged *FXBHA* has a positive effect on investment (*Inv*). This finding is consistent with the precautionary effect of cash holding over next-period investment. We evaluate the consistency of our results by estimating a different time period in column 7, and the main results hold. In columns 3, 4, 5, and 7, the coefficient of the lagged *FXBHA* is positive and statistically significant. Firms issue bonds, and the proceeds are used in the next period, since current issuance has no effects on investment.

High spreads result in more attractive conditions to borrow abroad, allowing firms to invest more in future periods. Thus, we test whether the existence of interest rate spreads increases the positive effect of *FXBHA* over future investment. Columns 4, 5, and 7 of Table 2 shows that the parameter of the interaction $FXBHA_{i,t-1} * Spread1_{c,t-1}$ is positive and statistically significant (1.753, SE=0.636; 1.635, SE=0.603; and 1.715, SE=0.616, respectively). The effect of the lagged spread interacted with the lagged hard currency bond issuance is significant on the investment decision. In column 4, the marginal effect of lagged hard currency issuances ($FXBH_{t-1}$) on the investment ratio is 0.053 + 1.753*$Spread1_{t-1}$. Evaluated at the spread's sample average (26 basis points), the result is a marginal effect of 0.058 (of 0.270).

Thus, the average of 26 basis points in lagged spread explains about 10% of the total effect of foreign currency borrowing on investment.

Figure 3 graphically illustrates the marginal effect of the estimation from columns 2 and 4 of Table 2. The figure shows that the point estimates for cash holdings and next-period investment increase with an increase in the spread. The findings suggest that firms may engage in foreign borrowing in anticipation of future investment. This anticipatory response can be attributed in part to carry trade motives, but as the figure shows, the effects are somewhat limited.

[FIGURE 3 ABOUT HERE]

Methodologically, the GMM results pass the required tests of autocorrelation and instruments validity. As Table 2 shows, these tests do not reject either the null hypothesis of validity of the instruments (Hansen) or the null hypothesis of absence of second-order autocorrelation.[7]

Finally, as preliminary robustness check, we estimate the models in Table 2 using ordinary least squares with two-way fixed effects panel data. Appendix C provides the results, which are consistent with those reported in Table 2.

4. Robustness Checks

We conduct a number of robustness checks. To test various types of specifications on cash holdings and investment, we run alternatives tests such as the cash flow sensitivity of cash

[7] These results hold for all GMM system estimations in the remaining tables.

estimations. We also replace the deposit-based spread with the borrowing-based spread and include additional covariates. In addition, to alleviate selection bias problems, we use matching methods. In all cases our results remain qualitatively robust.

Controlling for macroeconomic factors

Table 3 provides the first robustness check of the results for aggregate hard currency issuances and the interaction terms between the issuance and the spread. Specifically, we replace the country-year fixed effect with the country fixed effect and year fixed effect. This method allows us to introduce several country-level covariates as the spread (*Spread*), the natural logarithm of GDP per capita (LnGDP), total market capitalization over GDP (MkGDP), total private credit over GDP (PrivGDP), and an overall measure of capital controls (K), from Fernández *et al.* (2015).

[TABLE 3 ABOUT HERE]

Table 3 provides the results, which confirm the baseline results. Aggregate hard currency issuance positively affects cash holdings. In addition, this effect is increasing with the spread, which is consistent with carry trade. At the same time, the lagged decisions of debt affect investment decisions, and lagged spreads make the effect of foreign issuance of debt on investment larger (parameter $FXBHA_{i,t-1} * Spread1_{c,t-1}$).

Our firm specific results cannot be extended to an aggregate dimension because we only consider publicly listed firms, which are likely to be less affected by financial constraints to borrow. For example, the results in Table 2 suggest that higher spreads result in higher levels of

investment. In column 2 in Table 3 the current spread negatively affects investment, but the magnitude of this effect does not outweigh the positive effect stemming from the interaction with foreign borrowing. However, higher spreads are also related to higher levels of a country's risk. Hence, spread can be inversely related to aggregate investment at the country level (Aguiar *et al.* 2012). For instance, Hayakawa *et al.* (2013) show that some components of country risk, including higher political risk of internal conflicts, corruption, and bureaucracy, are inversely related to investment measured as the amount of foreign direct investment inflows. Appendix D provides the results of the country-level regressions in which aggregated investment (measured as the capital gross formation) depends on the spread and the lagged spread. The evidence presented in Appendixes D and E show a negative relation between aggregate investment and lagged spread. In other words, our results indeed suggest that the incremental effect of spread on next-period investment is only valid for unconstrained firms and cannot be generalized to a wide range of firms and to the country-level. In addition, Figure 3 shows that the quantitative effect of the spread on cash holdings and investment are relatively small compared to the direct effect of foreign currency issuance.

Alternative Spread Definition and the Cash Flow Sensitivity of Cash

Columns 1 and 2 of Table 4 reports the basic results of Equations (1) and (2) replacing the deposit-based spread with the borrowing-based spread. In terms of cash holding, the parameter for the hard currency issuance remains positive and significant as does the interaction term between spread and hard currency. Regarding investment, the lagged parameters $FXBH_{t-1}$ and the interacted term $FXBH_{t-1} * Spread2_{t-1}$ are also positive and significant. In sum, when we replace the deposit-based spread with a borrowing-based spread, the results are similar.

[TABLE 4 ABOUT HERE]

We also estimate the model of cash flow sensitivity of cash proposed by Almeida *et al.* (2004), in which the dependent variable is computed as the difference between cash holdings less cash holdings at the beginning of the period, scaled up by total assets at the beginning of the period. Column 3 (column 4) of Table 4 is estimated using the deposit-based (borrowing-based) spread specification. The results show a clearly positive effect of both the aggregate hard currency bonds issuances (*FXBHA*) and the interaction with the Spread (*FXBHA***Spread*). Thus, our basic results are robust.

Quantitatively, Table 4 indicates that changes in cash holdings are positively related to aggregate hard currency bonds issuances. These results are in the line with the evidence of our baseline estimations. The parameters of FXBHA in columns 3 and 4 are positive and statistically significant at the 1% level, with values 0.232 and 0.197 using the borrowing-based and the deposit-based spread, respectively.

The parameter for the interaction $FXBHA_{i,t} * Spread_{c,t}$ is positive and statistically significantly related to the changes in cash holdings. The quantitative relevance of the differences in spread is again relatively small. Column 4 of Table 4 shows that the marginal effect of hard currency issuances on the cash ratio is 0.175 + 3.813**Spread*. Evaluated at 26 basis points—the sample average of the spread between the domestic currency deposit rate and borrowing costs in the United States—this result implies a marginal effect of 0.185. Thus, the average of 26 basis points in spread explains less than 10% of the full effect.

Controlling for Aggregate Local Currency Bonds Issuance

In Table 5 we test the robustness of our findings by introducing the local currency bond issuance as an explanatory variable in Equations (1) and (2). One concern is that offshore debt represents only one of many financing sources (e.g., local currency debt, bank debt, internal cash flows, equity issuances). As we previously discussed, the different financing alternatives can influence cash holding and investment decisions. Hence, introducing aggregate local currency bonds issuances as additional control allows us to capture the potential effect of the firm's financial policy.

[TABLE 5 ABOUT HERE]

The results in Table 5 show that aggregate local currency bonds issuances do not have a significant effect on cash holdings and next period investment. Columns 1 to 4 show that the effect of hard currency issuances over cash holdings remains positive and statistically significant and thus support our baseline results. Regarding investment decisions, columns 5 and 6 also corroborate our baseline results on investment decisions, suggesting that hard currency issuances are used for next-period investment purposes.

Frequency of Hard Currency issuances on Cash Holdings and Investment

In contrast with other financing sources, bond issuances decisions follow a dynamic but not continuous pattern. While a firm's permanent investments can be financed by a mix between internal cash flows and other external financing sources such as bank lending, bond issuances

can be regulated to finance investments decisions or to deal with debt rescheduling. Thus, foreign currency issuances are a significant determinant of investment, whereas domestic issuance has no significant effects. The source of external funds is a very important decision for nonfinancial firms, especially in Latin-American countries. The legal origin and the institutional setting in Latin American markets are important factors due to the international difference in the quality of law and its enforcement. These factors help us to explain why firms in Latin American markets raise important amounts of resources from alternative funding sources such as private bank debt (Demirgüc-Kunt & Maksimovic 2002; Lefort & Urzúa 2008). In this sense, the understanding the dynamics of the environment in which firms issue bonds into the international capital markets is important to assess their influence on financial policies such as investment and cash holdings decisions.

Thus, to capture the effect of noncontinuous offshore bond issuances decisions, we first estimate the frequency in which the firms issue hard currency bonds. According to our sample, the average frequency is around two years. To control for the potential effect of the frequency of hard currency bonds issuances, Table 6 introduces a second lag of the aggregate hard currency and local currency bond issuance into Equations (1) and (2), respectively. The results across all the columns supports our baseline results of hard currency issuances on cash holdings (columns 1–6) and next-period investment (columns 7–9). In sum, the two-period lag of debt issuance has no significant effects on cash holdings and investment.

[TABLE 6 ABOUT HERE]

Nearest-Neighbor Matching

Finally, we estimate a nearest-neighbor matching analysis to mitigate selection bias due to observables (Heckman et al. 1997, 1998). In our case, we match two firms that belong to the same country, industry, and year. One firm has issued hard currency bonds in the year *t* and the other has not but is similar in size, cash flow, debt structure, and firm's investment opportunities (proxied by Tobin's Q). We then analyze differences in a firm's cash holdings and next-period investment where the treatment firms is the firm that has issued hard currency bonds Table 7 shows the main statistics and mean difference test of the main variables included into the match.[8] The results indicate that firms that have issued hard currency bonds present, on average, higher levels of cash holdings and higher levels of next period investment. This finding confirms our regression results.

[TABLE 7 ABOUT HERE]

Figure 4, Panel A, plots the distribution of the difference in cash holdings between the treated group (firms that has issued hard currency bonds) and the control group (firms that has not issued hard currency bonds). The estimated effect of the treated firms versus the control group is positive. The results of the nearest-neighbor matching suggests higher levels of cash holdings on the treated firms. We also present the cumulative density distribution for the two subsamples in the lower panel. The results show a clear stochastic dominance in cash holdings of the treated firms.

[FIGURE 4 ABOUT HERE]

[8] We employ a bias treatment using the Rosenbaun and Rubin's (1983) standardized bias method.

Figure 4, Panel B shows similar results using the next-period investment. The difference in next-period investment is significantly greater than zero. In addition, the lower panel shows that the cumulative density function of next-period investment for firms that have issued hard currency bonds have stochastic dominance, which supports the arguments related to the precautionary savings and next-period investment motives.

5. Conclusion

Using a sample of listed firms for six Latin American countries, we explore the relation between firms' offshore debt issuance, cash holdings, and investment. Previous research shows that lower international interest rates in recent years has motivated nonfinancial firms to raise debt from international bond markets (Shin, 2014; Duca et al., 2016).

Firms that have issued offshore debt experience abnormal increments in cash holdings (Bruno and Shin, 2017). This behavior suggests that firms have been taking advantage of carry trade. Although we do not rule out the existence of carry trade motivations, we provide evidence in favor of a precautionary savings motive. As in previous research, our results confirm that offshore debt has resulted in an increase in cash holdings. However, we also show that aggregate offshore debt issuances positively affects future investment. Consistent with the precautionary savings argument, we find that the effect of aggregate offshore debt issuances on investment is more prominent in those periods when the cost of debt is cheaper in international markets compared to domestic debt. Our results hold after several robustness checks. In addition, our data shows that foreign currency debt has substituted local currency debt, which suggests that another motive for issuing offshore debt has been debt restructuring.

Our findings do not rule out that firms are exploiting carry trade, but foreign borrowing is directly related to investment, which supports the existence of a precautionary motive to issue offshore debt. However, notwithstanding firm's use of foreign borrowing to invest and restructure debt, we cannot conclude that foreign exchange exposure is not a problem. Although many firms have natural hedges because they produce tradable goods and have cross-border operations, we cannot exclude the possibility that foreign borrowing is financing investment in the nontradable goods sector. As previously mentioned, this issue is at the center of the recent financial crisis in emerging market economies. However, at least in this latter option, firms do not use their balance sheet to arbitrage interest rate differentials.

Appendix A: Variable definitions

Abbreviation	Variable	Definition
$Cash_{i,t}$	Cash holdings	Cash and short-term investment over total assets.
$Inv_{i,t}$	Investment	Capital expenditures over lagged total assets.
dCash	Change in cash holdings	Change in cash and short-term investment over lagged total assets.
Hypothesis explanatory		
$FXBHA_{i,t}$	Aggregated hard currency bond issuances	Aggregated total hard currency bond issuances over lagged total assets.
$DCB_{i,t}$	Aggregated local currency bond issuances	Aggregated total local currency bond issuances over lagged total assets.
Moderating		
$Spread1$	Deposit spread	Spread between the local currency deposit rate and borrowing costs in the United States for BAA rated corporations of country.
$Spread2$	Borrowing spread	Spread between the local currency borrowing rate and borrowing costs in the United States for BAA rated corporations.
K	Overall capital control	Overall country-level measure of capital controls.
Firm-level control		
Q Tobin	Tobin's Q	(Market capitalization + Total debt)/Total asset's replacement value
Ln(assets)	Size	Natural logarithm of total assets
Debt/Assets	Debt ratio	Total debt to total assets
Lt debt	Long-term debt	Long-term debt to total debt
CFO	Cash flow	Cash flow from operating activities over lagged total assets.
Sales/Assets	Sales ratio	Total sales over lagged total assets
Fixed effects		
Industry	Industry fixed effect	Set of industry dummies (Thomson Reuters Business Level definition)
Year-country	Year-country fixed effects	Set of year-country dummies

Appendix B: Hard currency bonds examples

Country/Company	Date of issuance	Use of Proceeds
Argentina		
TGLT SA	3-Jul-13	Investment in real estate projects[a]
Edenor SA	25-Oct-10	Finance the purchase of their bonds in the market[b]
Brazil		
Hypermarcas SA	15-Oct-10	Finance acquisitions and repay bank loans[c]
Bandeirante Energia SA	13-Jul-10	Refinance debt and increase capital[d]
Chile		
SACI Falabella	30-Apr-2013	Give support to its investment plan, refinance debt and strengthen liquidity[e]
Empresas Copec SA	8-Sep-11	Financing investment projects of the issuer and/or its subsidiaries[f]
Colombia		
Avianca Holdings SA	10-May-13	Financing of fleet renewal plans, among other corporate projects[g]
Empresa de Telecomunicaciones de Bogota SA ESP	17-Jan-2013	Finance, develop and implement the program Convergent Services N-Play, with a view to ETB infrastructure evolve[h]
Mexico		
Kimberly-Clark de Mexico SAB de CV	11-Nov-10	Acquisition of fixed assets related to the normal course of business of the issuer[i]
America Movil SAB de CV	18-Dec-2006	Financing the investment program of America Movil, which will be about 35 billion pesos in 2007[j]
Peru		
Pesquera Exalmar SAA	1-Feb-13	Cancellation of an international syndicated loan as well as for other investments that will allow continued growth of the company[k]
Volcan Compania Minera SAA	2-Feb-12	Fund growth initiatives, and other objectives of corporate character[l]

[a] http://www.infobae.com/2013/08/07/1500597-tglt-anuncio-inversiones-mas-1700-millones-cinco-anos/
[b] http://www.ambito.com/546014-edenor-lanzo-colocacion-y-canje-de-deuda-por-us-300-millones
[c] http://www.bloomberg.com/news/articles/2010-06-15/brazilian-bond-market-heating-up-as-itausa-hypermarcas-plan-local-sales
[d] http://www.bloomberg.com/news/articles/2010-06-15/brazilian-bond-market-heating-up-as-itausa-hypermarcas-plan-local-sales
[e] http://gestion.pe/empresas/falabella-alista-primer-bono-mercados-internacionales-2064155
[f] http://www.svs.cl/documentos/cor/cor_2011090135179.pdf
[g] http://www.aviancaholdings.com/noticia/avianca-holdings-s-a-debuto-con-exito-en-el-mercado-internacional-de-capitales/19
[h] http://etb.com.co/inversionistas/docs/Informe_de_Gestion_ETB_2013.pdf
[i] http://www.kimberly-clark.com.mx/data/global/pdf/DOCFINESP/SuplementoKimber10-2.pdf
[j] http://www.americamovil.com/sites/default/files/57a0c50434c02_1969-12-31T07%3A00%3A00.pdf
[k] http://gestion.pe/mercados/exalmar-emitio-bonos-us-200-millones-bolsa-luxemburgo-2057523
[l] http://gestion.pe/noticia/1369567/volcan-emitio-bonos-10-anos-us-600-millones

Appendix C: Cash holdings and investments, baseline ordinary least squares regression

Dependent Variable (y):	Cash	Investment	Cash	Investment	Cash	Investment
	(1)	(2)	(3)	(4)	(5)	(6)
$FXBH_t$	0.067**	-0.002	0.093***	0.003	0.113***	0.002
	(0.027)	(0.015)	(0.033)	(0.016)	(0.040)	(0.016)
$FXBH * Spread_t$			1.510*		1.272*	
			(0.839)		(0.706)	
$FXBH_{t-1}$		0.030**		0.037**		0.044***
		(0.015)		(0.015)		(0.017)
$FXBH_{t-1} * Spread_{t-1}$				0.920**		0.631**
				(0.370)		(0.287)
Cash_{t-1}	0.392***	0.082***	0.388***	0.082***	0.387***	0.083***
	(0.028)	(0.017)	(0.039)	(0.016)	(0.040)	(0.016)
Inv_{t-1}		0.341***		0.345***		0.345***
		(0.042)		(0.041)		(0.041)
CFO	0.238***	0.027*	0.254***	0.029*	0.254***	0.030*
	(0.037)	(0.015)	(0.038)	(0.017)	(0.038)	(0.018)
Ln(Assets)	-0.001	-0.003	-0.006	-0.001	-0.006	-0.001
	(0.005)	(0.003)	(0.006)	(0.003)	(0.006)	(0.003)
Q tobin	0.004	0.010***	0.004	0.009***	0.004	0.009***
	(0.003)	(0.003)	(0.004)	(0.002)	(0.004)	(0.002)
Debt/Assets	0.026	-0.005	0.037*	-0.010	0.037*	-0.010
	(0.020)	(0.012)	(0.022)	(0.011)	(0.022)	(0.011)
LT debt	0.006	0.004	0.006	0.006	0.006	0.007
	(0.010)	(0.004)	(0.008)	(0.004)	(0.008)	(0.004)
Sales/Assets	-0.000	0.009	-0.004	0.014*	-0.004	0.014*
	(0.010)	(0.008)	(0.011)	(0.008)	(0.011)	(0.008)
			The spread is:			
			Deposit interest rate – US corporate bond yield BAA		Borrowing interest rate – US corporate bond yield BAA	
Observations	1,584	1,584	1,584	1,584	1,584	1,584
R^2	0.249	0.317	0.285	0.274	0.285	0.273
Number of id	184	184	184	184	184	184
Country-year FE	YES	YES	YES	YES	YES	YES
Marginal effect						
$\partial y/\partial FXBH$	–	–	0.097***	0.039**	0.297**	0.135***
	–	–	(0.035)	(0.016)	(0.136)	(0.052)

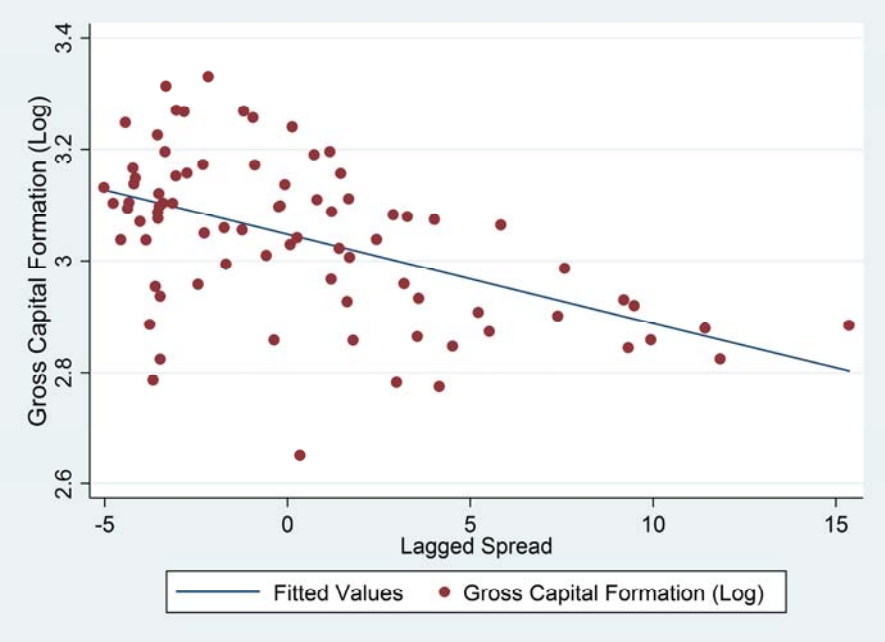
Notes: *FXBHA* is the hard currency issuance over total assets at the beginning of the period. *Spread1* is the difference between local deposit interest rate and the BAA US corporate bond yield. CFO is the operating cash flow over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. *T-statistics* from Standard Errors clustered at country-year level are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Appendix D: Capital gross formation and spread

	Capital gross gormation (log)	
Dependent variable	(1)	(2)
Spread	-0.008**	
	(0.004)	
$Spread_{t-1}$		-0.009**
		(0.003)
Constant	2.954***	2.918***
	(0.054)	(0.051)
Observations	89	82
R^2	0.590	0.601
Number of country	6	6
Country-FE	YES	YES
Year-FE	YES	YES

Notes: *Spread1* is the difference between local deposit interest rate and the BAA US corporate bond yield. Robust standard errors are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Appendix E: Capital gross formation and spread



References

Acharya, V., Cecchetti, S., De Gregorio, J., Kalemli-Ozcan, S., Lane, P., Panizza, U., 2015. Corporate debt in emerging economies: A threat to financial stability? Committee for International Policy Reform, Brookings Institution, Washington DC

Aguiar, S., Aguiar-Conraria, L., Gulamhussen, M., Magalhães, P., 2012. FOREIGN DIRECT INVESTMENT AND HOME-COUNTRY POLITICAL RISK: The Case of Brazil. Latin American Research Review 47, 144-165

Aivazian, V.A., Ge, Y., Qiu, J., 2005. Debt maturity structure and firm investment. Financial Management 34, 107-119

Almeida, H., Murillo, C., Weisbach, M.S., 2004. The cash flow sensitivity of cash. Journal of Finance 59, 1777-1804

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58, 277-297

Barroso, J., Pereira da Silva, L., Soares Sales, A., 2013. Quantitative Easing and Related Capital Flows into Brazil: measuring its effects and transmission channels through a rigorous counterfactual evaluation. In: Working Papers Series 313, Central Bank of Brazil, Research Department

Bates, T.W., Kahle, K.M., Stulz, R.M., 2009. Why do U.S. firms hold so much more cash than they used to? Journal of Finance 64, 1985-2021

Bengt, H., Jean, T., 1998. Private and Public Supply of Liquidity. Journal of Political Economy 106, 1-40

Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics 87, 115-143

Bruno, V., Shin, H.S., 2017. Global dollar credit and carry trades: a firm-level analysis. Review of Financial Studies 30, 703-749

Burns, A., Kida, M., Lim, J.J., Mohapatra, S., Stocker, M., 2014. Unconventional Monetary Policy Normalization in High-Income Countries: Implications for Emerging Market Capital Flows and Crisis Risks In: World Bank Policy Research Working Paper No. 6830

Caballero, J., Panizza, U., Powell, A., 2014. Balance Sheets and Credit Growth. A. Powell, Coord. In Global Recovery and Monetary Normalization: Escaping a Chronicle Foretold

Caballero, J., Panizza, U., Powell, A., 2015. The second wave of global liquidity: Why are firms acting like financial intermediaries?

Cleary, S., Povel, P., M., R., 2007. The U-shaped investment curve: Theory and evidence. Journal of Financial and Quantitative Analysis 42, 1-40

Chen, H., Chen, S., 2012. Investment-cash flow sensitivity cannot be a good measure of financial constraints: Evidence from the time series. Journal of Financial Economics 103, 393-410

Chung, K., Lee, J.-E., Loukoianova, E., Park, H., Shin, H.S., 2015. Global liquidity through the lens of monetary aggregates. Economic Policy 30, 231-290

Demirgüc-Kunt, A., Maksimovic, V., 2002. Funding growth in bank-based and market-based financial systems: evidence from firm-level data. Journal of Financial Economics 65, 337-363

Denis, D.J., Sibilkov, V., 2010. Financial constraints, investment, and the value of cash holdings. Review of Financial Studies 23, 247-269

Duca, M.L., Nicoletti, G., Martinez, A.V., 2016. Global corporate bond issuance: what role for US quantitative easing? Journal of International Money and Finance 60, 114-150

Fawley, B.W., Neely, C.J., 2013. Four Stories of Quantitative Easing. Federal Reserve Bank of St. Louis Review 95, 51-88

Fazzari, S.M., Hubbard, R.G., Petersen, B.C., 1988. Financing constraints and corporate investment. Brooking Papers on Economic Activity 1, 141-195

Fazzari, S.M., Hubbard, R.G., Petersen, B.C., 2000. Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales. Quarterly Journal of Economics 115, 695-705

Fernández, A., Klein, M.W., Rebucci, A., Schindler, M., Uribe, M., 2015. Capital control measures: A new dataset. National Bureau of Economic Research

Feyen, E., Ghosh, S., Kibuuka, K., Farazi, S., 2015. Global liquidity and external bond issuance in emerging markets and developing economies. World Bank Policy Research Working Paper

Flannery, M.J., Hankins, K.W., 2013. Estimating dynamic panel models in corporate finance. Journal Corporate Finance 19, 1-19

Hadlock, C.J., Pierce, J.R., 2010. New evidence on measuring financial constraints: Moving beyond the KZ index. Review of Financial Studies 23, 1909-1940

Hayakawa, K., Kimura, F., Lee, H.-H., 2013. How Does Country Risk Matter for Foreign Direct Investment? The Developing Economies 51, 60-78

Heckman, J., Ichimura, H., Todd, P.E., 1997. Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme. The review of Economics Studies 64, 605-654

Heckman, J., Ichimura, H., Todd, P.E., 1998. Matching As An Econometric Evaluation Estimator. The review of Economics Studies 65, 261-294

IMF, 2015. Corporate Leverage in Emerging Markets - A Concern? In: Global Financial Stability Report: Vulnerabilities, Legacies, and Policy Challenges. Risks Rotating to Emerging Markets. International Monetary Fund, pp. 83-112.

Kaplan, S.N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? Quarterly Journal of Economics 112, 169-213

Kaplan, S.N., Zingales, L., 2000. Investment-cash flow sensitivities are not valid measures of financing constraints. Quarterly Journal of Economics 115, 707-712

Kuo, Y.-P., Hung, J.-H., 2012. Family Control and Investment-Cash Flow Sensitivity: Moderating Effects of Excess Control Rights and Board Independence. Corporate Governance: An International Review 20, 253-266

Lefort, F., Urzúa, F., 2008. Board independence, firm performance and ownership concentration: Evidence from Chile. Journal of Business Research 61, 615-622

Lim, J., Mohapatra, S., Stocker, M., 2014. Tinker, Taper, QE, Bye? The Effect of Quantitative Easing on Financial Flows to Developing Countries. In: Policy Research Working Paper No. 6820. World Bank

Lima-Crisóstomo, V., López-Iturriaga, F.J., Vallelado-González, E., 2014. Nonfinancial companies as large shareholders alleviate financial constraints of Brazilian firm. Emerging Markets Review 18, 62-77

Lins, K.V., Servaes, H., Tufano, P., 2010. What drives corporate liquidity? An international survey of cash holdings and lines of credit. Journal of Financial Economics 98, 160-176

Pindado, J., Requejo, I., de la Torre, C., 2011. Family control and investment–cash flow sensitivity: Empirical evidence from the Euro zone. Journal of Corporate Finance 17, 1389-1409

Pinkowitz, L., Stulz, R., Williamson, R., 2015. Do U.S. Firms Hold More Cash than Foreign Firms Do? Review of Financial Studies Forthcoming

Shin, H.S., 2014. The second phase of global liquidity and its impact on emerging economies. In: Volatile Capital Flows in Korea. Springer, pp. 247-257.

Shin, H.S., Zhao, L., 2013. Firms as surrogate intermediaries: evidence from emerging economies. manuscript, Princeton University

World Bank, 2017. Global Economic Propects. Weak Investment in Uncertain Times. Bank TW (Ed.). The World Bank, Washington DC

Table 1: Summary statistics for the 2000–2014 period

	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Total
Cash	0.085	0.123	0.072	0.066	0.091	0.060	0.092
	(0.081)	(0.083)	(0.064)	(0.055)	(0.072)	(0.064)	(0.076)
Inv	0.051	0.064	0.053	0.065	0.051	0.076	0.058
	(0.042)	(0.044)	(0.034)	(0.048)	(0.039)	(0.050)	(0.042)
CFO/Assets	0.105	0.109	0.084	0.073	0.102	0.110	0.099
	(0.065)	(0.065)	(0.046)	(0.046)	(0.058)	(0.057)	(0.059)
Ln(Assets)	20.481	21.57	21.21	21.745	21.662	20.528	21.348
	(1.481)	(1.396)	(1.197)	(0.738)	(1.215)	(0.897)	(1.312)
Q Tobin	0.941	1.247	1.092	1.030	1.120	1.107	1.138
	(1.376)	(0.931)	(0.421)	(0.423)	(0.658)	(0.636)	(0.766)
Debt/Assets	0.365	0.32	0.302	0.229	0.284	0.314	0.306
	(0.179)	(0.151)	(0.099)	(0.142)	(0.134)	(0.117)	(0.136)
Lt Debt	0.665	0.707	0.779	0.755	0.765	0.663	0.736
	(0.301)	(0.211)	(0.173)	(0.233)	(0.228)	(0.205)	(0.217)
FXBHA	0.173	0.032	0.023	0.004	0.037	0.067	0.031
	(0.624)	(0.039)	(0.088)	(0.034)	(0.1.37)	(0.136)	(0.199)
DCB	0.020	0.041	0.033	0.042	0.015	0.015	0.028
	(0.015)	(0.180)	(0.122)	(0.143)	(0.091)	(0.089)	(0.130)
Spread1	0.060	0.051	-0.018	-0.003	–0.036	-0.031	0.0026
	(0.082)	(0.032)	(0.020)	(0.016)	(0.012)	(0.013)	(0.049)
Spread2	0.108	0.368	0.024	0.067	0.012	0.150	0.145
	(0.104)	(0.092)	(0.023)	(0.020)	(0.024)	(0.026)	(0.166)
K	0.690	0.546	0.314	0.618	0.549	0.017	0.451
	(0.194)	(0.174)	(0.192)	(0.057)	(0.057)	(0.016)	(0.230)

Notes: This table provides the mean (SD) for variables across sample countries. Cash is the ratio between cash over total assets. Inv is the ratio between capital expenditures over lagged total assets. CFO/Assets is the cash flow from operations over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. *FXBHA* is the aggregate hard currency issuance over lagged total assets and *DCB* is aggregate local currency issuance over lagged total assets. *Spread1* is deposit interest rate minus U.S. corporate bond yield BAA. *Spread2* is borrowing interest rate minus US corporate bond yield BAA. K is the aggregate capital control measure proposed by Fernández et al. (2015).

Table 2: Cash holdings and investment using a baseline generalized method of moments regression

Dependent variable	Cash		Investment			Cash 2008-2014	Investment 2008–2014
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$FXBHA_t$	0.110***	0.139***	–0.003	0.002	0.001	0.122***	–0.002
	(0.034)	(0.035)	(0.019)	(0.019)	(0.020)	(0.037)	(0.022)
$FXBHA_t * Spread1_t$		3.344**				3.123**	
		(1.305)				(1.503)	
$FXBHA_{t-1}$			0.031*	0.053***	0.049**		0.043**
			(0.018)	(0.020)	(0.019)		(0.019)
$FXBHA_{t-1} * Spread1_{t-1}$				1.753***	1.635***		1.715***
				(0.636)	(0.603)		(0.616)
$Cash_{t-1}$	0.617***	0.612***	0.045*		0.041*	0.447***	0.086***
	(0.038)	(0.039)	(0.023)		(0.024)	(0.056)	(0.028)
Inv_{t-1}			0.512***	0.487***	0.490***		0.465***
			(0.062)	(0.065)	(0.064)		(0.052)
CFO	0.128**	0.163***	0.040**	0.031*	0.037*	0.173***	0.029
	(0.058)	(0.056)	(0.020)	(0.018)	(0.021)	(0.042)	(0.026)
Ln(Assets)	0.001	0.001	0.005**	0.005**	0.005**	0.001	0.006*
	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.008)	(0.003)
Q tobin	0.005	0.004	0.004	0.006**	0.005*	0.016	0.003
	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.010)	(0.003)
Debt/Assets	0.084**	0.079**	–0.034*	–0.041**	–0.034**	0.124*	–0.039*
	(0.035)	(0.031)	(0.017)	(0.017)	(0.017)	(0.070)	(0.023)
LT debt	–0.047**	–0.042**	–0.001	0.001	–0.000	–0.035	0.008
	(0.020)	(0.020)	(0.011)	(0.012)	(0.012)	(0.033)	(0.017)
Sales/Assets	0.018	0.012	0.008	0.005	0.006	0.009	0.014
	(0.015)	(0.014)	(0.006)	(0.007)	(0.007)	(0.029)	(0.008)
Observations	1,584	1,584	1,584	1,584	1,584	990	990
Number of id	184	184	184	184	184	184	184
Country-Year FE	YES	YES	YES	YES	YES	YES	YES
F-Test	29.96	27.46	3.93	3.09	3.04	10.98	10.47
Auto(2)	0.226	0.178	0.459	0.395	0.394	0.919	0.356
Hansen *p*-value	0.767	0.791	0.461	0.546	0.511	0.119	0.321
Marginal effect: $\partial y/\partial FXB$	–	0.148***	–	0.058***	0.053***	0.126***	0.047**
	–	(0.0374)	–	(0.021)	(0.020)	(0.038)	(0.020)

Notes: *FXBHA* is the hard currency issuance over total assets at the beginning of the period. Spread1 is the difference between local deposit interest rate and the BAA U.S. corporate bond yield. CFO is the operating cash flow over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. Auto(2) is a test of second order serial autocorrelation of the residuals under the null hypothesis of no serial correlation. The Hansen test is a test of overidentifying restrictions, asymptotically distributed as χ^2 under the null hypothesis of no correlation between the instruments and the error term. *t*-statistics from standard errors clustered at country-year level are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Table 3: Cash holdings and investment, baseline generalized method of moments regression with macroeconomic controls

Dependent variable (y)	Cash	Investment	Cash 2008-2014	Investment 2008–2014
	(1)	(2)	(3)	(4)
$FXBHA_t$	0.145***	0.007	0.138***	–0.005
	(0.038)	(0.020)	(0.036)	(0.025)
$FXBHA * Spread1_{c,t-1}$	2.923***		3.742*	
	(1.115)		(2.234)	
$Spread1_{c,t-1}$	–0.043	–0.101**	0.388	–0.002
	(0.084)	(0.050)	(0.355)	(0.209)
$FXBHA_{t-1}$		0.057***		0.046***
		(0.019)		(0.017)
$FXBHA_{t-1} * Spread1_{t-1}$		1.810***		2.003***
		(0.639)		(0.645)
$Spread1_{t-1}$		–0.030		–0.023
		(0.038)		(0.159)
Cash_{t-1}	0.604***	0.040	0.472***	0.089***
	(0.044)	(0.025)	(0.059)	(0.027)
Inv_{t-1}		0.513***		0.478***
		(0.066)		(0.055)
CFO	0.197***	0.036*	0.178***	0.027
	(0.074)	(0.022)	(0.048)	(0.024)
Ln(Assets)	0.003	0.006**	–0.001	0.007**
	(0.006)	(0.003)	(0.006)	(0.004)
Q tobin	0.005	0.005**	0.009	0.003
	(0.006)	(0.003)	(0.007)	(0.003)
Debt/Assets	0.114***	–0.034	0.073	–0.045*
	(0.042)	(0.022)	(0.045)	(0.024)
LT debt	–0.053**	–0.011	–0.011	–0.001
	(0.023)	(0.014)	(0.024)	(0.018)
Sales/Assets	0.013	0.008	–0.006	0.013
	(0.018)	(0.007)	(0.020)	(0.011)
LnGDP	0.053	–0.010	0.044	–0.011
	(0.035)	(0.013)	(0.108)	(0.047)
MkGDP	–0.000	–0.027*	0.042	–0.020
	(0.046)	(0.016)	(0.039)	(0.020)
PrivGDP	–0.088	0.017	–0.109	0.074
	(0.087)	(0.042)	(0.165)	(0.076)
K	–0.028	–0.014	–0.014	–0.016
	(0.030)	(0.019)	(0.050)	(0.025)

Table 3 continues

Table 3 (cont.)

	The spread is: Deposit interest rate – US corporate bond yield BAA			
Observations	1,578	1,584	985	990
Number of id	184	184	184	184
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
F-Test	16.89	12.45	9.586	10.76
Auto(2)	0.170	0.518	0.977	0.426
Hansen *p*-value	0.832	0.568	0.186	0.273
Marginal effect				
$\partial y/\partial FXBH$	0.152***	0.061***	0.142***	0.052***
	(0.040)	(0.020)	(0.037)	(0.018)
$\partial y/\partial SP$	–0.001	–0.006	0.460	0.016
	(0.083)	(0.038)	(0.360)	(0.158)

Notes: FXBHA is the hard currency issuance. Spread is the difference between the local deposit interest rate and the BAA US corporate bond yield. CFO is the operating cash flow over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. Auto(2) is a test of second order serial autocorrelation of the residuals under the null hypothesis of no serial correlation. The Hansen test is a test of overidentifying restrictions, asymptotically distributed as χ^2 under the null hypothesis of no correlation between the instruments and the error term. *t*-statistics from standard errors clustered at country-year level are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Table 4: Cash holdings and investment robustness, using generalized method of moments

Dependent Variable (y):	Cash	Investment	dCash	
	(1)	(2)	(3)	(4)
$FXBHA_t$	0.174***	0.002	0.232***	0.197***
	(0.044)	(0.019)	(0.067)	(0.055)
$FXBHA_t * Spread_t$	2.558***		3.308***	4.414***
	(0.838)		(1.248)	(1.481)
$FXBHA_{t-1}$		0.071***		
		(0.022)		
$FXBHA_{t-1} * Spread_{t-1}$		1.410***		
		(0.509)		
Cash_{t-1}	0.619***	0.041*	–0.172***	–0.172***
	(0.040)	(0.023)	(0.065)	(0.066)
Inv_{t-1}		0.490***		
		(0.062)		
CFO	0.161***	0.037*	0.094*	0.090*
	(0.053)	(0.020)	(0.052)	(0.053)
Ln(Assets)	0.001	0.005**	0.005	0.005
	(0.004)	(0.002)	(0.005)	(0.004)
Q tobin	0.004	0.005*	0.016**	0.016**
	(0.006)	(0.003)	(0.006)	(0.006)
Debt/Assets	0.076**	–0.033*	0.074	0.082*
	(0.032)	(0.017)	(0.045)	(0.042)
LT debt	–0.046**	0.001	–0.048**	–0.040
	(0.020)	(0.012)	(0.024)	(0.027)
Sales/Assets	0.015	0.008	0.012	0.012
	(0.015)	(0.007)	(0.015)	(0.014)
	The spread is			
	Borrowing interest rate – US corporate bond yield BAA			Deposit interest rate – US corporate bond yield BAA
Observations	1,584	1,584	1,584	1,584
Number of id	184	184	184	184
Country-Year FE	YES	YES	YES	YES
F-Test	16.3	14.34	4.646	5.427
Auto(2)	0.164	0.406	0.289	0.324
Hansen p-value	0.822	0.543	0.544	0.550
Marginal Effect $\partial y/\partial FXBHA$	0.544***	0.275***	0.711***	0.209***
	(0.159)	(0.090)	(0.239)	(0.0586)

Notes: *FXBHA* is the hard currency issuance over total assets at the beginning of the period. *Spread* is the difference between deposit (borrowing) interest rate and BAA U.S. corporate bond yield. CFO is the operating cash flow over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. Auto(2) is a test of second order serial autocorrelation of the residuals under the null hypothesis of no serial correlation. The Hansen test is a test of overidentifying restrictions, asymptotically distributed as χ^2 under the null hypothesis of no correlation between the instruments and the error term. *t*-statistics from standard errors clustered at country-year level are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Table 5: Hard currency issuances vs. domestic currency issuances, using the baseline generalized method of moments regression

Dependent	Cash		dCash		Investment	
Variable (y):	(1)	(2)	(3)	(4)	(5)	(6)
$FXBHA_t$	0.113***	0.142***	0.143***	0.181***	0.002	0.007
	(0.035)	(0.036)	(0.049)	(0.055)	(0.019)	(0.019)
$FXBHA * Spread_t$		3.300**		3.932**		
		(1.314)		(1.567)		
$FXBHA_{t-1}$					0.033*	0.055***
					(0.018)	(0.021)
$FXBHA * Spread_{t-1}$						1.743***
						(0.621)
$DCBA_t$	0.068	0.069	0.314*	0.357*	0.054	0.076
	(0.105)	(0.123)	(0.188)	(0.194)	(0.053)	(0.052)
$DCBA_t * Spread_t$		–3.860		7.751		
		(6.706)		(11.190)		
$DCBA_{t-1}$					0.022	0.013
					(0.061)	(0.062)
$DCBA_{t-1} * Spread_{t-1}$						1.044
						(4.085)
Cash_{t-1}	0.616***	0.614***	–0.162**	–0.175**	0.045*	0.038*
	(0.037)	(0.039)	(0.076)	(0.079)	(0.025)	0.020
Inv_{t-1}					0.507***	0.471***
					(0.072)	(0.073)
CFO	0.133**	0.171***	0.113*	0.106*	0.040**	0.035*
	(0.059)	(0.055)	(0.066)	(0.064)	(0.020)	(0.021)
Ln(Assets)	0.002	0.001	0.012**	0.011*	0.005**	0.006**
	(0.004)	(0.004)	(0.006)	(0.006)	(0.002)	(0.002)
Q tobin	0.004	0.005	0.023***	0.022***	0.004	0.006**
	(0.005)	(0.006)	(0.009)	(0.008)	(0.003)	(0.003)
Debt/Assets	0.082**	0.071**	0.050	0.059	–0.037**	–0.047***
	(0.035)	(0.034)	(0.053)	(0.057)	(0.017)	(0.018)
LT debt	–0.048**	–0.045**	–0.063**	–0.063**	–0.003	–0.003
	(0.021)	(0.019)	(0.028)	(0.027)	(0.011)	(0.012)
Sales/Assets	0.019	0.010	0.014	0.012	0.009	0.004
	(0.014)	(0.015)	(0.014)	(0.015)	(0.007)	(0.007)

Table 5 continues

Table 5 (cont.)

	The spread is: Deposit interest rate – US corporate bond yield BAA					
Observations	1,584	1,575	1,578	1,578	1,584	1,584
Number of id	184	184	184	184	184	184
Country-Year FE	YES	YES	YES	YES	YES	YES
F-Test	27.58	31.1	4.787	5.022	10.7	10.8
Auto(1)	0	5.08e–11	2.26e–09	4.32e–09	7.03e–08	2.05e–07
Auto(2)	0.238	0.188	0.408	0.380	0.389	0.279
Hansen p-value	0.746	0.774	0.718	0.619	0.496	0.511
Marginal effect						
$\partial y/\partial FXBHA$	–	0.151***	–	0.192***	–	0.057***
	–	(0.038)	–	(0.058)	–	(0.021)

Notes: *FXBHA* is the hard currency issuance. *DCB* is the aggregate domestic currency bond issuance. *Spread* is the difference between deposit (borrowing) interest rate and BAA U.S. corporate bond yield. *DCB*Spread* is an interaction term between the domestic currency issuance and the demeaned spread. CFO/Assets is the income-based cash flow over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. Auto(2) is a test of second-order serial autocorrelation of the residuals under the null hypothesis of no serial correlation. The Hansen test is a test of overidentifying restrictions, asymptotically distributed as χ^2 under the null hypothesis of no correlation between the instruments and the error term. *t*-statistics from standard errors clustered at country-year level are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Table 6: Cash Holding, Investment and Frequency of Aggregated Issuances GMM

	Cash			dCash			Investment		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$FXBHA_t$	0.097*	0.104***	0.167**	0.136**	0.142**	0.225***	–0.001	–0.012	–0.004
	(0.052)	(0.040)	(0.072)	(0.054)	(0.059)	(0.079)	(0.022)	(0.022)	(0.021)
$FXBHA * Spread_t$			4.318*			5.973***			
			(2.393)			(2.195)			
$FXBHA_{t-1}$	–0.026	–0.019	–0.003	–0.021	–0.013	–0.000	0.043**	0.032*	0.055***
	(0.026)	(0.022)	(0.064)	(0.033)	(0.028)	(0.032)	(0.020)	(0.019)	(0.019)
$FXBHA * Spread_{t-1}$									1.847**
									(0.812)
$FXBHA_{t-2}$	–0.032	–0.026	–0.022	–0.036	–0.036	–0.033	–0.012	–0.012	–0.014
	(0.019)	(0.021)	(0.044)	(0.027)	(0.030)	(0.030)	(0.022)	(0.023)	(0.021)
$DCBA_t$		0.139	0.140		0.304**	0.347***		0.049	0.033
		(0.115)	(0.252)		(0.128)	(0.129)		(0.365)	(0.030)
$DCBA_{t-1}$		0.115	0.131		0.130	0.085		0.078	0.024
		(0.129)	(0.345)		(0.153)	(0.139)		(0.065)	(0.040)
$DCBA_{t-2}$		0.056	0.068		–0.084	–0.079		–0.110	–0.034
		(0.132)	(0.225)		(0.177)	(0.182)		(0.080)	(0.043)
Cash_{t-1}	0.612***	0.618***	0.614***	–0.260***	–0.266***	–0.264***	0.040*	0.051**	0.037*
	(0.054)	(0.052)	(0.081)	(0.073)	(0.079)	(0.071)	(0.023)	(0.025)	(0.021)
Inv_{t-1}							0.542***	0.503***	0.454***
							(0.084)	(0.068)	(0.072)
CFO/Assets_t	0.208**	0.237***	0.245**	0.102*	0.131*	0.147*	0.070*	0.074**	0.084***
	(0.083)	(0.078)	(0.121)	(0.058)	(0.077)	(0.078)	(0.038)	(0.031)	(0.028)
Ln(Assets)_t	0.002	0.002	0.001	0.011**	0.012**	0.010**	0.003	0.002	0.002
	(0.004)	(0.004)	(0.007)	(0.005)	(0.005)	(0.005)	(0.003)	(0.002)	(0.003)
Q tobin_t	0.000	–0.002	–0.002	0.012*	0.010	0.009	0.005*	0.005*	0.005
	(0.006)	(0.006)	(0.009)	(0.006)	(0.007)	(0.007)	(0.003)	(0.003)	(0.003)
Debt/Assets_t	0.076*	0.063	0.063	0.105*	0.090	0.086	–0.042	–0.028	–0.019
	(0.042)	(0.047)	(0.132)	(0.054)	(0.064)	(0.065)	(0.026)	(0.020)	(0.022)
LT debt_t	–0.033	–0.042	–0.033	–0.039	–0.052	–0.047	–0.006	0.016	0.016*
	(0.035)	(0.026)	(0.029)	(0.032)	(0.032)	(0.032)	(0.017)	(0.011)	(0.010)
Sales/Assets	0.016	0.010	0.009	0.015	0.013	0.006	0.005	0.011	0.010
	(0.017)	(0.018)	(0.028)	(0.017)	(0.020)	(0.020)	(0.009)	(0.007)	(0.008)

Table 6 continues

Table 6 (cont.)

	The spread is Deposit interest rate – US corporate bond yield BAA								
Observations	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345
Number of id	179	179	179	179	179	179	179	179	179
Country-Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
F-test	17.12	18.40	16.6	3.970	3.189	3.235	15.56	14.96	12.51
Auto(2)	0.194	0.155	0.191	0.681	0.608	0.674	0.751	0.673	0.581
Hansen p-value	0.568	0.526	0.545	0.690	0.696	0.683	0.551	0.587	0.628
Marginal Effect									
$\partial y/\partial FXBHA$	–	–	0.178**	–	–	0.241***	–	–	0.060***
	–	–	(0.075)	–	–	(0.083)	–	–	(0.019)

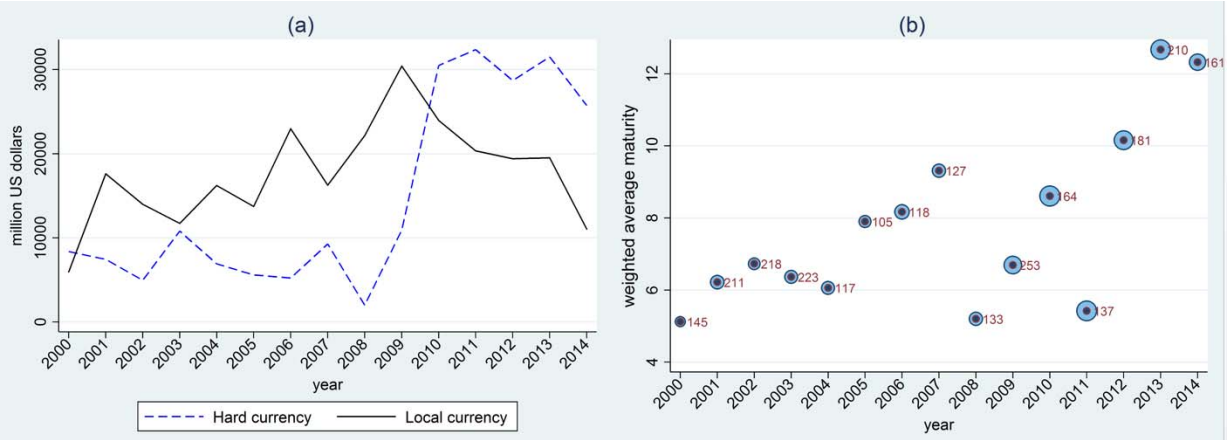
Notes: *FXBHA* is the hard currency issuance. DCB is the aggregate domestic currency bond issuance. *Spread* is the difference between deposit (borrowing) interest rate and BAA U.S. corporate bond yield. CFO/Assets is the income based cash flow over lagged total assets. Ln(Assets) is the log of total assets. Q Tobin is the market cap plus total debt over total assets. Debt/Assets is debt over total assets and LT Debt is long-term debt over total debt. Auto(2) is a test of second order serial autocorrelation of the residuals under the null hypothesis of no serial correlation. The Hansen test is a test of over identifying restrictions, asymptotically distributed as χ^2 under the null hypothesis of no correlation between the instruments and the error term. *T-statistics* from Standard Errors clustered at country-year level are in parentheses. ***, **, and * represents a level of significance lower than 1%, 5%, and 10%, respectively.

Table 7: Descriptive statistics and mean's difference test of the nearest-neighbor matching regression

		Hard currency issuer firms and matching firms		
Variables	Obs	FXH=1 (a)	FXH=0 (b)	Mean diff: (a)–(b)
Cash	121	0.100	0.072	3.99***
		(0.081)	(0.058)	
Inv	121	0.058	0.057	0.17
		(0.046)	(0.038)	
Inv_{t+1}	85	0.062	0.051	2.55**
		(0.046)	(0.031)	
CFO	121	0.088	0.091	–0.64
		(0.070)	(0.057)	
Q Tobin	121	1.197	1.185	0.71
		(0.777)	(0.834)	
Ln(Assets)	121	22.149	22.142	0.38
		(1.390)	(1.400)	
Debt/Assets	121	0.347	0.344	1.09
		(0.109)	(0.108)	

Notes: *t*-statistics are in parentheses.

Figure 1: Hard currency and local currency issuance per year for Latin American nonfinancial firms

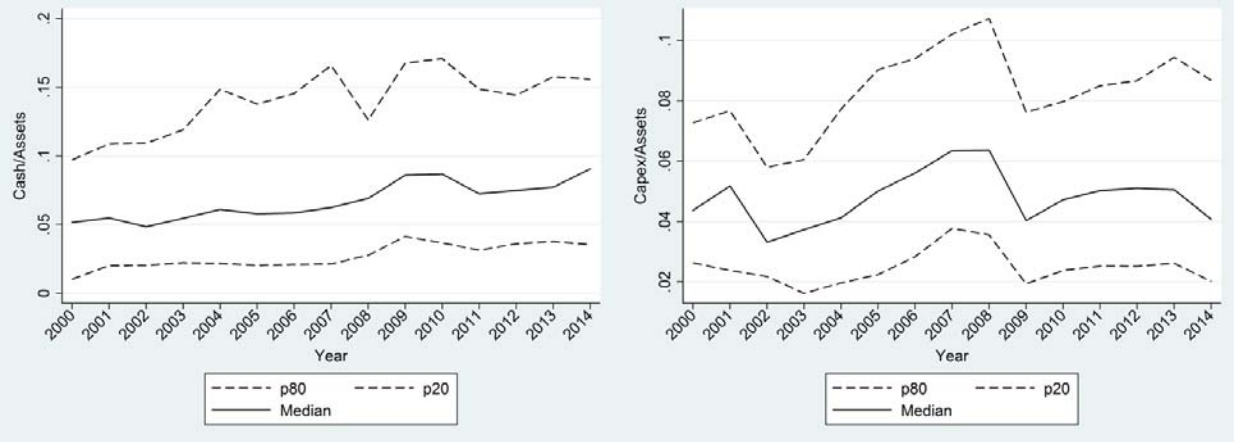


Notes: Panel A plots the total amount of bond issuance per year decomposed by hard and local currency. Panel B plots the total number of bond issuances per year. The size of the circle represents the size of the issue, the height represents the average maturity (weighted by the amount of the issue), and the center value represents the issuance number.

Figure 2: Cash holdings and investment ratio per year

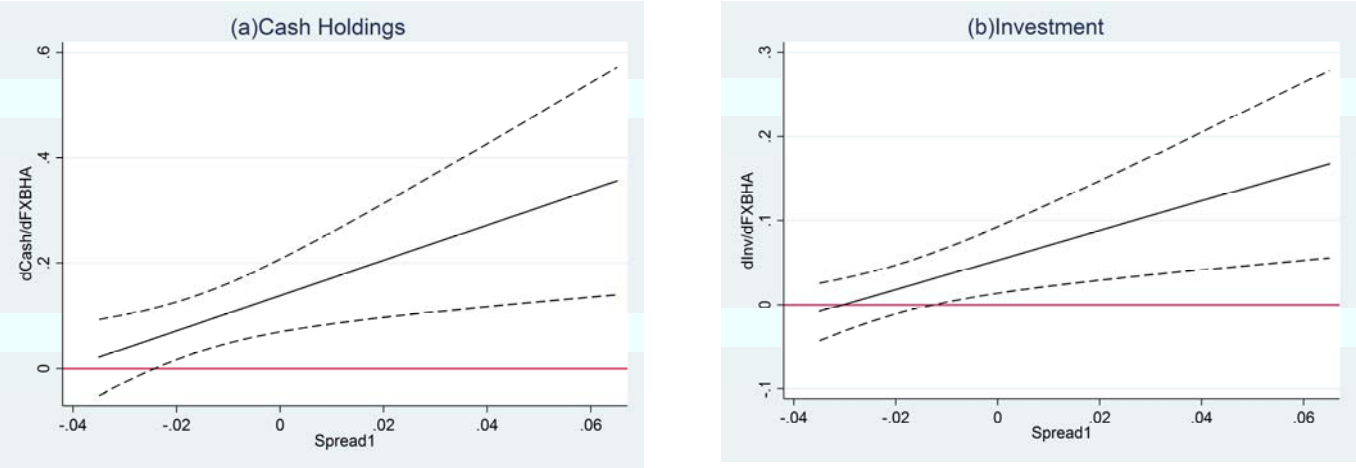
Panel A. Cash holding ratio

Panel B. Investment ratio



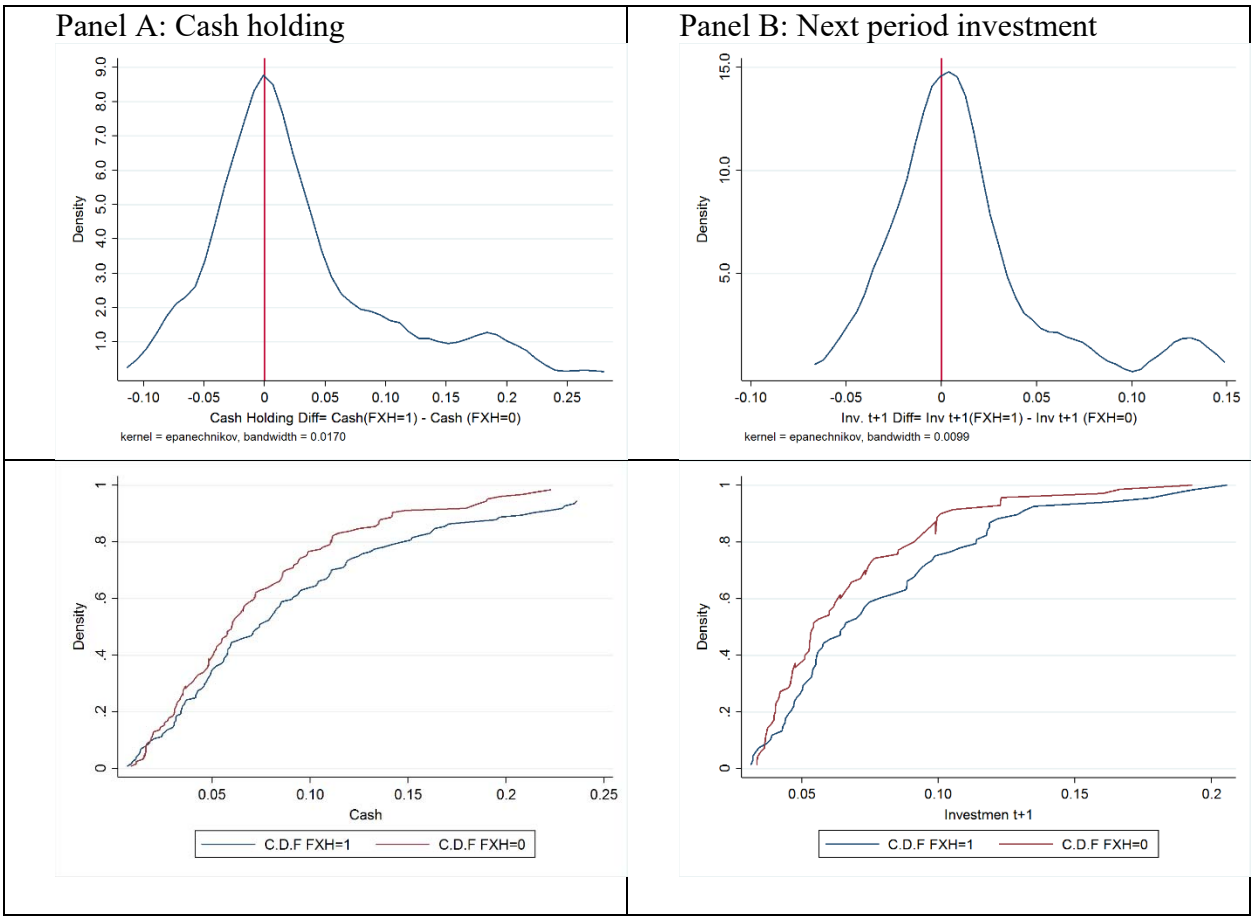
Notes: Panels A and B plot the 20th percentile, median and 80th percentile for the sample's cash holding ratio and investment ratio, respectively, for each sample year.

Figure 3: Marginal effect of the hard currency bond issuance over cash holdings and investment (with Spread1)



Notes: Panel A (Panel B) uses the model in column 1 (column 2) of Table 3. Panel A plots the sensitivity of the relationship between hard currency issuances and cash holding varies with the spread computed as the difference between local deposit rate and BAA U.S. corporate bond yield. Panel B plots the same effect of the spread over the relationship between the lagged hard currency issuance and the current investment. The solid line plots the main effect and the dashed lines are 95% confidence intervals.

Figure 4. Kernel density estimate for cash holding and next period investment differential between hard currency issuers firms and non-hard currency issuers at time *t*



Notes: After performing the nearest-neighbor matching between hard currency bonds issuers at *t* (FXH=1) and non-hard currency issuers at *t* (FXH=0) controlled by cash flow, investments, Tobin's Q, size and debt (exact matching in year, country, and industry), the matched samples are bounded to an investment differential between –5% and 5% resulting in a paired sample of 121 paired observations. Epanechnikov kernel function is used to estimate the density function. Two-sample Kolmogorov-Smirnov test for equality of distribution functions is performed for each treatment. The result for hard currency issuance treatment (FXH) indicates that the biggest difference in cash holdings between firms that issued hard currency bonds (c.d.f FXH=1) and firms that have not issued hard currency bonds (c.d.f FXH=0) is 0.182 (*p*-value=0.018). The biggest difference, between the FXH=0 c.d.f and the FXH=1 c.d.f, is –0.0413 (*p*-value=0.813), and the combined tests have a *p*-value of 0.037. In addition, the result of this matching indicates that the biggest difference in the next-period investment between the firms that have issued hard currency bonds (c.d.f FXH=1) and firms that have not issued hard currency bonds (c.d.f FXH=0) is 0.351 (*p*-value=0.010). The biggest difference between the FXH=0 c.d.f and the FXH=1 c.d.f is –0.027 (*p*-value=0.973), and the combined tests have a *p*-value of 0.021.