

The Rise in Foreign Currency Bonds: The Role of US Monetary Policy and Capital Controls^{†,*}

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Abstract

An unintended consequence of loose US monetary policy is the increase in currency risk exposure abroad. Using firm-level data on corporate bond issuances in 16 emerging market economies (EMEs) between 2003 and 2017, we find that EME companies are more likely to issue bonds in foreign currency when US interest rates are low. This effect is driven by non-exporters. Interestingly, capital controls on bond inflows significantly decrease the likelihood of issuing in foreign currency and can even eliminate the adverse impact of low US interest rates. In contrast, macroprudential foreign exchange regulations increase foreign currency issuances among nonfinancial companies.

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1. Introduction

While bank financing has been historically a dominant source of financing for emerging market economies (EME) firms, a striking feature in the last decade has been the substantial growth of debt by nonfinancial corporations in both local and foreign currency. Most of the increase has come from bond issuance rather than from banks because of tighter regulations forcing banks in advanced economies to retreat from EME and de-risk in the aftermath of the Global Financial Crisis.¹ A concern is that risks migrate to less regulated and less transparent entities that behave more pro-cyclically making markets more volatile. Another concern is that firms increase their foreign currency exposure, which contributes to financial instability.² This concern has been fueled by the dominance of corporate bonds issued in dollars. First, there is a search for yield due to low short-term interest rates in the US (e.g., see McCauley et al., 2015). Second, there has been a growing demand for dollar assets (e.g., Maggiori et al., 2020), which has led to cheaper borrowing in dollars.³ Lower borrowing costs increase the incentive to issue bonds in dollars despite the exchange rate risk and heightened solvency risk (as firms become vulnerable to tightening of dollar conditions).⁴ Are there policies that can limit this increase in systemic risk? Standard macroprudential policies may not be appropriate, as they typically focus on financial intermediaries. In contrast, there might be a role for capital controls.

This paper sheds light on these issues by using firm-level data on corporate bond issuances for EME companies and analyzing the determinants of foreign currency borrowing. The results show that companies are more likely to issue in foreign currency with more expansionary US

¹ E.g., see Gozzi et al. (2015), Ayala et al. (2017), CGFS (2021), and Avdjiev et al (2022) for descriptions. The issuance of new debt (our focus) is dominated by bonds, while the stock remains dominated by loans.

² Krugman (1999), Aghion et al. (2004), and the subsequent theoretical literature show how corporate debt denominated in foreign currency can lead to financial crises.

³ Liao (2019) documents deviations from covered interest rate parity on corporate bonds since 2008. In this context, Jiang et al. (2021) develop a theoretical model where the dollar provides a convenience yield, which implies increased dollar borrowing outside of the US. Another reason issuing in dollars might be cheaper is that bonds may be included in international indices. See Calomiris et al. (2022).

⁴ For systematic analyses of these developments, see Shin (2014), Chui et al. (2014), Feyen et al. (2015), Acharya et al. (2015), International Monetary Fund (2015), Chow (2015), Chui et al. (2016), Chang et al. (2017) or Cerutti and Hong (2018).

monetary policy. This effect is stronger for domestic-oriented firms whose revenues are negatively correlated with a currency depreciation and concerns a wide range of firms along the leverage distribution. Higher leverage increases financial fragility and is magnified by foreign currency debt especially for non-exporters. Therefore, there may be systemic risk implications from increased foreign currency corporate bonds. We examine the role of policies in this context. We find that capital controls on bond inflows significantly decrease the likelihood to issue in foreign currency and can even eliminate the adverse effect of low US interest rates. In contrast, macroprudential FX regulations increase the probability of issuance in foreign currency, in line with Ahnert et al. (2021). These results indicate that capital controls may complement other prudential tools when leverage increases through market borrowing.⁵

The empirical analysis is conducted on 16 EMEs⁶ over the period 2003-2017. The data on publicly issued corporate bonds come from the SDC Platinum database (Thomson Reuters). We focus on the private nonfinancial sector and exclude all government-related companies. The sample includes only companies that have a positive demand for debt, resulting in a baseline dataset of 1647 companies and 4697 bond issuances. Our matched covers on average 40 percent of the bond activity across the sample period.⁷ Our sample is naturally biased towards firms issuing bonds.

To assess variations in companies' foreign currency exposure, we look at the proportion of corporate bond issuances denominated in foreign currency among companies that have issued bonds. By looking at the share of foreign currency-denominated bonds, conditional on an issuance taking place, we focus on the decision to issue in a particular currency and not on the decision to issue or on the size of issuance.

⁵ See Ostry et al. (2011) for a policy discussion of the role of capital controls as prudential measures in the presence of corporate bonds.

⁶ Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Russian Federation, South Africa, Thailand, and Turkey.

⁷ This is the average across the nine countries that contribute 90 percent of our observations and ignoring years before 2005 when Orbis data are sparse.

To obtain firm characteristics and, in particular, balance-sheet data, we use two databases: Worldscope (Datastream – Thomson Reuters), which contains data only on (large) publicly listed companies, and Orbis (Bureau van Dijk), which offers data for the last decade. Data on capital controls are taken from Fernandez et al. (2016) and allow us to distinguish across various types of capital flows and to focus on controls on bond inflows. For macroprudential policies, we use the databases of Ahnert et al. (2021) and Cerutti et al. (2017).

For the empirical methodology, we apply fractional logistic methods as suggested by Papke and Wooldridge (2008) and reviewed by Ramalho et al. (2011). The reason is that our dependent variable is a fractional variable. An interesting feature of our empirical specification is the neat identification that allows for clear causal inference. Indeed, global variables such as US interest rates or the VIX are exogenously given for individual companies in EMEs. Moreover, a company's decision to issue in domestic or foreign currency can hardly be thought to influence domestic macro variables. To further ensure that this is the case, we lag by one period (one year or quarter) all our macro variables.⁸ Lagging our capital control variables by one year also solves the issue of the exact timing of their introduction within a year.

Controlling for relevant variables used in the literature, we start by analyzing the determinants of foreign currency borrowing using firm-level, country-level and global variables. We find that loose US monetary policy, measured by a shadow Fed funds rate, significantly increases the likelihood of a firm issuing in a foreign currency.⁹ In our baseline regression, we find that a decrease in the shadow rate of one standard deviation increases the share of bonds issued in foreign currency by 13 percentage points. The threat to financial stability associated with such increase in foreign currency debt is significant because it is concentrated at domestic-

⁸ One could argue that if companies decide simultaneously to issue in foreign currency, this could influence some macro variables, for instance the activation of capital controls. By lagging by one year, we overcome this potential issue.

⁹ Brauning and Ivashina (2020) find similar results when looking at lending by global banks to EMEs. On the other hand, Avdjiev and Hale (2018) find more ambiguous results.

oriented firms whose debt burden increases when the local currency depreciates. However, systemic risk is somewhat mitigated by the fact that these firms are ranked at the bottom end of the leverage distribution.

Turning to the role of policies, we find that capital controls significantly reduce the likelihood of foreign currency issuance and curb the impact of US monetary policy: having controls on bonds acquired by foreign investors reduces the share of issuances in foreign currency by 15 to 20 percentage points. Interestingly, the marginal effects of capital controls are particularly strong at low values of the shadow Fed funds rate. Furthermore, capital controls can fully eliminate the effect of the shadow Fed funds rate on the probability of foreign currency issuances. Looking at the role of macroprudential policies, we find that more FX regulations on financial intermediaries lead to a higher likelihood of issuing bonds in foreign currency, in line with previous findings by Ahnert et al. (2021).

Having documented that capital controls can curb firms' reliance on foreign currency debt, we address the question of whether they have been used effectively by policymakers to reduce firms' vulnerability to exchange rate fluctuations. In the spirit of Adler and Dumas (1984) and similarly to Ahnert et al. (2021), we analyze how stock returns react to exchange rate fluctuations and extend their framework to explore the role capital controls. We find that capital controls can significantly mitigate the vulnerability of firms to exchange rate fluctuations.

Finally, to balance costs and benefits, we provide an analysis of the real effects of capital controls. We find a strong negative effect of capital controls on employment growth, especially for firms with a high external finance dependency, larger firms, and domestic-oriented firms. For the latter category of firms, we also find significant negative effects on sales growth, cash growth, and capital expenditure in line with Alfaro et al. (2017).

The contribution of this paper is to focus on the choice of currency composition of corporate debt and the role of capital controls. While there is a large literature on the determinants

of foreign currency borrowing, only a small number of studies analyze corporate bonds in EMEs.¹⁰ Bruno and Shin (2017) examine the determinants of the issuance of US dollar-denominated bonds by nonfinancial corporations outside the United States at the firm level. Their findings show that companies issue more debt in US dollars when they have large cash holdings, especially in periods of advantageous carry-trade opportunities. In a similar vein, Caballero et al. (2015) emphasize that nonfinancial firms act as financial intermediaries, issuing abroad when carry-trade opportunities are favorable, especially when capital controls are high. Unlike the current study, neither paper considers any global factors that could influence firms' decisions. Moreover, both focus on the likelihood of issuing US dollar-denominated bonds versus not issuing or issuing in local currency, while we analyze the determinants of currency denomination conditional on the firm issuing debt.¹¹

The literature on capital controls and macroprudential policies is vast, but only a few studies distinguish across types of capital flows, especially between bank lending and corporate bonds.¹² The recent literature, however, considers more disaggregated capital controls, and some studies focus on bond flows. For example, using country-level data, Ostry et al. (2012) find that controls on bond inflows reduce market borrowing in favor of bank lending. However, we are not aware of studies that examine the impact of capital controls on the currency composition of corporate bond issuances. Macroprudential policies have been found to have an impact on bank lending or on total credit, but these policies do not directly affect bond inflows. In contrast, Ahnert

¹⁰ In a recent study, Gambacorta et al. (2020) examine the determinants of dollar borrowing by corporations in advanced countries.

¹¹ Allayannis et al. (2003) examine the currency denomination of debt for 327 of the largest companies in East Asia between 1996 and 1998. They empirically examine companies' decisions to issue debt in local, foreign or synthetic currency, i.e., hedged foreign currency, and find that the factors determining the currency denomination vary. They emphasize that natural and synthetic domestic debt are substitutes, while domestic and foreign currency debt are closer to complements.

¹² See Erten et al. (2021) and Rebucci and Ma (2019) for recent surveys of the literature. In a recent paper, Das et al. (2022) show that preemptive capital controls reduce exchange rate risk premia, which decreases the incentive to borrow in foreign currency.

et al. (2021) find that macroprudential FX regulations applied to the banking sector stimulate nonfinancial firms to use more foreign currency bonds.

The remainder of the paper is organized as follows. Section 2 develops the empirical approach and describes the data. Section 3 presents the main results on the determinants of foreign currency borrowing and the role of capital controls. Section 4 assesses the broader policy questions of the cost of capital controls and their impact on the resilience of firms in the face of exchange rate movements. Section 5 concludes.

2. Methodology and Data

This section starts by describing the econometric method. Then, it defines the key explanatory variables and the set of control variables and explains the motivations for their use. Our dependent variable is the share of issued bonds denominated in foreign currency, conditional on an issuance taking place in a given quarter. Hence, our focus is on firms with a positive demand for debt: we do not explain the decision to issue debt but the choice of the issuance currency.

2.1 Methodology

The dependent variable is a fractional variable: the share of bonds issued in foreign currency in a given quarter. Hence, we use a fractional logistic model. Formally, we estimate the following equation:

$$E(\{FX_{fijt} | F_{fit}, I_{jt}, L_{it}, G_t\}) = \Lambda[\alpha_{ji} + \beta_F F_{fit} + \beta_I I_{jt} + \beta_L L_{it} + \beta_G G_t] \quad (1)$$

where FX_{fijt} is the dependent variable, representing the share of issuance in foreign currency for a given firm f in country i and a given industry j in quarter t . $\Lambda(z) == \exp(z)/[1 + \exp(z)]$ is the logistic function, and F_{fit} , I_{jt} , L_{it} , and G_t are vectors of firm characteristics, industry controls, local macro controls, and global variables, e.g., the shadow Fed funds rate or the VIX. The

estimation is based on a quasi-maximum likelihood method based on the Bernoulli log-likelihood function. Since our dependent variable is a ratio, we weight our regression using the principal amounts so as to give more weight to firms that issue more debt.

We also control for country and industry time-invariant characteristics through country and industry fixed effects. The choice to use industry rather than firm fixed effects is due to the small number of issuances per firm over the sample period: many firms enter the sample only once while 42% of our baseline sample of firms issue bonds up to 3 times over the whole period (17% of firms appear only once, 13% only twice and 12% only three times). As we compare firms belonging to the same industry and control for a wide range of firm characteristics, our estimates are unlikely to be materially affected by a change in the population of firms tapping the market over time. We report robust standard errors clustered at the country level. All explanatory variables are lagged by one period, and marginal effects are reported. Using a graphical analysis, we also investigate marginal effects at various values of some key variables. This sheds light on potential nonlinear effects and is useful to assess interaction effects and systemic risk implications of our results.

Importantly, we extend equation (1) to explore the effect of capital controls and macroprudential policies. We are interested in both the direct effect of policies and their effects as potential mitigators of the influence of global factors. Interaction effects are not straightforward to derive in nonlinear models. Ai and Norton (2003) show that using the partial effect of the estimated interaction term is not a meaningful way to estimate the magnitude of an interaction effect in nonlinear models. Building on their work, Greene (2010) proposes graphical representations of interaction effects. We follow his approach.

2.2 Data Sources and Variable Definitions

Table 1 gives the description of our sample by country. Descriptive statistics are reported in Table 2 for the variables used in the baseline model and in Appendix A Table A.1 for the variables used in the robustness analysis. In this section, we describe our sources and define and explain the motivation for the use of each variable. A complete description of all variables and sources are given in Appendix B.

Bond issuances

We collect bond issuance data from the SDC Platinum database (Thomson Reuters).¹³ The data collection is based on the ultimate parent firm's nationality instead of the issuer's nationality, meaning that bonds issued by foreign subsidiaries are included in our sample. For instance, the branch of a Malaysian company issuing bonds abroad is considered in our analysis. However, this design ensures that a foreign firm's subsidiary located in Malaysia issuing bonds is not part of our sample of EME firms.

We observe the currency denomination of the bond, whether the bond is issued locally, the nationality of the issuer, the sector of activity of the issuer, the issuer's name, the amount issued; and the issuance date. Foreign currency bonds include mostly dollar bonds but also bonds denominated in yen, euros, and Swiss francs. Our final baseline sample contains 4697 bond issuances by 1647 firms between 2003 Q1 and 2017 Q4 and covers 16 EME countries. Overall, we match about 30 percent of SDC data. This is because some years are missing in the balance sheet data, but mostly because of some year/country data missing. Table 1 reports the number of bonds issued and issuers by country. China is by far the largest country of issuance. We show below that our results are robust to dropping China from the sample.

The share of foreign currency debt issued is constructed as follows: when a company issues more than once in a given quarter and in two different currencies, we use the principal

¹³ Cortina et al (2021) calculate that the coverage from SDC is fairly similar to the coverage obtained from BIS debt securities statistics.

amounts as weights. If a company issues only once and fully in foreign (domestic) currency, its share of issuance in foreign currency is equal to 100% (0%). Table 2 reports descriptive statistics of the foreign currency share. On average, approximately 19.5 % of the bonds issued are in foreign currency.

The proportion of foreign currency issuance is much higher for bonds issued abroad, especially in the later period. Figure 1 depicts the percentage of bonds issued in foreign currency by country, distinguishing between the first and second halves of the sample period, and between bonds issued abroad (left panel) and bonds issued locally (right panel). As seen for several countries, there is a shift over time from local to foreign currency debt that is very significant for bonds issued abroad.

Global variables and country characteristics

To measure global liquidity, we use the VIX from the FRED platform of the St. Louis Fed and the shadow Fed funds rate (FFR) measured by Wu and Xia (2016) and available on their website.¹⁴ Both variables are at daily frequency and averaged quarterly. The average shadow FFR is below zero, at -0.38%. This is not surprising, as our sample contains more quarters with relatively loose monetary policy conditions. In fact, the sample averages of the shadow FFR before and after 2010 are 2.5 and -1.57, respectively. The average VIX is 18.5. In the analysis, alternative measures of global financial conditions are used as well, and various additional or alternative macro variables are included as robustness checks.

We collect various country-level time-varying characteristics. Multiple data sources are used to collect these variables. Countries' three-month money market rates are obtained from Datastream to measure the domestic monetary policy stance and therefore the cost of domestic currency debt (local interest rate). Real GDP growth is computed as the growth rate of real GDP

¹⁴ <https://sites.google.com/site/jingcynthiawu/home/wu-xia-shadow-rates>.

relative to the same period in the previous year: higher growth may be associated with less demand for foreign currency debt as firm quality improves and the domestic banking system becomes more dynamic. In our sample, GDP growth values are quite heterogeneous across but also within countries. Overall, GDP growth is on average 5.7% but ranges between -11% and 25%.

Further we include indicators of exchange rate and price stability: the rolling standard deviation of the nominal exchange rate and inflation, a dummy for pegged exchange rate regimes (following Shambaugh, 2015), and FX reserves over GDP. Higher exchange rate stability may induce moral hazard and higher demand of foreign currency. A greater volatility of exchange rates and prices hurts investments, trade, and firm profitability. It also exposes firms borrowing in foreign currency to unexpected rises in their debt burden. We also control for the level of inflation. A higher inflation level is predicted to have a negative effect on foreign currency borrowing through a higher probability of future depreciation of the local currency.

To measure the extent to which firms in a country hedge currency risk, we follow Mizen et al. (2012), using the BIS Triennial Survey to obtain a country's total amounts of foreign exchange derivatives, which include currency swaps, FX swaps, options, outright forwards and other derivatives. Missing quarters are interpolated using the BIS Semi-annual Survey and the amounts of foreign exchange derivatives in other currencies (all except the five biggest) as weights. The semiannual data are then linearly interpolated to obtain a measure of the depth of the derivatives market at quarterly frequency. Firms should be more willing to borrow in foreign currency if they can hedge the currency risk at a low cost.

We obtain real GDP per capita adjusted for purchasing power parity, scaled by 1000 for readability, the stock market capitalization to GDP and the regulatory quality index (ranging between -2.5 and 2.5) at annual frequency from the World Bank database. Less developed

countries with less stringent financial regulations are expected to borrow more in foreign currency, as they have less developed financial markets.

Policy variables

Information on capital controls (CCs) on bond inflows is obtained from Fernandez et al. (2016). The index of controls on bond inflows can take three values: 0, 0.5 or 1. These three values are based on two subcategory dummy variables: one for the existence of controls on bonds purchased locally by nonresidents and one for controls on bonds sold or issued abroad by residents. Hence, the index takes a value of 0 when no controls whatsoever are in place, 0.5 when one of them is in place and 1 when both types of controls are in place locally and abroad. The left panel of Figure 2 plots the number of countries over the period 2003-2017 with bond controls on inflows and the right panel shows the number of years each country has had active capital controls. These figures combined show a sufficient variation across countries to identify the effect of capital controls. Three countries (Brazil, Mexico, and Turkey) experience significant changes over time and have capital controls only one third of the time.

We also obtain from Ahnert et al. (2021) indices of macroprudential FX regulations, i.e., prudential regulations targeting the financial sector. Changes in FX regulations are coded as a +1 in case of additional or tightened restrictions, -1 when they are loosened or removed and 0 when no change occurs in a given quarter. For robustness, we also consider indices from Cerutti et al. (2017).¹⁵

Firm characteristics

To obtain firm characteristics and, in particular, balance-sheet data, we use three databases: Worldscope (Datastream – Thomson Reuters) and Capital IQ, which contain data only on (large)

¹⁵ A notable difference between the variables in Ahnert et al. (2021) and Cerutti et al. (2017) is that the former consider changes in FX regulations, while the latter assess whether FX regulations are in place.

publicly listed companies, and Orbis (Bureau van Dijk), which contains data covering the last decade. Hence, our baseline sample is at the intersection of SDC Platinum, Worldscope, Capital IQ and Orbis. Unfortunately, there is no unique identifier to match firms across the latter data providers. We therefore match companies manually based on their names and industrial sectors. We can match about 30 per cent of SDC data with balance sheet data; the matching is better in the second half of the sample period as more balance-sheet data become available.

Balance-sheet information becomes public every year in reference to the previous year. We take this timing into account and use yearly values at every quarter to match the frequency of other variables. Based on a thorough review of the literature as well as on data availability, we select a range of firm characteristics to include as controls. First, we include firm size and book-to-market value as in Gozzi et al. (2015). Firm size is used to control for transparency and profitability and is measured as the log of total assets. The book-to-market value is defined as the difference in total assets and liabilities over market value and is used as a proxy for growth opportunities.

Following Demirguc-Kunt et al. (2015), we control for profitability using ROA, i.e., the ratio of profits before taxes and interest expenses over total assets and collateral measured by the share of tangible assets (PPE) over total assets. We also add cash measured by cash holdings and equivalents, as suggested in Bruno and Shin (2017). We expect healthier firms to have greater access to foreign investors who prefer to lend in foreign currency.

Another relevant characteristic is firm riskiness. We measure this with leverage, computed as the ratio of debt over total assets as in Becker and Ivashina (2014) and in Norden and van Kampen (2013). We also include a dummy indicating whether a firm is classified as high-yield in SDC Platinum. Jeanne (2000) shows that fragile entrepreneurs can borrow in

foreign currency to signal that they are not fragile and obtain lower financing costs. In Aghion et al. (2004), riskier firms prefer to borrow in foreign currency due to moral hazard.¹⁶

Last, we build a dummy variable based on the correlation of firm income and exchange rate changes as a measure of trade intensity. A value of 1 indicates that firm income is positively correlated with a nominal exchange rate depreciation (respectively negatively correlated with a nominal exchange rate appreciation). The descriptive statistics of firm characteristics are reported in Table 2 for the sample used in section 3 and in Appendix A Tables A.2 and A.3 for the samples used in section 4.

3. Determinants of Foreign Currency Bond Issuance and the Role of Capital Controls

This section describes the determinants of foreign currency borrowing based on the methodology described above. We start by analyzing the impact of global-, national-, industry- and firm-level variables. We document that the rise of foreign currency indebtedness is chiefly driven by the stance of US monetary policy among the standard measures of global liquidity. Capital controls on bond inflows also play a key role. In subsection 3.2, we examine in more details the role of capital controls. We show that capital controls can fully offset the impact of expansionary US monetary policy and their effect is strongest at low levels of the US rate. Finally, we show that FX macroprudential policies increase foreign currency bond issuance, hence the importance of implementing them alongside capital controls.

3.1 The Role of Global Factors

¹⁶ Foreign currency debt implies a lower interest rate in good times, but a much larger repayment in bad times; however, in bad times, firms default and only partially repay their debt.

We start by estimating equation (1) using all controls described earlier. Table 3 reports our estimates. All country- and firm-specific controls are included in each column but not reported for the sake of conciseness. Our specification explains a significant part of the variation in the data with an R^2 of around 60%. Full tables are shown in Appendix A. Each of column (1) to (7) considers an alternative indicator of the US monetary policy stance or of global volatility.

The stance of US monetary policy is found to be a robust factor affecting the decision to issue debt in foreign currency. The statistically significant coefficient of -0.068 in column (1) indicates that a decrease in the shadow FFR by one standard deviation raises issuances in foreign currency by 12 percentage points ($1,8975 \times 0,068$). Figure A.1. in Appendix A shows that the marginal effects of a decrease in the shadow FFR by one percentage point is somewhat higher at lower values of the shadow FFR, although the differences are not statistically significant.¹⁷

This finding is unaltered through the different specifications (columns (2) to (7)), where the shadow FFR is replaced by the 10-year Treasury constant maturity rate (2), the Treasury inflation-indexed long-term average yield (3) and the Fed funds rate (4). In column (5), the shadow FFR and VIX are replaced by a dummy taking the value of 1 from 2010 Q1 onwards and the conclusion is unchanged.

The effect of global uncertainty or risk aversion, as measured by VIX, is significant as well. An increase in the VIX by one standard deviation decreases the share of issuances in FX by 13,6 percentage point ($7,4828 \times 0,018$) and this effect is relatively stable over different VIX values (see Figure A.2. in Appendix A). However, since VIX started declining significantly after 2012, which is posterior to the timing of the rise in foreign currency bond issuances in our sample countries we can conclude that US monetary policy has played a more significant and growing role in driving bond inflows post 2009. CGFS (2021) arrive to the same conclusion.

¹⁷ Hence, we can treat the relationship between the FFR and FX issuance as linear and correctly interpret the marginal effect as the effect of a 1-percentage-point rise in the FFR.

In columns (6) and (7), the VIX is replaced by the MOVE,¹⁸ and a global uncertainty index taken from Baker et al. (2016). The coefficient on the MOVE variable is statistically significant, but the effect is smaller, while the coefficient on the global policy uncertainty index is marginally significant and small.

The other country characteristics included in the regressions that are statistically significant and robust across the different specifications are the local interest rate, derivatives market depth, real GDP per capita, regulatory quality, and financial market development (see Table A.4 in Appendix A). Overall, foreign currency indebtedness is less prevalent in more developed countries, in countries where borrowing in local currency is cheaper, and in countries where financial regulation is weak and currency hedging using financial instruments is less accessible. We find no robust effect of exchange rate instability or inflation.

As regards firm characteristics the significant variables are measures of firm profitability (return on assets), carry-trade incentives (cash holdings) and a measure of firm riskiness (high yield flag). All are positively associated with the share of foreign currency bonds as expected.

While the econometric specification focuses on the share of foreign currency debt, we can verify that increases in this share of foreign currency bonds come from increases in the amount in dollar bonds rather than from a decline in the amount domestic currency bonds. In Appendix A Table A.5, we show that changes in the US dollar rate also have a significant impact on the gross amount of foreign currency issuance. In Table A.6 we further assessed whether changes in US rates have any impact on the structure of firms' financing and find no significant shifts from loans to bonds or from debt to equity. Throughout our sample period the firms in our sample mainly finance themselves through bonds.

We ran several robustness checks. Our conclusions continue to hold if we cluster our standard errors by firm (Table A.7); if we exclude Chinese firms (Table A.8); if we exclude

¹⁸ The 3-month MOVE index is based on the implied volatility for US Treasuries rather than that of US firm stocks.

countries with less than 50 observations (Table A.9) and if we use yearly frequency data (Table A.10). Further, changes in other global currency rates (notably those of the euro and the Swiss franc) have effects comparable to changes in the US rate.¹⁹ This is not surprising given that monetary policies in these regions are highly correlated with US monetary policy. For the yen and the pound, the results are less stable.

All in all, the main factor behind the increase in foreign currency exposure is a search-for-yield phenomenon. This is line with McCauley et al. (2015), who, using a different approach, argue that investors seeking higher-yield assets buy bonds in US dollars from non-US issuers. This can also be interpreted as evidence in favor of the gap-filling hypothesis proposed by Greenwood et al. (2010). This hypothesis is empirically tested in Lo Duca et al. (2016), who analyze the relationship between corporate bond issuances in EMEs and Fed quantitative easing policies. They find that as the Fed removes assets from the markets, investors turn to EME companies to fill the gap.

3.2 Financial Stability Implications

Our findings hold for the average firm. To assess the financial stability implications of this result we refine our analysis by distinguishing firms based on three indicators of vulnerability to sudden stops: leverage, size, and trade intensity.²⁰ The financial stability implications of a higher exposure to foreign currency risk²¹ will be less acute if foreign currency borrowing is concentrated among firms that are financially sound, firms with a natural hedge against currency risk, and larger firms that use derivatives instruments to hedge currency risk. Indeed, lower leverage, higher foreign currency revenues, and currency hedging using derivatives instruments

¹⁹ See Table A.11 in Appendix A.

²⁰ Trade intensity is captured by a dummy variable taking the value of 1 indicating whether a firm has a positive correlation between its revenues and the nominal exchange rate.

²¹ Essentially the risk of bankruptcy if US rates go up or if the dollar appreciates.

allow firms to better withstand a sudden increase in the cost of borrowing in foreign currency if the domestic currency depreciates.

Therefore, we check how the marginal effects of the shadow FFR vary with firm leverage, firm size, and trade intensity. Figures 3 to 5 display our results. We find that the increase in foreign currency borrowing in response to a change in US monetary policy is driven by a wide range of firms along the leverage distribution. Indeed, in Figure 3 we see that firms with a leverage ratio as high as 1 standard deviation above the mean (35 percent) increase issuances of foreign currency bonds significantly in response to a decline in the shadow FFR. In Figure 4 we see that the effect of the shadow FFR is insignificant for firms with a size below the median. In Figure 5 changes in US monetary policy have a larger impact on domestic-oriented (low trade) firms which, by increasing foreign currency borrowing, increase their vulnerability to a possible depreciation of the local currency. Consistent with the fact that export-oriented (high trade) firms may choose to match their foreign currency revenues with their foreign currency liabilities their response to changes in US monetary policy is not statistically significant.

All in all, the systemic risk implications of rising foreign currency debt in a context of low US dollar rates are significant as this evolution concerns firms with high leverage and firms with no natural hedge against currency risk.

3.3 The Role of Capital Controls

The activation of capital controls (CCs) also significantly curbs the propensity to borrow in foreign currency by around 15 percentage points, and this effect is quite stable across the different specifications. Economically the effect is large given that the mean of the dependent variable is about 20%.

In Table 4 we compare this baseline estimate (reported in column 1) with the estimate when including a time fixed effect and removing country fixed effects (column 2) and estimates

using the continuous measure of CCs (column 3) and the conclusion is unchanged.²² Comparing across countries yields higher points estimates (column 2). In column 3 an increase in the continuous index by 0.5 is associated with a 12% decrease in the share of foreign currency borrowing.

A follow-up and important question is whether beyond their direct effect, capital controls are effective in dampening the impact of a lower US interest rate. To address this question, we estimate the interaction effect between capital controls and the shadow FFR. Figure 6 plots the marginal effects of the shadow FFR with and without CCs on bond inflows. Clearly, the introduction of capital controls neutralizes the effect of US monetary policy.

One corollary question is whether CCs can be actively used as a prudential tool. If so, CCs ought to be activated at times when US policy is softened such that their effect is concentrated at low levels of the Fed funds rate. This is what we observe in Figure 7, which reports the marginal effects of CCs on bond inflows (dummy) on the predicted probability of issuing in foreign currency at various levels of the shadow Fed funds rate. The effect of CCs is significant only at low levels of the shadow FFR.

3.4 Macroprudential Policies and Capital Controls

Next, we examine the impact of macroprudential policies targeting the financial sector, as such policies may be implemented simultaneously and therefore confound the effect of capital controls. Indeed, the majority of our sample countries introduce capital controls following the activation of macroprudential policies.²³ The results are reported in columns (4) to (6) of Table 4. As in Ahnert et al. (2021), we include the FX regulation variables for each quarter up to three quarters in the past (i.e., current and with up to three lags). We then compute the p-value of the

²² Estimates of the control variables are reported in Table A.12 .

²³ Five countries only have capital controls (India, Malaysia, Mexico, Russia, and South Africa) and one country is only using macroprudential policies (Peru).

joint significance F-test of the four estimates. The results are, however, similar when we directly pool the macroprudential variable over a year or use lagged macroprudential variables.

The positive marginal effects in column (4) confirm the findings of Ahnert et al. (2021) on the effect of macroprudential FX policies for the corporate sector. Controlling for these policies does not weaken the estimated effect of capital controls; on the contrary, the marginal effects associated with CCs are even larger. Further whether we control for time fixed effects only (column 5) or both time and country fixed effects the effect of CCs remains statistically and economically significant (column 6).

As a robustness check, in Table A.13 in Appendix A, we present the results using the macroprudential policies database of Cerutti et al. (2017) described earlier. Here the effect of capital controls remains negative and significant statistically and economically but the effect of macroprudential policies is insignificant.

4. Capital Controls and Firms' Performance

While controls on capital inflows reduce foreign currency bond issuances, there are two broader policy questions. First, do capital controls strengthen the resilience of firms to currency movements? The impact of these controls could be limited if they are not sufficiently intense and broad based or if borrowers substitute bond finance with bank finance. The second issue is to weigh the costs and benefits of capital controls. Theory suggests that capital controls can drive up the cost of capital and curb investment by increasing uncertainty and reducing the availability of external finance.

In this section, we examine these two questions from two different perspectives. First, we analyze the impact of CCs on firms exchange rate risk, extending the framework of Adler and Dumas (1984). Second, we analyze the impact of CCs on real firm outcomes, including employment, capital expenditure, and sales.

4.1 Capital Controls and Firms' Stock Market Performance

Having documented the role of capital controls in shielding EM firms from excessive foreign currency borrowing in bond markets, we next assess their impact on firms' stock market valuations. Precisely, does the reduction in foreign currency borrowing translate into a significantly lower vulnerability of firms to exchange rate fluctuations? To measure the exchange rate vulnerability of firms, we use a two-step approach. We start by regressing the exchange rate on policy variables as well as other relevant country-specific controls and use the residual from this regression in the second-step regression. This two-step approach helps isolate the impact of the exchange rate from that of policy variables on stock returns.²⁴ The estimates of the first-step OLS regression are presented in Table A.14 of Appendix A. We denote by $\widetilde{\Delta E}$ the residual variation of the nominal exchange rate against the USD (an increase is a depreciation of the local currency) cleansed of the potential effects of country-specific and policy variables. In a second step, we estimate the following equation:

$$r_{fit} = \alpha + \gamma_f + \beta_1 \widetilde{\Delta E}_{it} + \beta_2 CC_{it-1} + \beta_3 \widetilde{\Delta E}_{it} * CC_{it-1} + X_{fit} \beta_4 + \varepsilon_{fit} \quad (2)$$

where r_{fit} is the stock return and CC_{it-1} represents lagged capital controls. The vector of control variables X includes relevant firm characteristics and macro factors, liquidity factors, and global volatility measures that affect firm value through channels other than the exchange rate. Finally, γ_f denotes firm fixed effects.

The sign of β_1 is ambiguous. On the one hand an appreciation of the domestic currency could have a positive effect on the stock return of a domestic firm indebted in foreign currency

²⁴ Indeed, as documented in Ouyang and Guo (2019), capital controls and macroprudential policies can also affect the exchange rate itself.

through a reduction in its debt burden. This debt reduction implies a rise in ex post profits and net worth.²⁵ On the other hand an appreciation of the domestic currency is detrimental for exporters as it curbs competitiveness vis à vis foreign firms and hence pushes down foreign currency revenues. The coefficient of interest is β_3 . It should be positive if capital controls curb the currency risk exposure of firms through a reduction of foreign currency liabilities.

The results are reported in Table 5. Column 1 presents the results for the full sample and columns (2) to (5) replicate the analysis splitting the sample by firm size and trade intensity using medians as thresholds. Because stock returns are not available for all firms, our sample is reduced to 696 firms and a total of 15918 quarterly observations. Descriptive statistics of the variables used are shown in Appendix A Table A.2 and estimates of the control variables are shown in Table A.15.

The results are broadly consistent with the hypothesis that a domestic currency depreciation heightens the debt burden of firms, as it hurts firm value: a currency 1 percent depreciation causes a 0.98 percent fall in stock returns (column 1). This effect is significant statistically and economically across firm size (columns 2 and 3).

The fact that exchange rate risk is lower for large firms is consistent with previous evidence that decisions to hedge currency risk using derivatives is positively related to firm size.²⁶ Nonetheless the resilience of larger firms to a currency depreciation is only partial. In line with our results, Alfaro et al. (2019) find that a currency appreciation has a positive effect on the sales growth of the more highly levered large firms.

Exporters are more negatively impacted by a depreciation (column 4) than non-exporters (column 5). While perhaps counterintuitive this result is not surprising in this context for two

²⁵ An appreciation of the domestic currency can also increase the dollar value of companies' collateral. Indeed, Bruno and Shin (2015) show that most of the assets of EME companies are priced in local currency.

²⁶ There is strong empirical evidence that larger firms are more likely to engage in hedging strategies than smaller ones due to the fixed costs of hedging and scale economies. There is also evidence that large firms pass through a portion of currency changes to customers and use both operational and financial hedges. According to Batram et al. (2010), financial hedging and FX derivatives decrease firm exposure by 40%.

reasons. First, between 2008 and 2019 the ratio of dollar denominated debt to exports in emerging markets has skyrocketed from 8 percent to 20 percent in China, from 24 percent to 70 percent in South Asia, and from 70 percent to 106 percent in Latin America.²⁷ And second, exporters are more indebted than non-exporters, therefore their dollar revenues are insufficient to shield them from the negative effect of a depreciation.

$\hat{\beta}_3$ is positive and statistically significant: the presence of capital controls plays a role of dampening the vulnerability of firms to exchange rate fluctuations through reducing foreign currency liabilities. In contrast, we find that macroprudential FX policies exacerbate the negative effect of a currency depreciation consistent with the fact that they induce non-financial corporates to hold higher foreign currency liabilities.²⁸ Last, given that several countries in our sample introduce both policies simultaneously, we ran a model not controlling for macroprudential policies and our results are unchanged (see Table A.16).

4.2 Real Effects of Capital Controls

The recent literature has provided evidence of adverse effects of capital controls. Andreasen (2017) finds that controls on bond inflows increase corporate bond spreads. Alfaro et al. (2017) document falling stock returns and investment expenditures of firms following capital control events in Brazil. Interestingly, they find that capital controls disproportionately affect small, non-exporting firms, especially those more dependent on external finance. We revisit this question with a larger sample of firms and countries. In addition to CAPX, we consider the impact of capital controls on net debt, the variation in cash holdings, the variation in the interest coverage ratio, employment growth, and sales growth. Appendix A Table A.3 reports descriptive statistics of the variables used in this section. Since real outcome variables are slow moving, we estimate

²⁷ These data are from Forni and Turner (2021).

²⁸ This result contrasts with that of Ahnert et al. (2021). However, their results are also not significant when they consider as their dependent variable a proxy for corporate stock returns, which we focus on in our paper.

the impact of cumulated capital controls over the past 3 years on these outcomes using the following regression:

$$FV_{fit} = \alpha + \gamma_f + \delta_t + \beta_1 cumCC_{it-1} + X_{fit}\beta_2 + \varepsilon_{fit} \quad (3)$$

FV_{fit} is one of six outcome variables considered, and the vector X_{fit} contains relevant country and firm time-varying characteristics based on our reading of the literature. The specification is estimated at annual frequency, and we include both firm and time fixed effects (γ_f and δ_t). Then, we reestimate this equation by distinguishing between small and large firms, firms with high and low dependence on external finance and firms being exporters or not (high or low-trade firms).²⁹

Table 6 reports $\hat{\beta}_1$ for all specifications.³⁰ In the full sample, we find no economically or statistically significant effect of capital controls on net debt, cash growth, CAPX, sales growth, or the interest coverage ratio. In contrast, employment growth declines on average in the full sample by 1.456 percentage points with the activation of capital controls. This effect on employment growth is economically large and is chiefly driven by firms with a high dependence on external finance, firms belonging to the high end of the size distribution, and domestic-oriented firms. Larger firms being more impacted by capital controls is consistent with the fact that they tap foreign capital more, as a result, they are more adversely affected by the erection of barriers to foreign capital inflows. During our sample period these firms also had a lower capacity to substitute toward other forms of funding, like syndicated loans, as foreign banks repatriated massively their credit activity to their domestic market (Giannetti and Laeven, 2012). In line with Alfaro et al. (2017), domestic-oriented firms are particularly adversely impacted as they also

²⁹ We define low-leverage companies as those in the first two quantiles of the distribution, while high-leverage firms are those in the last two quantiles. For size and dependence on external finance, we use the same approach based on the amount of total assets. We measure external dependence with the measure proposed in Rajan and Zingales (1998): capital expenditures minus cash flow from operations divided by capital expenditures.

³⁰ In the Appendix Tables A.17 to A.20, we also report the full specifications including the control variables.

experience a decline in cash growth, an increase in debt, and a decline in investment and sales growth. A comparison with sample means shows that these effects are statistically and economically significant.

5. Conclusion

The destabilizing role of foreign currency borrowing in EMEs has stimulated the growth of a large literature, with most of the empirical literature analyzing bank loans. Given the growing role of market financing in EMEs, this paper focuses on corporate bond borrowing. This is of interest because the incentives to borrow in foreign currency from bond markets may differ from the incentives to take out bank loans. Moreover, foreign bond flows appear more sensitive to changes in global risk appetite and financial conditions than foreign bank lending.³¹ The effects of policies may also differ for different types of borrowing. This paper emphasizes the latter policy dimension.

In this paper, we provide the first evidence that the currency composition of bond flows to EMEs is sensitive to changes in global interest rates. This result implies that if a US monetary tightening decreases capital flows to EMEs, this is amplified by a larger foreign currency exposure for firms. However, this effect can be dampened or eliminated by capital controls. We find that controls on bonds issued purchased by nonresidents are particularly effective in reducing foreign currency issuance. We also show that controls on bond inflows are effective in reducing the vulnerability of firms to exchange rate fluctuations.

With the growing popularity of EME corporate bonds, capital controls may also be used in combination with macroprudential policies. The results in this paper and in Ahnert et al. (2021) show that firms may circumvent tighter FX regulations for financial intermediaries by issuing more bonds. Our results show that controls on bond inflows help neutralize this effect.

³¹ See Carney (2019) for a recent discussion.

Our results show that capital controls have more impact when US monetary policy is expansionary. However, is it desirable to actively use capital controls as prudential tools? This is not a conclusion that can be drawn from our analysis, and a welfare analysis of capital controls goes beyond the objectives of this paper. While capital controls can contribute to financial stability by reducing foreign currency exposure, they also have costs. In our sample, we show that they limit firm-level employment growth. Notice also that the available evidence is that capital controls are not countercyclical (Fernandez et al., 2016) and do not appear to influence financial variables or GDP growth (Klein, 2012), which suggests that policymakers have not systematically used capital controls on prudential grounds. This is an important issue for further research.

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Table 1: Final sample: Number of bond issuances and firms per country

Country	Issuances	Firms	Period
Argentina	27	13	2006Q4-2017Q2
Brazil	426	137	2008Q1-2017Q4
Chile	115	34	2003Q1-2015Q2
China	2004	771	2005Q1-2017Q4
Colombia	11	4	2008Q1-2017Q1
India	573	208	2003Q1-2017Q4
Indonesia	94	56	2003Q2-2017Q4
Malaysia	294	101	2003Q1 -2017Q4
Mexico	256	66	2003Q1-2017Q3
Peru	32	13	2003Q1-2014Q4
Philippines	112	22	2003Q1-2017Q4
Poland	18	12	2005Q3-2017Q2
Russia	159	53	2003Q4-2017Q4
South Africa	40	25	2004Q1-2015Q4
Thailand	534	123	2003Q1-2017Q4
Turkey	14	9	2004Q3-2014Q4
Total	4697	1647	2003Q1-2017Q4

Table 2: Descriptive statistics of key variables in baseline

Variable	Mean	SD	Median	Min	Max
Dependent variable					
Foreign currency issuances (%)	0.1959	0.3932	0	0	1
Firm-specific variables					
High-yield flag	0.08814	0.2835	0	0	1
Leverage: debt over total assets (%)	20.780	14.088	19.924	0	105.48
Size: log of total assets	1.9032	2.2416	1.6724	-6.0649	11.147
Cash: log of cash or equivalent	-0.6310	2.3568	-0.7100	-11.870	9.2714
Book-to-market value	0.9466	1.8521	0.6213	-77.746	32.668
Profitability: ROA	1484.8	2177.5	16.540	-448.18	8618
Collaterals: Tangible assets/total assets (%)	33.436	24.509	30.709	0	98.048
Income exchange rate correlation	0.6566	0.4749	1	0	1
Global variables					
Shadow FED funds rate	-0.3833	1.8975	-0.9836	-2.9220	5.1945
VIX	18.491	7.4828	16.211	10.944	58.588
World GDP growth rate	1.4355	1.3760	1.6677	-2.8533	3.1144
Country-specific & policy variables					
Capital controls (CC) on bond inflows	0.8797	0.3253	1	0	1
Real GDP growth (%)	5.7332	3.3222	6.8000	-10.934	15.295
Real Effective Exchange Rate volatility	0.05846	0.02723	0.05083	0.02005	0.2538
Local interest rate	4.9624	2.7767	4.5120	0.05342	27.343
Pegged exchange rate regime (dummy)	0.2627	0.4402	0	0	1
Inflation volatility	1.5998	1.0639	1.4435	0.3164	21.036
CPI inflation (year-on-year)	3.9081	3.7346	2.5178	-3.0292	42.438
Derivatives market depth (mios USD)	33.583	26.718	29.928	0.1962	101.53
Real GDP per capita PPP (1000 USD)	12.723	5.2392	12.692	2.7128	28.683
Regulatory quality index	-0.05088	0.3930	-0.2408	-1.0743	1.5385
Reserves/GDP (%)	28.458	11.409	29.934	5.5432	53.067
Stock market capitalisation to GDP (%)	64.708	30.861	62.050	6.5320	256.20

Table 3: The impact of global financial conditions

Share of FX bond issuances (%)	Baseline	10Y gov. yield	LT gov. average yield	FED funds rate	Post-crisis dummy	MOVE	Global uncertainty
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ShadowFFR/Alt variable	-0.068** (0.027)	-0.092 (0.062)	-0.115* (0.059)	-0.074* (0.039)	0.244* (0.127)	-0.065** (0.028)	-0.076*** (0.028)
VIX/Alt variable	-0.018** (0.008)	-0.019** (0.008)	-0.016** (0.007)	-0.020** (0.008)		-0.006*** (0.002)	-0.002* (0.001)
CC on bond inflows (dummy)	-0.153*** (0.056)	-0.149* (0.079)	-0.154** (0.075)	-0.147** (0.067)	-0.202** (0.092)	-0.147*** (0.057)	-0.183** (0.075)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country/Firms controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4697	4697	4697	4697	4697	4697	4697
Pseudo R^2	0.581	0.578	0.578	0.579	0.573	0.581	0.579

Notes: The table shows the marginal effects (all variables evaluated at their means) obtained from a fractional logistic regression with robust standard errors clustered at the country level in parentheses. All variables are lagged. The stars indicate the statistical significance as follow: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable is the share of issuances denominated in foreign currency (%). The shadow FED funds rate is from Wu and Xia (2016). VIX is an index of implied volatility of the U.S. S&P500. In columns (2) to (4), shadow FFR is replaced by, the 10-Year treasury constant maturity rate (2), the treasury inflation-indexed long-term average yield (3) and the FED funds rate (4). In (5), both shadow FFR and VIX are replaced by a dummy taking the value of 1 for 2010Q1 onwards. In columns (6) to (8), VIX is replaced by, respectively, the MOVE, a global uncertainty index and the VIX for emerging markets. Capital controls (CC) on bond inflows is a dummy variable taking the value 1 when any type of restrictions on bond inflows is in place. We also control for various country- and firm-specific variables described in the text. The full table with all controls is available in Appendix A, Table A.4.

Table 4: The impact of capital controls and macroprudential policies

Share of FX bond issuances (%)	CC as dummy		CC as index	Adding macroprudential policies		
	(1)	(2)	(3)	(4)	(5)	(6)
Shadow FED funds rate	-0.068** (0.027)		-0.070*** (0.027)	-0.067*** (0.015)		
VIX	-0.018** (0.008)		-0.018** (0.008)	-0.012** (0.006)		
Capital Controls	-0.153*** (0.056)	-0.368*** (0.141)	-0.244** (0.109)	-0.201** (0.081)	-0.481*** (0.130)	-0.128** (0.065)
FX regulations (t to t-3)				4.317**	4.374 **	4.236
	p-value			0.024	0.087	0.317
Country FE	Yes	No	Yes	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	No	Yes	No	No	Yes	Yes
Country/Firms controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4697	4697	4697	3194	3194	3194
Pseudo R^2	0.581	0.506	0.582	0.582	0.474	0.614

Notes: The table shows the marginal effects (all variables evaluated at their means) obtained from a fractional logistic regression with robust standard errors clustered at the country level in parentheses. All variables are lagged. The stars indicate the statistical significance as follow: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable is the share of issuances denominated in foreign currency (%). The shadow FED funds rate is from Wu and Xia (2016). VIX is an index of implied volatility of the U.S. S&P500. Capital controls (CC) variables are from Fernandez et al. (2016). The dummy CC on bond inflows take the value 1 when there are CC on bond inflows. The continuous CC on bond inflows can take three values, 0 for no controls, 0.5 with controls either abroad or locally and 1 for both abroad and locally. It is entered as a continuous variable. FX regulation are macroprudential policy variables from Ahnert et al. (2021), taking the value of 1 in every quarter macroprudential policies increase, -1 when they decrease and 0 when they do not change. All baseline controls are included as well in the regressions. The full table with all controls is available in appendix A, Table A.6.

Table 5: Stock returns, exchange rate fluctuations and capital controls - Two-step OLS approach

Stock returns	All	Firms > median	Firms < median	High-trade firms	Low-trade firms
	(1)	(2)	(3)	(4)	(5)
$\widetilde{\Delta ER}$	-98.512** (37.834)	-86.013** (33.113)	-142.084*** (40.128)	-108.861** (37.342)	-68.840 (44.704)
CC (y-1)	7.642* (3.790)	6.795 (4.339)	9.718 (6.130)	8.665* (4.407)	3.874 (4.003)
CCx $\widetilde{\Delta ER}$	175.801** (64.261)	172.326** (60.398)	192.136** (72.164)	159.767* (80.981)	152.318*** (49.831)
Cum. FX regulations (q to q-3)	0.787 (1.528)	0.482 (1.788)	0.036 (1.167)	1.237 (1.059)	-0.074 (2.326)
Cum. FX reg x $\widetilde{\Delta ER}$	-79.398** (32.223)	-85.706** (33.790)	-35.453 (23.506)	-47.231* (25.725)	-103.894** (36.182)
Constant	11.475 (10.051)	24.772 (14.559)	27.245 (21.533)	15.028 (11.210)	24.184 (26.939)
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	15551	11683	3868	8784	6767
Number of firms	694	585	380	452	309
R-squared	0.074	0.087	0.059	0.056	0.141

Notes: The table shows the estimates OLS regression with robust standard errors clustered at the country level in parentheses and all variables are lagged. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable is either stock returns at country-level based on the MSCI index or stock returns at the firm level directly. Size of firms are defined regarding the median, where the size is measured with total assets. High and low trade firms are defined based on the correlation between income and exchange rate. ΔER is instrumented using the residuals from the first-step regression (Table A.8), where change in trade-weighted exchange rate is regressed on macroprudential policy and country variables. An increase in the ER is an appreciation of the local currency. Capital controls (CC) on bond inflows are from Fernandez et al. (2016), taking the value of 1 in case of controls both abroad and locally, 0.5 if one type of controls is in place, 0 otherwise. They are included as the sum of CC over the current and last three years or over the last three years. FX regulation are macroprudential policy variables from Ahnert et al. (2021), taking the value of 1 every quarter macroprudential policies increase, -1 when they decrease and 0 when they do not change. They are included as the sum of the variable over four quarters. Further controls are included as well in the regressions. The full table with all controls is available in appendix A, Table A.9.

Table 6: $\hat{\beta}_1$ of OLS regressions of various firm-level variables on cumulated capital controls

	Net debt	Cash growth	Δ Int. cov.	Emp. growth	CAPX	Sales growth
	(1)	(2)	(3)	(4)	(5)	(6)
Full sample	-0.002 (0.004)	-0.389 (1.321)	0.415 (0.854)	-1.393** (0.675)	-0.000 (0.005)	0.005 (0.005)
High FinancialDep	0.000 (0.005)	0.124 (1.848)	-0.234 (0.807)	-2.127** (0.939)	-0.003 (0.006)	0.010 (0.007)
Low FinancialDep	0.002 (0.007)	-2.282 (2.919)	-0.327 (2.934)	-1.459 (1.359)	0.001 (0.008)	-0.007 (0.011)
Firms>median	0.001 (0.006)	-3.511** (1.641)	-0.164 (0.948)	-2.501*** (0.936)	0.007 (0.007)	0.006 (0.007)
Firms<median	0.008 (0.006)	2.098 (2.724)	3.212* (1.850)	-0.975 (1.398)	-0.005 (0.008)	-0.004 (0.009)
High-trade firms	0.001 (0.004)	-1.094 (2.024)	-0.496 (1.218)	-0.684 (1.072)	0.005 (0.007)	0.007 (0.007)
Low-trade firms	0.016** (0.007)	-6.010** (2.342)	0.053 (2.232)	-3.590*** (1.299)	-0.016* (0.009)	-0.027** (0.011)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the estimates obtained from a linear regression with robust standard errors clustered at the firm level in parentheses and *** $p < 0.01$, ** $p < 0.05$, * $p < 0.11$. The dependent variables are net debt (= $(Current + Noncurrentliabilities - cash)/totalassets$), growth in cash holdings, change in interest rate coverage (= $EBIT/InterestExpenses$), the growth rate of the number of employees, CAPX (= $(FixedAssets_t - FixedAssets_{t-1} + Depreciation_t)/FixedAssets_t$) and sales growth. Other controls at the country and firm level are also included and full tables can be found in the Appendix (Tables A.10-A.13).

Figure 1: Percentage of bonds issued in foreign currency abroad (left) and locally (right) by country and period

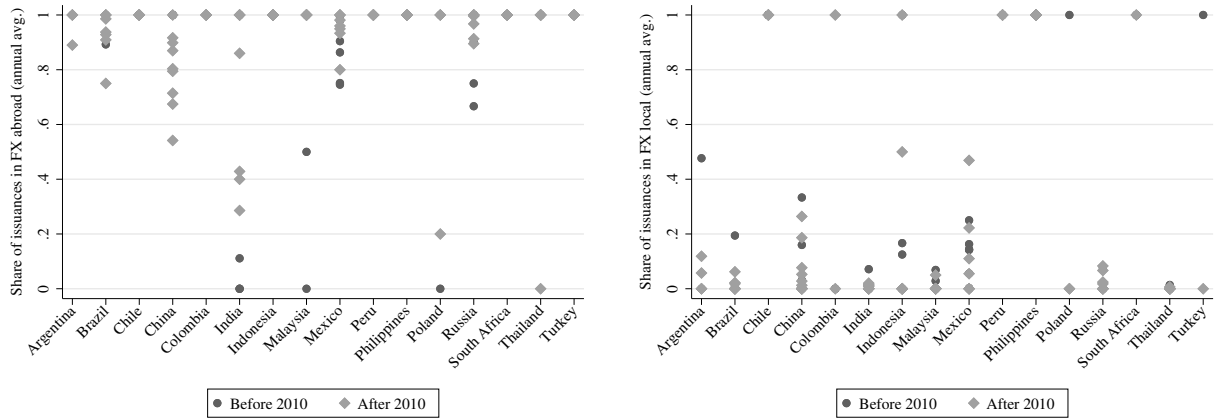


Figure 2: Number of countries with bond controls on inflows over time (left) and number of years with bond controls on inflows by country (right)

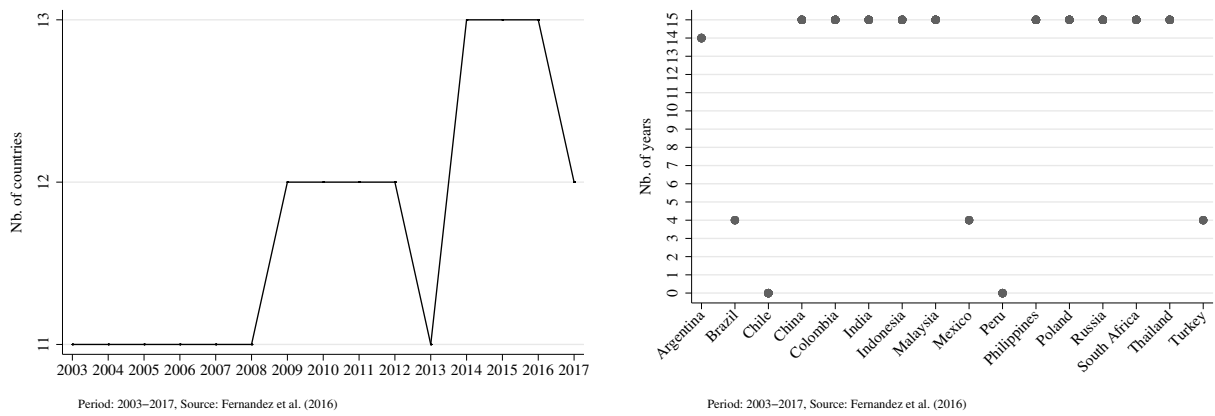
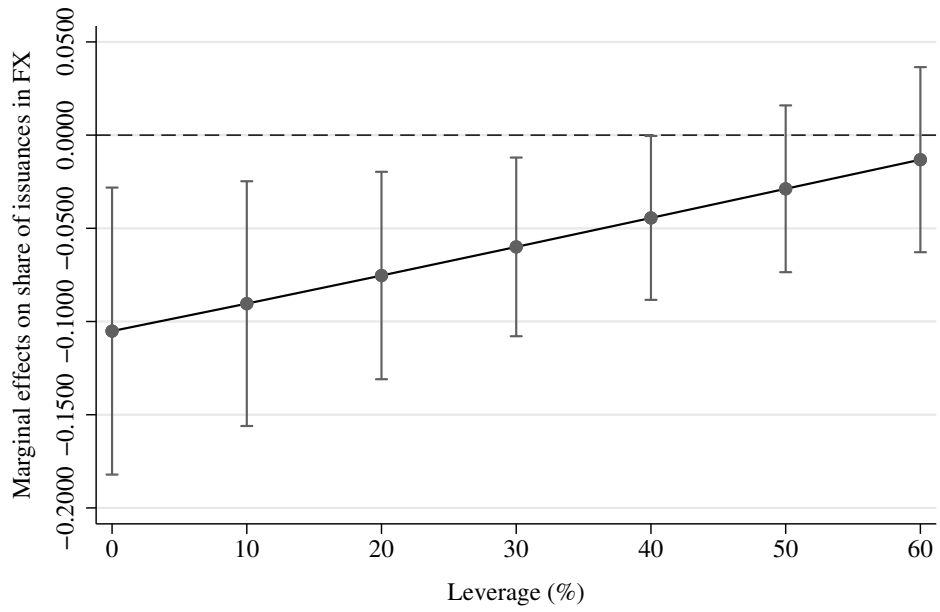
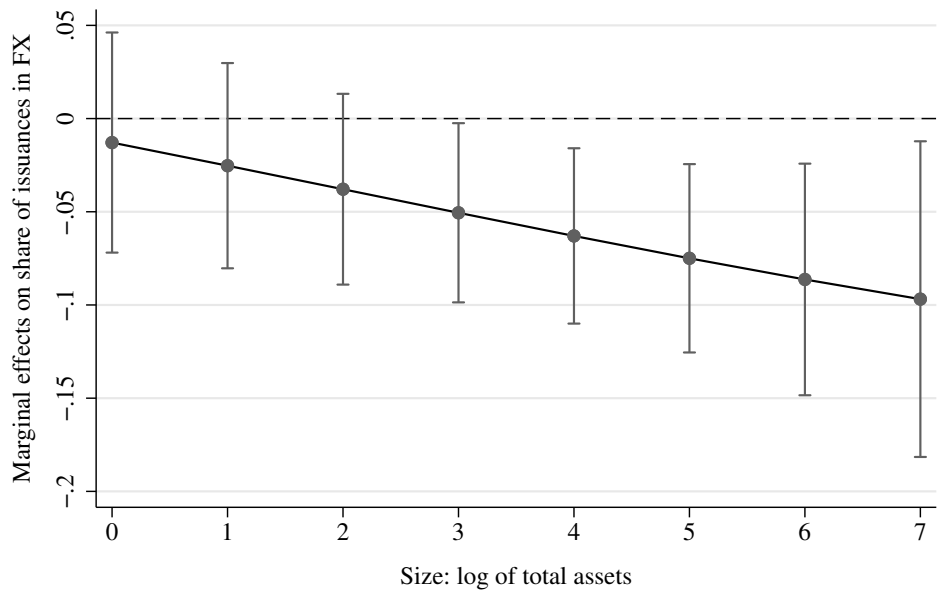


Figure 3: Marginal effects of shadow FFR on probability of issuing in foreign currency across various leverage levels



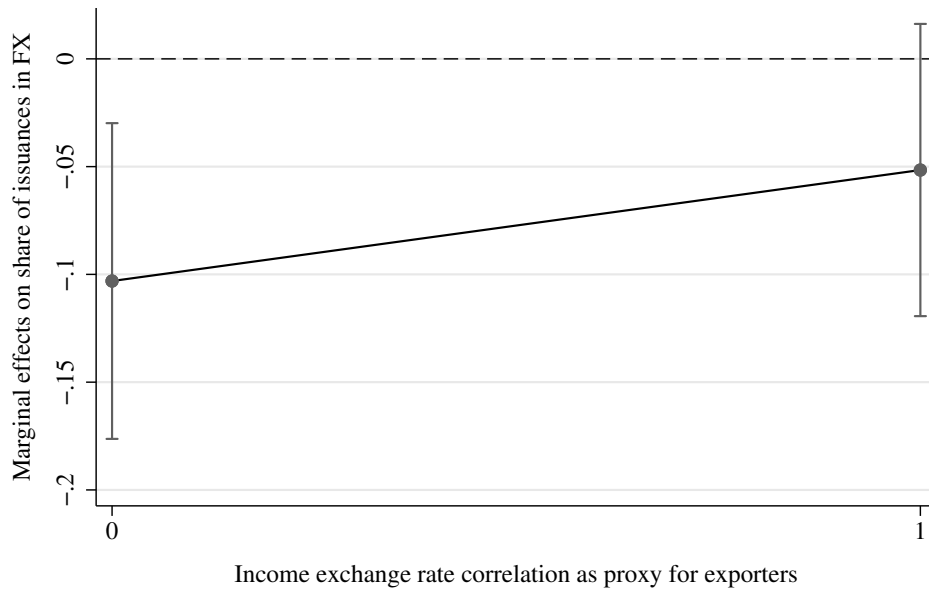
Note: 95% confidence intervals, other control variables evaluated at their means

Figure 4: Marginal effects of shadow FFR on probability of issuing in foreign currency across firm size



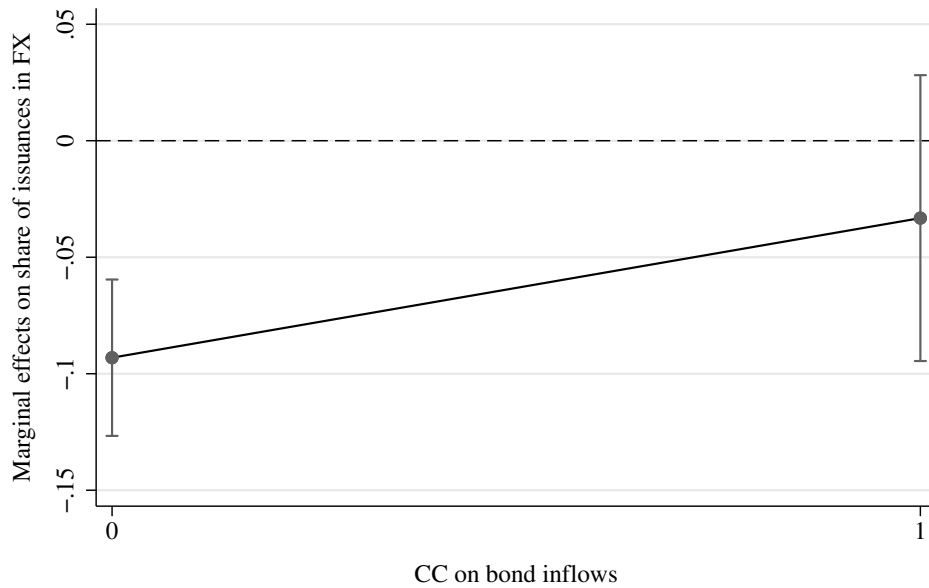
Note: 95% confidence intervals, other control variables evaluated at their means

Figure 5: Marginal effects of shadow FFR on probability of issuing in foreign currency at high or low trade intensity



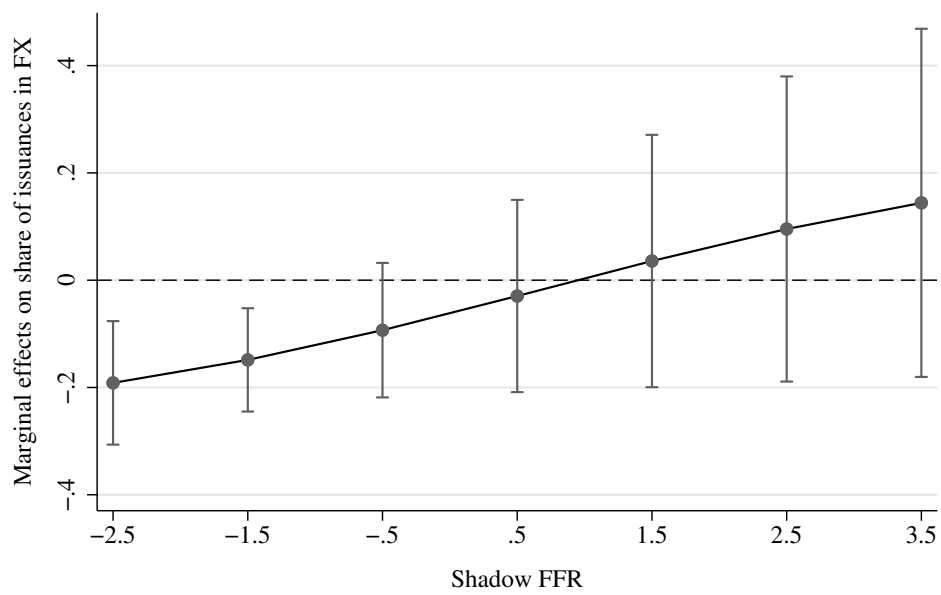
Note: 95% confidence intervals, other control variables evaluated at their means

Figure 6: Marginal effects of shadow FFR with or without bond inflows capital controls



Note: 95% confidence intervals, other control variables evaluated at their means

Figure 7: Marginal effects of CC on bond inflows for various values of shadow FFR



Note: 95% confidence intervals, other control variables evaluated at their means