Capital Controls, Firm Leverage and Profitability: Evidence from Corporate Bond Issuance*

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Abstract

We study how controls on capital inflows affect firms' financing and real outcomes in emerging markets. Using a novel dataset that combines firm-level bond issuance and balance sheet data with granular measures of capital controls, we uncover a bond channel through which tighter inflow controls reduce the likelihood of subsequent bond issuance by about one-third. Firm responses are heterogeneous and reveal how two channels are at play: leveraged firms delever and cut back investment, whereas more profitable firms sustain investment by substituting away from bond markets, including through lower dividend payouts. These findings are robust across alternative measures of firm profitability, controls for the macroprudential stance, and variation over the financial cycle. We rationalize these findings through a model of capital inflow controls and firm heterogeneity. Optimistic borrowing leads to excessive leverage and default risk, while uniform inflow controls reduce financial fragility but constrain productive firms, highlighting a trade-off between financial stability and productive efficiency.

Keywords: Capital flows; Capital Controls; Emerging Markets; Misallocation; Leverage.

JEL codes: F32, F38, F41.

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1 Introduction

Capital inflows are central to emerging market economies (EMEs), fostering growth and facilitating the allocation of capital to productive uses (Levine, 1997; Henry, 2000a; Henry, 2000b; Larrain and Stumpner, 2017; Varela, 2018). Yet large capital inflows can also fuel credit booms and amplify the risk of financial crises (Carmen M Reinhart and K. Rogoff, 2009; Jordà, Schularick, and Taylor, 2011; Mendoza and Terrones, 2012). As a result, managing capital flows poses a delicate trade-off between supporting growth and safeguarding financial stability (Bianchi and Mendoza, 2020; Ma, 2020). On the one hand, capital flow management policies can, in principle, reduce the likelihood and severity of financial crises by curbing riskier borrowing and encouraging prudential deleveraging (Jeanne and Korinek, 2010; Bianchi and Lorenzoni, 2022; Zeev, 2017; Fabiani, López, et al., 2023). On the other hand, such policies may impose efficiency losses due to capital misallocation, particularly when they disrupt the optimal allocation of resources across firms by depriving productive firms from the funding they need to reach their efficient scale (Johnson and Mitton, 2003; Rajan and Zingales, 2003; Forbes, 2007b; Alfaro, Chari, and Kanczuk, 2017; Andreasen, Bauducco, Dardati, and Mendoza, 2023; Andreasen, Bauducco, and Dardati, 2024). While this trade-off has long featured in both academic and policy discussions (IMF, 2012 and 2022), systematic cross-country evidence on how it operates in practice remains limited.

Motivated by these observations, this paper asks three central questions about how controls on capital inflows (CCIs) impact firms in EMEs. First, we examine whether a specific form of CCIs –restrictions on nonresident purchases of domestically issued bonds–reduce firms' *local* issuance. Second, we investigate the mechanisms behind any observed reduction, focusing on two channels that capture heterogeneous effects of CCIs across firms. A *prudential channel* tests whether the impact is stronger for more leveraged firms, while a *profitability channel* asks whether firms with relatively higher returns on assets (ROA) are disproportionately more affected. Third, we assess the real consequences of these policy actions by studying how CCIs alter firms' total debt and investment, thereby linking financing constraints to broader economic outcomes.

To address these questions, we put together a novel dataset that combines cross-country data on capital controls with detailed firm-level data. We complement the empirical analysis with a simple model that clarifies the mechanisms behind the empirical findings we document. Specifically, we begin by drawing on granular bond-inflow capital control measures from Fernández, Klein, et al. (2016), which capture restrictions on nonresident purchases of domestically issued corporate bonds. We merge this with issuance data from Thomson Reuters SDC Platinum, which provides firm-level information on bond deals across EMEs, and with balance sheet data from Worldscope, which covers firm characteristics and financing decisions. Our panel includes 2,695 firms across various sectors, in 18 EMEs observed at a quarterly frequency over 1998–2019, yielding more than 72,000 firm–quarter observations. We harmonize the policy series using bond-inflow CCI that account for the existence of restrictions on nonresident purchases of *domestically issued* corporate bonds. We complement this with data on CCIs on other instruments (equity, derivatives, money-market instruments, financial credit, and direct investment), along with a measure of countries' macroprudential stance.

Bond deals from SDC include issue-level identifiers as well as several other bond characteristics (issuer name, ISIN/CUSIP, currency, market of issuance, etc.). We classify an issuance as *domestic* if it is placed in the firm's home market, and as offshore otherwise. We focus on domestic issuance because this segment has expanded most rapidly in EMEs during our sample period, consistent with trends in C. Bertaut, Bruno, and Shin (2025). Moreover, the bond-inflow CCI we study explicitly targets nonresident purchases of domestically issued bonds, aligning the treatment with the outcome studied, improving the identification of the policy effect. We link SDC to Worldscope at the ultimate-parent level using firm identifiers where available, suplemented by fuzzy string matching and manual checks. Worldscope provides balance-sheet variables (total assets/liabilities, leverage, ROA, capex), which we use to construct leverage and profitability quartiles, and to measure total-liability and investment responses.

This combination of datasets enables us to analyze both cross-sectional and time-series variation in capital controls and bond issuance. To quantify the impact of CCIs on firms' bond issuance, we estimate a firm-quarter linear probability model where the outcome is an indicator for domestic bond issuance. The key regressor is a lagged country-level indicator for bond-inflow CCIs. Following Becker and Ivashina (2014), we restrict the sample to firm-quarters in which the total debt of the firm rises, ensuring that demand for external finance is positive and that changes in composition reflect credit-supply drivers rather than demand. We include firm characteristics and macro-financial controls, plus dummies for CCIs on other instruments and other macroprudential tools. Firm and sector*time fixed effects absorb time-invariant heterogeneity and net out time-invariant firm heterogeneity and sectoral shocks that are common across countries, respectively.

To measure heterogeneous impacts, we interact the CCI indicator with pre-determined firm characteristics, namely leverage and ROA quartiles. These interactions reveal whether tighter bond-inflow controls curb issuance more for highly leveraged firms—a prudential channel—, and whether higher-ROA firms also pull back—a profitability channel. Lastly, to assess real effects, we replace the issuance outcome with growth in total liabilities and investment, testing whether reduced bond issuance leads to deleveraging and lower capex, or if, instead, it is offset by substitution toward domestic credit. We also explore the extent to which firms draw from retained earnings. All specifications retain the same identification strategy ensuring that the heterogeneity and real-effects estimates are directly comparable to the baseline issuance results.

Results from our empirical analysis highlight three key findings. First, we provide evidence of a bond channel of capital controls: CCIs significantly reduce the likelihood of firms' domestic bond issuance. On average, the probability of issuance falls by 1.7 percentage points, equivalent to 33 percent of the historical mean. Moreover, we find that controls on other instruments, such as equity issuance, are associated with higher bond issuance, suggesting substitution across sources of finance. Second, the reduction in bond issuance is consistent with both channels: the effect is stronger for more leveraged firms, but also present –though smaller–for high-ROA firms. Finally, we show that the prudential channel extends to total debt and investment decisions: among riskier firms, total liabilities decline by up to 2%, and quarterly investment by 0.2%. Crucially, by contrast, we do not find reductions in total liabilities or investment among more profitable firms. These firms maintain investment by substituting away from bond finance and tapping alternative domestic banks' funding sources.

We extend the baseline empirical results along four dimensions. First, we study additional substitution margins and provide evidence that dividend-payout cuts act as an internal-finance valve for profitable firms. Second, we re-estimate heterogeneity using alternative profitability and efficiency measures. On the former, we substitute ROA measures for return on equity (ROE). On the latter, lack of employment levels at the firm level prevent us from computing direct measures of firms' total factor productivity. Instead, we explore substituting firms' ROA with average revenue product of capital (ARPK). These alternative measures are consistent with capital controls inhibiting profitable firms' bond issuance. They also corroborate the relative stronger effects of the prudential channel that operates through leverage. Third, we also control for the country-specific cumulative macroprudential stance (in addition to lagged changes in other macroprudential measures) to account for the possibility that countries with relatively tighter or looser macroprudential frameworks may differ in their underlying need to resort to capital controls in the first place. Reassuringly, our results remain robust to this modification too. Fourth, we examine state dependence by interacting the CCI measures with the financial cycle, separating domestic (EMBI) from global drivers (broad and AE dollar indices). We find that the prudential channel is strongest when domestic conditions are loose. Under globally loose conditions both prudential and productivity channels continue to operate.

To interpret these findings, the paper develops a simple model of capital inflow controls and firm heterogeneity. The model features a small open economy with ex ante identical firms that finance investment through foreign borrowing before firm-level productivity is realized. Firms and their foreign lenders hold optimistic beliefs about future outcomes, both regarding the likelihood of being highly productive and the severity of adverse aggregate states. These beliefs distort borrowing decisions upward, leading firms to take on more external debt than would be warranted by true risks.

A central implication of the model is that excessive borrowing exposes firms with lower realized productivity to default in adverse aggregate states, generating financial fragility and output losses. This mechanism provides a natural interpretation of the empirical evidence that capital inflows raise leverage disproportionately among weaker firms and are associated with heightened downside risk. At the same time, more productive firms remain solvent even in bad states, but their borrowing decisions are tied to the same ex ante incentives and financing conditions as those of weaker firms.

Within this environment, a uniform capital inflow control plays a dual role. On the one hand, by raising the cost of external borrowing, it curbs excessive leverage among low-productivity firms, delivering prudential benefits that operate primarily through the leverage channel documented in the data. On the other hand, because policy cannot be conditioned on firm characteristics, the same control also constrains borrowing by high-productivity firms that would not default even in the absence of regulation, preventing them from operating at their efficient scale. The model therefore rationalizes the heterogeneous firm-level responses observed in the empirical analysis and highlights the fundamental trade-off policymakers face between reducing financial fragility and preserving productive efficiency.

Overall, our findings entail important policy implications for the management of capital flows in EMEs. The results highlight the trade-off policymakers face between financial stability and long-run efficiency. On the one hand, the prudential channel shows that CCIs can mitigate financial stability risks by curbing excessive bond issuance among riskier and more-leveraged firms. On the other hand, the productivity channel warns of potential longer-term costs if measures disproportionately constrain high-ROA firms, with implications for aggregate growth. Our evidence on real outcomes, however, shows that productive firms maintain investment by substituting away from bond finance. This suggests that the absence of a profitability penalty depends critically on the availability of substitutes. A key lesson, therefore, is to use CCIs only insofar as the conditions for firms with high growth potential to tap into alternative sources of finance exist. Such conditions include the existence of deep local-currency markets, developed financial systems, and measures incentivize the use of internal funds for investment. Finally, because our analysis focuses on large, listed firms that regularly tap capital markets, policymakers should recognize that smaller firms–more dependent on bank credit–may be affected through different channels. CCIs that impact bank intermediation should thus be calibrated with this credit in mind and coordinated with macroprudential tools, so prudential benefits are realized without suppressing high-productivity investment. The effectiveness of such measures may also depend on the state of the financial cycle, calling for a calibration that differs between periods of domestic vs. global loosening of financial conditions.

Literature Review. Our work contributes to two strands of the empirical literature on capital controls. The first documents the microeconomic costs these policies can impose on firms. In a seminal contribution, Forbes (2007a) shows that during the Chilean encaje in the 1990s, smaller traded firms faced significant financial constraints, which eased as firm size increased. In a companion survey, Forbes (2007b) summarizes early microeconomic studies, concluding that capital controls increase financial constraints, especially for smaller firms and those without international market access, and can distort investment decisions. Alfaro, Chari, and Kanczuk (2017) find that Brazilian firms experienced lower returns after capital control announcements, consistent with higher financing costs, with effects concentrated among firms more dependent on external finance. Building again on the Chilean experience, Andreasen, Bauducco, and Dardati (2024) document that controls had heterogeneous effects on firms as exporting firms operating in more capital-intensive sectors were more negatively affected than those operating in less capital-intensive sectors. Using a structural model, they relate their findings to the increase in financing costs, the depreciation of the real exchange rate, and compositional effects on the mass of exporters and non-exporters. Extending this analysis, Andreasen, Bauducco, Dardati, and Mendoza (2023) show that capital controls raise misallocation and welfare costs, particularly for exporters and highly productive firms with large optimal scale gaps. New cross-country evidence from Andreasen, De Gregorio, et al. (2024) indicates that capital controls tighten firm-level financing constraints, while macroprudential policies tend to alleviate them.

The second strand of literature investigates the potential benefits of controls for financial stability. While the debate remains unsettled, Erten, Korinek, and Ocampo (2021) conclude in their comprehensive survey that empirical evidence generally supports a stabilizing role, particularly when controls are used countercyclically. At the firm level, Gallego and Hernández (2003) find that Chilean firms reduced leverage and increased reliance on retained earnings in the 1990s, thereby lowering vulnerability to short-term speculative flows during the Asian and Russian crises. Using Colombian microdata, Fabiani, Piñeros, et al. (2022) show that capital controls taxing FX debt break the carry-trade, reducing risky credit supply from FX-indebted banks to riskier firms. In subsequent work, Fabiani, López, et al. (2023) further show that controls slow firm debt growth during booms, improve firm performance during crises, and do not significantly distort credit allocation between productive and unproductive firms. The debate, however, is far from closed. Keller (2019), for instance, documents that Peru's limits on banks' FX forward positions shifted exchange rate exposure from foreigners onto domestic firms, while Andreasen and Nuguer (forthcoming) find that higher FX reserve requirements in Peru reduced overall credit supply.

Our work contributes to both strands of the literature. To some extent, the firm-level costs and the stability benefits are two sides of the same coin: deleveraging that strengthens balance sheets at the macro level may also mean firms cutting expenditures and facing tighter constraints. The relevant question is therefore whether controls disproportionately affect firms with high potential, leaving scars that weigh on long-run growth. This is where our paper makes its main contribution: we *jointly* test the prudential and profitability channels in a large cross-country firm panel, linking financing outcomes to real investment responses. By assembling the largest cross-section of EME firms with detailed balance sheet information, we move beyond single-country case studies—where firm-level financial data are often missing—and provide systematic evidence on both the benefits and costs of CCIs across heterogeneous firms and economic conditions. To the best of our knowledge, ours is the first study to assess these firm-level CCI-induced trade-offs jointly across a broad EME sample with rich information of firms' balance sheet and real outcomes.

Our work is also the first to shed light on the bond channel of capital controls, offering a cleaner identification of how these policies affect firms. We do this by expanding the dataset with bond-level information on domestic issuance, a dimension that has not been unexplored in prior work. Focusing on the bond channel allows us to directly align the policy measure—restrictions on nonresident purchases of domestic bonds—with the outcome of interest, firms' domestic bond issuance. This focus also helps us bypass a common concern in the literature: small firms are largely absent from bond markets. As we show, our sample is indeed tilted toward larger listed firms, which makes the bond channel especially relevant.[1]

Our modeling framework is also related to a growing literature that emphasizes the role of beliefs and optimism in shaping capital flows and external borrowing. A long-standing theme, dating back at least to Carmen M. Reinhart and K. S. Rogoff (2009)' *This Time Is Different*, is that episodes of large capital inflows are often accompanied by overly optimistic expectations about future growth prospects and the likelihood or severity of adverse states. More recently, this intuition has been formalized in models where shifts in sentiment or news about future productivity drive capital inflows and borrowing booms. In this vein, Benhima and L. Cordonier (2022) develop a model in which optimistic news and sentiment generate excessive capital inflows, amplify leverage, and increase vulnerability to sudden reversals.

[1] The exclusion of small firms remains a caveat, which we addressed explicitly when discussing the policy implications of our work in the Introduction.

Our model shares with this literature the emphasis on belief-driven overborrowing but differs in focus by explicitly linking optimism-induced borrowing to firm-level heterogeneity and the differential real effects of capital inflow controls across firms.

At the same time, our theoretical mechanism is complementary to, but distinct from, existing rationales for prudential capital controls based on pecuniary and aggregate demand externalities.[2] In contrast to these approaches, which rely on distortions arising from price effects or aggregate demand spillovers, our framework highlights how distorted beliefs at the firm level can lead to excessive external borrowing and financial fragility even in the absence of such externalities. This allows us to rationalize why uniform capital inflow controls may reduce fragility while simultaneously generating heterogeneous real effects across firms, a pattern that closely aligns with our empirical findings. To the best of our knowledge, this is the first model that jointly accounts for the trade-offs associated with capital inflow controls by capturing both their prudential benefits in curbing financial fragility and their efficiency costs arising from constrained firm scale under firm-level heterogeneity.

The remainder of the paper is structured as follows. Section 2 introduces the dataset and provides descriptive statistics. Section 3 outlines the empirical strategy and identification approach. Section 4 presents the baseline empirical results, while Section 5 extends the analysis and reports robustness exercises. Section 6 develops the simple model of capital inflow controls under firm heterogeneity. Section 7 concludes. Additional technical material is provided in the Appendix.

2 Dataset

This section describes the dataset constructed for our empirical analysis. We first report the main data sources and discuss the variables in our analysis and the related summary statistics. The last subsection describes trends in domestic and international bond issuance

[2] See references in the surveys by Erten, Korinek, and Ocampo (2021) and Bianchi and Lorenzoni (2021), among others.

by non-financial EMEs firms in the dataset.

2.1 Data sources

Our study focuses on bond issuance by non-financial companies in 18 EMEs.[3] We retrieve transaction-level information on bond issuance from LSEG's Securities Data Company (SDC) Platinum, including data on issuance volume, date, the market in which the bond was issued and firm-level identifiers. SDC Platinum is a standard database for analyzing bond issuance in a cross-country setting and especially by non-US firms (Boyarchenko and Elias, 2023). Importantly, SDC Platinum links each issuing firm to its ultimate parent company.[4] We assign firm-level attributes to the issuing firm according to the parent company's identifier. Hence, our sample includes all bond issues by firms with parent company headquartered in the 18 emerging economies in our sample. We then compare the nationality of the parent company with the market in which the bond was issued to define the transaction as "domestic" or "international". For concreteness, consider the example of a bond issued by a firm with Brazilian parent. We label it as domestic if it is issued in a Brazilian bond market, and as international if issued in any non-Brazilian bond market. We exclude issuance of commercial paper by retaining only transactions that SDC categorize as bond issuance, involving maturity equal to or above one year.[5]

Next, we gather quarterly balance sheets for publicly listed firms from Worldscope.[6] We retain information on leverage (total debt/assets), profitability (ROA, ROE),[7] size (log total

[3]We identify Emerging Economies as those countries with an active EMBI index, namely: Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Kazakhstan, Malaysia, Mexico, Peru, Philippines, Poland, Russian Federation, Thailand, Turkey, and Vietnam. Appendix Table A.1 reports the precise available sample coverage for each country.

[4]Whenever the parent company is not reported, we assume the issuing firm is the parent company itself, which occurs in 16 percent of the cases.

[5]Formally, we retain transactions that are attributed the following security types in SDC: bonds, notes, and debentures. We exclude convertible bonds as they represent a hybrid between equity and debt securities.

[6]While similar information is also available in Compustat Global, we rely on Worldscope given its broader coverage of listed firms in Emerging Market Economies and its smoother integration with SDC identifiers (CUSIP, SEDOL, ISIN).

[7]For ROA and ROE, we use annual data both because of severe attrition in quarterly information and because quarterly fluctuation in such measures may reflect seasonal dynamics.

assets) and the liquid assets ratio. We merge SDC and Worldscope data through a three-stage process. First, as already explained, we identify the parent company for each issuing firm in the SDC dataset. Second, for each parent company in SDC, we look for the corresponding information in Worldscope through three common identifiers, namely the CUSIP, SEDOL, and ISIN codes. Finally, we employ a fuzzy name-matching algorithm for the remaining unmatched issuers, followed by manual verification to ensure exact matching. The initial dataset from SDC Platinum identifies approximately 4,256 non-financial corporate issuers of domestic bonds whose parent firms are located in EMEs. Following our matching procedure, we successfully merge 4,045 of these issuers.[8]

Our analysis also exploits a wide variety of country-level time-series variables. Most importantly, we obtain data on capital controls from Fernández, Klein, et al. (2016), building on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) and capturing the extensive margin of capital controls with annual frequency. This dataset is particularly suited for our study because of three distinguishing features in its granularity. First, it splits capital controls across different financial instruments including bonds, which is at the center of our analysis, as well as on other instruments such as equity, derivatives, money market, collective instruments and real estate. Second, capital controls on each instrument are further categorized based on the residency of the buyer and seller of each financial asset. Third, the dataset also distinguishes capital controls on inflows versus outflows. While we control for broad set of capital controls in our empirical methodology, the key control of interest remains the controls on purchasing bonds locally by non-residents, referred to as $Bonds(PLBN)$ hereafter. That is, our main interest lies on capital controls limiting inflows in the form of nonresidents' ability to buy locally-issued bonds. The dataset in Fernández, Klein, et al. (2016) provides categorical information on

[8] Attrition is due to two reasons. First, bonds may be issued by private firms, that are not covered in Worldscope. Second, a publicly listed firm may be covered in SDC but not in Worldscope. The very low attrition rate (close to 5%) associated with merging the two datasets implies that neither of the two issues is relevant in our context.

the presence (or absence) of any type of these restrictions by country and year.[9]

We also retrieve information on other macroprudential measures (different from capital controls), that could be simultaneously used to manage credit growth. In particular, we rely on the Integrated Macroprudential Policy (iMaPP) Database (Alam et al., 2019). Distinguishing across different macroprudential measures, the dataset defines categorical monthly variation indicating whether a measure has been loosened (assigned value -1), tightened (1) or kept constant (0). The data comes at monthly frequency, that we aggregate at the quarterly frequency. There are 17 indices to measure the extensive margin of controls and, following Alam et al. (2019), we create iMaPP index as the sum of all 17 indices.

In addition to capital controls, we control for key measures of economic conditions including the real GDP growth rate, the inflation rate, the exchange rate against the US dollar, the IMF financial development index and the EMBI spread. The complete list of data sources is in the Appendix Table A.2.

2.2 Main variables and summary statistics

We generally employ a firm-level quarterly panel. Table A.3 displays summary statistics for firm-level variables in our baseline regression sample, comprising approximately 2,700 firms and resulting from the merge of the different firm-level information with country-level time-series and from the application of controls and fixed effects in the empirical model described in the next section.

The baseline outcome variable of interest is $1(\text{Domestic Bond Iss})_{f,t}$, a dummy with value 1 if a firm f issues a bond domestically in a given quarter t, and with value 0 otherwise.[10] The average likelihood that a firm issues a bond on any given quarter is about 5%. We also report additional information on bond issuance; the average firm issues bonds around 6 times

[9] Note that our analysis could not be carried with the other two well-known sources for capital controls, namely Chinn and Ito (2006) and Quinn and Toyoda (2008), as they do not distinguish across financial assets nor the direction of the capital flow.

[10] We include firms from the first to the last time we observe a bond issue in SDC. For instance, if we observe a firm in SDC issuing a bond in, say, 2000, and for the last time in 2015, we will include it in our observations within those date range.

over our sample period, with average volume of more than 200 milion USD and maturity above 3 years (see Appendix Table A.3).

One of our main variables is firm leverage, defined as total debt over total assets. On average, firms finance one third of their assets through debt, as depicted in Table 1. However, the data reflect notable dispersion in firm leverage, with a standard deviation (s.d.) of 16 percentage points (p.p.) and interquartile range (IQR) of 22 p.p.. Our preferred measure for firm profitability is return on assets (ROA), obtained by dividing net income by total assets. The average firm displays positive profitability of around 5%, with significant heterogeneity as accounted for by a s.d. and IQR of roughly 6 p.p..

Table 1 shows additional summary statistics for the country-level variables. Most importantly, $Bonds(PLBN)_{c,t}$ is a dummy variable with value 1 if country c in quarter t has implemented capital controls on foreign purchase of domestically issued bonds, and with value 0 otherwise. It has to be noted that, consistently with the original data frequency in Fernández, Klein, et al. (2016), this variable varies at the country-year level (i.e. it is constant across the quarters of a given year). In our sample of Emerging Economies, capital controls on foreigners' purchase of locally issued bonds are in place for approximately two thirds of the time, as signalled by the average of 0.67.[11] Our dataset overall captures 20 switches in capital controls on purchase of locally issued bonds by non residents—that is, episodes in which governments either enforces or removes such measure—across 11 countries (see Appendix Table A.3). This is consistent with previous work that has documented stickiness in the use of capital controls (Fernández, Rebucci, and Uribe, 2015; Acosta-Henao, Alfaro, and Fernández, 2025).

Next, we collapse information on domestic macroprudential policy from Alam et al. (2019) into a country-specific quarterly index, iMaPP. The original data provides a variable with

[11] We also use other information on capital controls. In particular, $Bonds(SIAR)_{c,t}$ is a dummy variable for whether a country implements capital controls on sale or issue abroad by residents of foreign issued bonds. We also report several other capital controls dummies, related to the purchase by foreigners of locally issued collective investment, derivatives, equity (either direct investments or not) and money market instruments, and to the extension of other credits (Financial Credits) from abroad or the purchase of real estate assets.

value 0 if a macroprudential tool (e.g. countercyclical capital buffers) has not changed over a month, 1 if it has been tightened, and -1 if it has been loosened. We take the sum over a quarter. In an extension, we also consider an overall macroprudential stance index, which cumulates the iMaPP over time for each country.

2.3 Domestic and International Bond Issuance

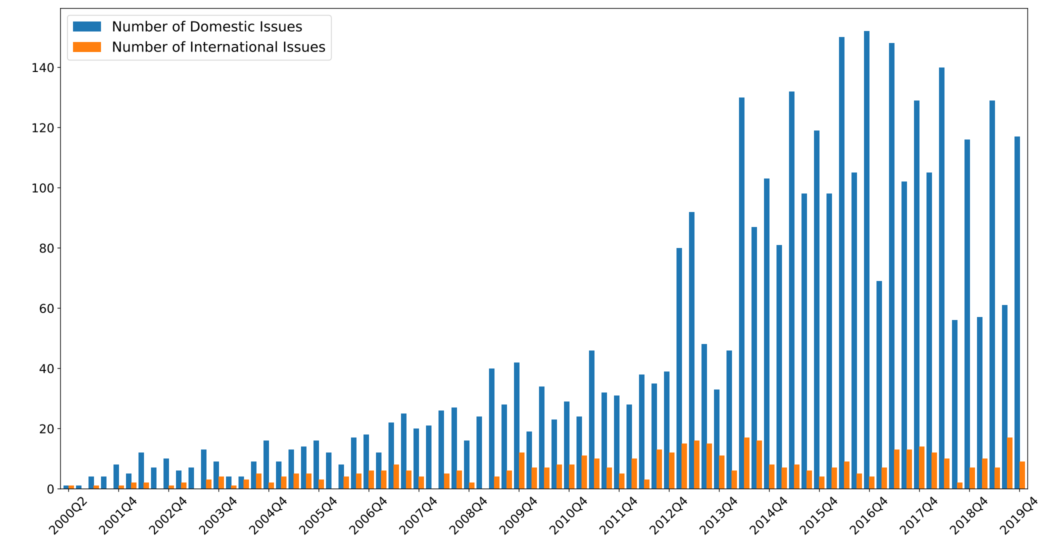
Our primary focus rests on *domestic* bond issuance by firms, as opposed to international issuance. For concreteness, considering the usual example of a Brazilian firm issuing bonds, we mostly concentrate on issues occurring in Brazilian bond markets, as opposed to bonds issued in international (i.e. non-Brazilian) bond markets.

This choice is due to the fact that, since the Global Financial Crisis (GFC) of 2008, firms in emerging market economies (EMEs) have increasingly relied on domestic bond markets to meet their financing needs (Avdjiev, Burger, and Hardy, 2024; C. C. Bertaut, Bruno, and Shin, 2021). This structural shift reflects both regulatory developments and evolving market dynamics that have favored local debt issuance, mostly in local currency. Consistent with this trend, our final sample exhibits a substantially higher volume of domestic bond issuances relative to international ones. Figure 1 illustrates the prevalence of domestic bond issuance (denoted by blue bars) versus international bond issuance (orange bars), both in terms of the of the number of bonds issued (panel A) and in terms of volume (panel B).

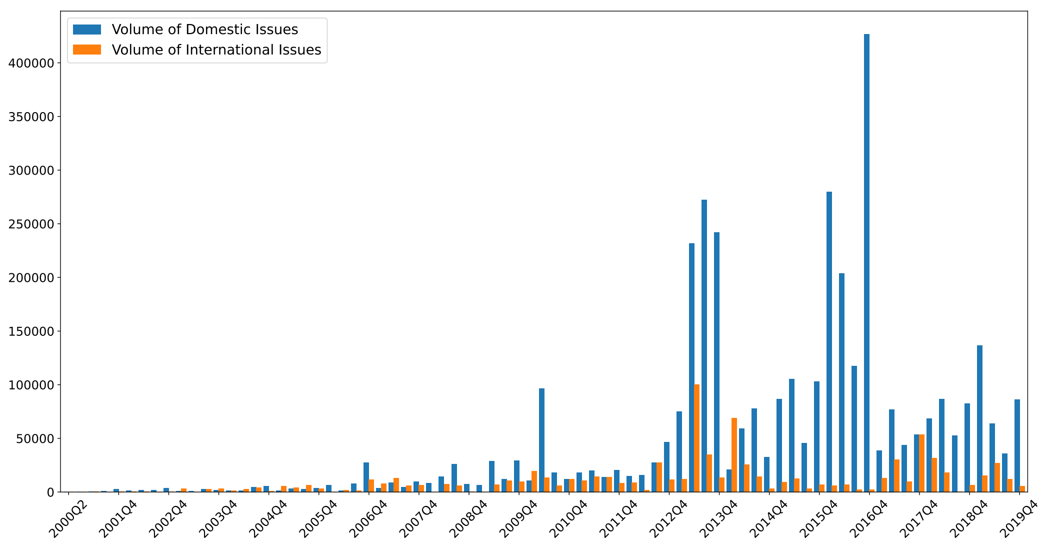
Appendix Table A.3 reports some additional information on bond issuance . The average firm in our sample issues bonds around 6 times, and the average issuance equals 227 millions of US dollar.

Observations: 72,332	Mean	Median	Std. Dev.	p25	p75
Dependent Variable					
bois: 1(Domestic Bond Iss)	0.051	0.00	0.22	0.00	0.00
Firm Controls					
Leverage (%)	32.58	31.87	16.56	20.91	43.37
ROA (%)	5.46	5.08	6.36	2.77	8.27
Size (≡ log(Total Assets))	20.88	20.86	1.69	19.75	22.01
(log) Liquidity	3.11	3.26	0.89	2.66	3.75
Capital Controls on bond inflows					
Bonds (PLBN)	0.67	1.00	0.47	0.00	1.00
Other Capital Controls					
Equity (PLBN)	0.75	1.00	0.44	0.00	1.00
Money Market (PLBN)	0.67	1.00	0.47	0.00	1.00
Bonds (SIAR)	0.79	1.00	0.41	1.00	1.00
Collective Inv. (PLBN)	0.61	1.00	0.49	0.00	1.00
Derivatives (PLBN)	0.76	1.00	0.43	1.00	1.00
Real Estate (PLBN)	0.90	1.00	0.31	1.00	1.00
Financial Credits (Inflows)	0.90	1.00	0.29	1.00	1.00
Direct Investment (Inflows)	0.92	1.00	0.27	1.00	1.00
Macroprudential policy					
iMaPP Index	0.65	0.00	1.48	0.00	1.00
Economy Controls					
Real GDP growth rate	6.01	6.50	3.67	4.13	7.89
CPI Inflation	3.60	2.80	3.52	1.75	4.83
(log) Exchange Rate	2.44	1.89	2.00	1.34	2.11
Overall Financial Development	0.54	0.56	0.11	0.47	0.63
EMBI spread (%)	1.87	1.62	1.43	1.10	2.14

Table 1: Summary statistics of capital controls and other economy controls



(a) Number of Issues



(b) Volume of Issues (in Millions USD)

Figure 1: Domestic vs International Bond Issuance

3 Empirical model

3.1 Identification of the effects of capital controls on bond issuance

Our baseline model aims at identifying the effects of capital controls on non-financial firms' propensity to issue bonds. We borrow the identification strategy from Becker and Ivashina (2014).[12] In practice, we retain firm-quarter pairs in which total firm-level debt displays a positive growth rate. Hence, we restrict our analysis on firm-quarter pairs in which, by a revealed preference argument, a firm exhibits positive demand for external funding. Hence, estimated adjustments on bond issuance along the extensive margin must be supply driven.

We estimate the following regression model:

$$1\left[Bond_{f,c,t}\right] = \beta_1 CC^{bond}_{c,t-1} + \Gamma X_{f,c,t-1} + \mu_f + \mu_{s,t} + e_{f,t} \tag{1}$$

The outcome variable, $1\left[Bond_{f,c,t}\right]$, is a dummy with value 1 if firm f from country c issues a bond in quarter t, and with value 0 otherwise. The key coefficient of interest, β_1, loads a (lagged) dummy variable for whether capital controls on bond inflows are in place in country c, $CC_{c,t-1}$. We focus on capital controls on purchases of bonds issued locally in country c from non-residents, i.e. from investors from country c', $c' \neq c$. Under our baseline hypothesis that capital controls are associated with a reduction in the supply of foreign funding for locally issued bonds, it should be the case that $\beta_1 < 0$.

Capital controls on bond inflows are observed at the annual frequency. We first construct a lag of the annual capital control indicator, so that the value assigned in a year reflects whether bond inflow restrictions were in place during the previous year. This lagged annual series is then mapped to the quarterly firm level panel by assigning the same value to all four quarters within a given calendar year. A lagged value of the capital control variable therefore is assumed to be known to firms and investors when bond issuance decisions in quarter t are

[12] Becker and Ivashina (2014) study the propensity to issue bonds versus bank debt by listed US firms in reaction to variations in US credit supply conditions. For an applications to Emerging Markets of such approach and in the context of capital controls, see Bacchetta, R. Cordonier, and Merrouche (2023).

made. This timing reflects the idea that capital controls affect bond issuance with a delay, as firms adjust financing plans in response to the regulatory environment prevailing over the prior year rather than contemporaneous within quarter policy changes.

We augment the model with a rich list of lagged firm-level and country-level controls, denoted by the vector $X_{f,c,t-1}$. In particular, we control for firm profitability and riskiness through ROA and leverage, respectively; moreover, we control for firm liquidity (via the liquid asset ratio) and size (through log total assets). Country-level controls include proxies of business cycle and financial cycle conditions such as GDP growth rate, inflation rate, exchange rates to US Dollar, overall financial development index and variations in the EMBI spread.

We also add other lagged capital controls dummies on other instruments, namely derivatives, equity, money market inflows from non-residents, financial credit and direct investment. Controlling for the enforcement of other capital controls measures is important to avoid omitted variable bias in our estimates. Indeed, capital controls on different classes of transactions may correlate[13] and investors may use the associated securities and financial flows as substitutes or complements to bonds. For analogous reasons, we also control for change in macroprudential stance as measured by lagged iMaPP index described in Section 2. Finally, μ_f is a vector of firm fixed effects, whereas $\mu_{s,t}$ denote a vector of sector*time FE. Finally, $e_{f,t}$ is an error term, which we cluster at the firm-level.

We conclude this section by discussing the main threat to our identification, related to the issue of capital controls endogeneity. Indeed, capital controls are not exogenous, but rather driven by current macro-financial local and global developments, including bond issuance by NFCs. However, the empirical model outlined above takes care of such endogeneity to a large extent. First, we control for global (sector-specific) shocks through sector*time fixed effects. Second, we exclude reverse causality by using lagged and therefore predetermined dummies for capital controls. Third, since we control for a long list of local macro-financial

[13] See Table A.4 in the Appendix.

variables, we exploit residual variation in capital controls after controlling for local business and financial cycles. Last, but not least, the Becker and Ivashina (2014)'s identification strategy narrows down the endogeneity concern by focusing on the choice of issuing bonds vis-à-vis other forms of external finance (e.g. bank loans). Hence, for the potential bias to impact our results significantly, it has to be the case that unobserved macro-financial conditions prompting capital controls tilt firms' financing choice towards bond, as compared to other forms of external financing such as bank loans. In this respect, however, a relatively large literature shows that the global credit cycle influences credit supply by local banks in Emerging Markets as well (see, e.g., Bräuning and Ivashina (2020); Di Giovanni et al. (2022); Morais et al. (2019)).

3.2 Heterogeneous effects across firms

We test whether capital controls influence firms' ability to issue bonds differently depending on their profitability (ROA) and leverage. In particular, we categorize firms into quartiles (q) of these two variables and run the following regression model:

$$1\left[Bond_{f,c,t}\right] = \sum_{q\neq 1,} \sum_{Z=ROA,Lev} \beta_q^Z \left(CC_{c,t-1}^{bond} * Z_{f,c,t-1}^q\right) + \Gamma X_{f,c,t-1} + \mu_f + \mu_{s,t} + \mu_{c,t} + e_{f,t} \quad (2)$$

We are especially interested in the coefficients β_q^{ROA} and β_q^{Lev}, $q = 2, 3, 4$, loading the interaction between the capital controls dummy, $CC_{c,t-1}^{bond}$, and a further dummy for whether a firm is in the q-th quartile of the distribution of either ROA or leverage. Hence, β_q measures the relative impact of capital controls on bond issuance for firms in the q-th quartile of either leverage or ROA, as opposed to firms in the first quartile, with $q = 2, 3, 4$. The rest of the model is otherwise identical to model 1, apart from a few elements. First, we augment our model with country*time fixed effects, $\mu_{c,t}$, which absorb any country-specific and time-varying shocks, controlling for any potential unobserved country-specific factors that influence both the likelihood of capital controls and firm-level bond issuance. Importantly, country*time fixed effects take care of the endogeneity of capital controls with respect to local economic conditions, as they imply that the coefficients of interest are identified via the within country and time variation across firms. Second, we also control for the interaction of other firm characteristics (liquidity and size) with capital controls, subsumed in vector of controls $X_{f,c,t-1}$.

3.3 Real effects

To investigate whether capital controls have an ultimate effect on firms' performance, we check whether they impact investment. However, before that, we notice that even under a significant negative effect of capital controls on bond issuance, capital controls may not affect investment to the extent that firms can substitute the forgone bond funding with other sources of external finance, e.g. bank loans. Hence, checking for real effects through a "bond channel" requires a two-step test in which we first verify the effect of capital controls on total liabilities and, next, on investment.

The employed regression model follows. Since a reduction in debt could take time to materialize and to display its influence on investment, we estimate a dynamic model in the spirit of Jordà (2005)'s local projections:

$$\Delta_h y_{f,c,t+h} = \gamma_{1,h} CC^{bond}_{c,t-1} + \Psi_h X_{f,c,t-1} + \mu_{f,h} + \mu_{s,t,h} + e_{f,t,h}, \quad h = 0, 1, 2, \cdots, 8 \tag{3}$$

We estimate sequentially the models above by OLS. The dependent variable, $\Delta_h y_{f,c,t+h}$, measures the cumulative log-change of the variable of interest (either total liabilities or total investment) between period $t-1$ and $t+h$, where $h = 0, 1, 2, ..., 8$. Hence, through the coefficients $\gamma_{1,h}$, we pin down the response of total liabilities and investment over a 2-year horizon following the use of capital controls. The employed set of controls and fixed effects is identical to that explained for the baseline model 1. We eventually augment the model with interactions of the capital control dummy and firm-level indicators of profitability and risk to investigate heterogeneity in real effects.[14]

4 Results

4.1 Baseline Results: Domestic Bond Issuance

Table 2 displays results from the estimation of model 1. Column 1 reports estimates from a minimal model, where we just apply macroeconomic controls (including other capital controls measures). In column 2, we add firm and time (year-quarter) fixed effects. Column 3 further augments the model by employing sector*time fixed effects, but excludes time fixed effects. Finally, column 4 shows the most robust estimates, including firm controls, fully aligned with the model described in section equation 1. Across all specifications, and despite a notable increase in the adjusted R-squared from 2% to almost 13%, lagged capital controls are systematically associated with a subsequent fall in the likelihood of issuing bonds domestically. The coefficient is also very stable across the different models and, according to the most robust estimate in the last column, is close to -1.7 percentage points (p.p.). This effect is economically sizable, implying a cut by one third with respect to the unconditional average probability of issuing bonds (5.1 p.p.).

Having established that capital controls on bond inflows are associated with subsequent economically meaningful declines in domestic bond issuance, we next ask whether other types of controls are also systematically related to issuance by redirecting firms across markets. To that end, Table 3 reports the same regression estimates as the just commented Table 2 but zooming into the estimated coefficients for the other policy tools. Irrespectively of the model

[14] In such models, we will also augment the model with country*time fixed effects and with the interaction of firm level controls with capital controls, as explained in the previous subsection when discussing equation 2.

Table 2: Effect of Capital Controls on Bond Domestic Bond Issuance

bois: 1(Domestic Bond Iss)	(1)	(2)	(3)	(4)
L.Bonds (PLBN)	-0.0096**	-0.0160***	-0.0156***	-0.0169***
	(-2.01)	(-3.16)	(-2.99)	(-3.29)
Other Capital Controls, iMaPP	✓	✓	✓	✓
Economy Controls	✓	✓	✓	✓
Firm Controls	×	×	×	✓
Firm FE	×	✓	✓	✓
Time FE	×	✓	–	–
Sector*Time FE	×	×	✓	✓
Observations	72332	72332	72332	72332
Adj. R-sq	0.0209	0.115	0.125	0.127
Mean bois	0.0510	0.0510	0.0510	0.0510
Std. dev. bois	0.220	0.220	0.220	0.220
Obs. if L.Bonds (PLBN)=1	48113	48113	48113	48113
Number of countries	18	18	18	18

Notes: The dependent variable is a dummy variable equal to 1 if firm f issues a domestic bond in quarter t, and 0 otherwise. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). The symbol "-" denotes cases where a group of controls and/or fixed effects spanned out by the introduction of other controls and/or fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

we use, introducing capital controls on locally issued equity and money market debt flows raises the likelihood of issuing bonds domestically, as signaled by the positive and statistically significant coefficients on $L.Equity(PLBN)$ and $L.MoneyMarket(PLBN)$. These results point to a *substitution effects* between equity and short-term money market financing, on one hand, and (long-term) bond financing, on the other hand. Likewise, introducing capital controls on international bond issuance raises the likelihood to issue bonds locally, as signaled by the positive and statistically significant coefficients on $L.Bonds(SIAR)$. Interestingly, capital controls on financial credits (mostly bank loans) from abroad as well as domestic macroprudential measures reduces the likelihood of issuing domestic bonds, possibly due to the fact that such measures, by targeting domestic credit growth, also desincentivize bond issuance.[15]

4.2 Heterogeneous effects

We estimate model 2 and report the results in Table 4. In column 1, we test the hypothesis that capital controls reduce funding especially for highly leveraged firms. Consistently with this conjecture, the likelihood of issuing bonds falls relatively more for firms with above-median leverage, as opposed to firms with low (first-quartile) leverage. We call this a *prudential channel* of capital inflow controls on firms' bind issuance.

In column 2, we ask whether firms with different degrees of profitability are heterogeneously affected by capital controls. Indeed, very profitable firms, as identified by those in the upper quartile of ROA, suffer a relatively stronger cut in the probability to issue bonds (as opposed to firms in the lower quartile of ROA). This, in turn, we label a *profitability channel* of capital inflow controls.

One subtle aspect of this heterogeneity analysis is that ROA and leverage correlate substantially, in line with evidence that leverage varies substantially across firms of different size and profitability.[16] Hence, in order to test whether the two channels operate independently of each other, columns 3 directly carries out a horse-race between the two variables in a model excluding country*time fixed effects, but including economy controls. Lastly, column 4 is the richest specification by including country*time fixed effects.

The resulting estimates confirm both channels are active. This analysis points to significant trade-offs associated with the enforcement of capital controls. On one hand, capital controls reduce debt accumulation by risky firms, in line with a prudential function. On the

[15] They may operate also through a signaling channel, by which more government intervention may eventually enforce more controls on bond issuance. We do not report capital controls measures (e.g. on derivatives) displaying a statistically insignificant coefficient.

[16] See, e.g., Dinlersoz et al. (2019).

Table 3: The effects of capital controls on instruments other than bonds inflows on domestic bond issuance.

bois: 1(Domestic Bond Iss)	(1)	(2)	(3)	(4)
L.Bonds (PLBN)	-0.0096**	-0.0160***	-0.0156***	-0.0169***
	(-2.01)	(-3.16)	(-2.99)	(-3.29)
L. Equity (PLBN)	0.0188***	0.0218***	0.0208***	0.0185***
	(4.38)	(3.24)	(2.90)	(2.59)
L. Money Market (PLBN)	0.0087	0.0189***	0.0200***	0.0228***
	(1.44)	(2.71)	(2.80)	(3.21)
L.Bonds (SIAR)	0.0086*	0.0169*	0.0193**	0.0173*
	(1.89)	(1.96)	(2.10)	(1.88)
L.Financial credits	-0.033***	-0.0172***	-0.0197***	-0.0167***
	(-6.90)	(-3.28)	(-3.61)	(-3.16)
L.iMaPP Index	-0.0024***	-0.0018**	-0.0019**	-0.0015*
	(-3.97)	(-2.17)	(-2.30)	(-1.89)
Other Capital Controls	✓	✓	✓	✓
Economy Controls	✓	✓	✓	✓
Firm Controls	×	×	×	✓
Firm FE	×	✓	✓	✓
Time FE	×	✓	–	–
Sector*Time FE	×	×	✓	✓
Observations	72332	72332	72332	72332
Adj. R-sq	0.0209	0.115	0.125	0.127
Mean bois	0.0510	0.0510	0.0510	0.0510
Std. dev. bois	0.220	0.220	0.220	0.220

Notes: The dependent variable is a dummy variable equal to 1 if firm f issues a domestic bond in quarter t, and 0 otherwise. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. SIAR stands for sold or issued abroad by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). The symbol "-" denotes cases where a group of controls and/or fixed effects spanned out by the introduction of other controls and/or fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

other hand, capital controls also tend to reduce funding for highly profitable firms. Insofar as these relatively more profitable firms cannot substitute this issuance with alternative sources of finance, this could potentially contribute to a more inefficient allocation of capital across firms that is detrimental for growth. We turn to this next.

4.3 Real effects

We conclude our empirical analysis by examining whether capital controls are associated with real effects at the firm level and whether such effects vary systematically across firms. We begin by studying their relationship with firms' total liabilities, which captures the balance-sheet channel through which changes in external financing conditions may operate. We then assess how these balance-sheet responses translate into firms' investment decisions

So far, we have shown that capital controls on bond inflows are associated with a sizable reduction in the likelihood to issue bonds locally. However, firms may substitute the forgone bond funding (due to capital controls) with local bank credit or other forms of bank financing. Hence, in order to understand whether capital controls are binding for firms' overall funding capacity, we first check whether they have an ultimate bearing on firms' total liabilities.[17] To this end, Panel A of Table 5 shows the results from the estimation of model 3. Capital controls reduce total liabilities on impact by 1.2% and by 1.8% over the next quarter. Nonetheless, the effect is relatively short-lived and mean reverts to 0 already after 2 quarters. Panel B shows coefficients for an analogous regression model, though with investment (ratio between CAPEX and the lagged total assets ratio) growth as outcome variable. Consistent with a short-lived impact of the bond channel of capital controls on total firm liabilities, investment goes down on impact, although the effect is marginally statistically insignificant. The reduction in investment peaks 6 quarters when it reaches -0.21% (about

[17] Total liabilities, as reported in Worldscope, encompass all short term and long term obligations of the firm, including interest bearing debt and non debt liabilities such as trade credit, provisions, deferred taxes, and pension obligations. Equity instruments and minority interests are excluded. Consequently, our results on total liabilities allow firms to substitute away from bond issuance toward other non equity sources of financing, including bank loans or trade credit, but do not capture substitution toward equity issuance.

Table 4: Heterogeneous effects of capital controls on bond issuance: firm profitability *vs* leverage.

bois: 1(Domestic bond Iss)	(1)	(2)	(3)	(4)
L.Bonds (PLBN)*Lev Q2	-0.00241		-0.00496	-0.00368
	(-0.44)		(-0.91)	(-0.67)
L.Bonds (PLBN)*Lev Q3	-0.0111*		-0.0107*	-0.0122**
	(-1.86)		(-1.77)	(-2.05)
L.Bonds (PLBN)*Lev Q4	-0.0123*		-0.0116*	-0.0137**
	(-1.89)		(-1.80)	(-2.11)
L.Bonds (PLBN)*ROA Q2		0.00514	0.00378	0.00542
		(0.88)	(0.65)	(0.93)
L.Bonds (PLBN)*ROA Q3		0.00195	-0.00603	0.00221
		(0.32)	(-1.01)	(0.37)
L.Bonds (PLBN)*ROA Q4		-0.0110*	-0.0190***	-0.0107*
		(-1.75)	(-3.05)	(-1.71)
Other Capital Controls, iMaPP	–	–	✓	–
Economy Controls	–	–	✓	–
Firm Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓
Country*Time FE	✓	✓	×	✓
Observations	72233	72233	72332	72233
Adj. R-sq	0.136	0.137	0.127	0.137

Notes: The dependent variable is a dummy variable equal to 1 if firm f issues a domestic bond in quarter t, and 0 otherwise. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Lev Q and ROA Q are quartile indicators for leverage and return on assets, with Q1 the lowest and Q4 the highest. Reported rows are coefficients on L.Bonds (PLBN) interacted with each quartile indicator, the omitted group is Q1. We also interact L.Bonds (PLBN) with other firm controls, size and liquidity, but do not show them here for brevity. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). The symbol "-" denotes cases where a group of controls and/or fixed effects spanned out by the introduction of other controls and/or fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

13% of the unconditional average.[18])

[18] See Table A.5 for summary statistics on investment and total liabilities at all horizons.

Table 5: Real effects of capital controls

Δ_h log **Total Liabilities**	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)	-0.0119*	-0.0174*	-0.00710	-0.0188	0.00649	0.0138	0.0166	0.0245	0.0574**
	(-1.90)	(-1.89)	(-0.63)	(-1.35)	(0.43)	(0.77)	(0.84)	(1.16)	(2.51)
Observations	62834	60225	58195	57258	56879	55083	54046	52787	51910
Δ_h**Investment**	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)	-0.0010	-0.0007	-0.0016	-0.0018*	-0.0020*	-0.0015	-0.0021*	-0.0005	-0.0006
	(-1.51)	(-0.73)	(-1.54)	(-1.71)	(-1.79)	(-1.31)	(-1.68)	(-0.36)	(-0.46)
Observations	57593	54875	53232	52136	51775	50063	49237	48018	47149
Other Capital Controls, iMaPP	✓	✓	✓	✓	✓	✓	✓	✓	✓
Economy Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Each column reports horizon h regressions for $h = 1, 2, \cdots, 8$. As a dependent variable, Panel A uses Δ_h log Total Liabilities; Panel B uses Δ_h Investment, where Investment is CAPEX divided by lagged total assets and Δ_h is the change from quarter $t-1$ to $t+h$. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^*p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

In line with the the results for bond issuance described in the previous section, we conclude by asking whether real effects are heterogeneous across firms with different profitability and leverage. In Panel A of Table 6, firms with higher leverage undergo a relatively stronger and more persistent cut in total liabilities. For instance, firms in the top quartile of leverage suffer a relative cut in total liabilities (compared to firms in the first quartile) of about 7% one year after the enforcement of capital controls and of 10% after two years. Interestingly, in contrast, highly profitable firms manage to substitute the forgone bond funding and do not experience a significant reduction in total liabilities.

Turning now to the heterogeneous effects on investment, results show that, consistently, only relatively leveraged firms undergo a significant reduction in investment. At impact, top leverage-quartile firms reduce investment by -0.14%, as compared to firms in the first quartile. This is a sizable reduction in investment, corresponding to 8.14% of the unconditional mean. Moreover, the adjustment is quite persistent, and peaks at -0.23% after 5 quarters (about 14% of the unconditional mean). In sharp contrast, we do not observe any systematic negative

Table 6: Heterogeneous real effects across firms: profitability vs leverage

Δ_h log **Total Liabilities**	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)*Lev Q2	-0.00866	-0.0214**	-0.0253	-0.0319*	-0.0368*	-0.0285	-0.0401*	-0.0246	-0.0471**
	(-1.18)	(-2.05)	(-1.58)	(-1.70)	(-1.68)	(-1.23)	(-1.87)	(-1.14)	(-2.00)
L.Bonds (PLBN)*Lev Q3	-0.0205**	-0.0353***	-0.0443***	-0.0430**	-0.0469**	-0.0490**	-0.0490**	-0.0494**	-0.0607**
	(-2.33)	(-3.10)	(-2.68)	(-2.32)	(-2.19)	(-2.05)	(-2.15)	(-1.99)	(-2.17)
L.Bonds (PLBN)*Lev Q4	-0.0138	-0.0335***	-0.0549***	-0.0661***	-0.0680***	-0.0715***	-0.0768***	-0.0825***	-0.0984***
	(-1.56)	(-2.72)	(-3.37)	(-3.38)	(-2.87)	(-2.69)	(-2.99)	(-2.90)	(-3.12)
L.Bonds (PLBN)*ROA Q2	-0.0013	0.0016	-0.0058	-0.0001	-0.0030	-0.0043	-0.0108	-0.0114	-0.0017
	(-0.23)	(0.17)	(-0.50)	(-0.01)	(-0.20)	(-0.27)	(-0.60)	(-0.59)	(-0.08)
L.Bonds (PLBN)*ROA Q3	0.0031	-0.0034	-0.0015	0.0034	0.0031	-0.0058	-0.0181	-0.0179	-0.0090
	(0.45)	(-0.32)	(-0.11)	(0.20)	(0.19)	(-0.31)	(-0.84)	(-0.79)	(-0.35)
L.Bonds (PLBN)*ROA Q4	0.0181**	0.0092	0.0164	0.0228	0.0146	0.0001	-0.0212	-0.0205	-0.0061
	(2.23)	(0.70)	(0.99)	(1.08)	(0.69)	(0.00)	(-0.84)	(-0.80)	(-0.22)
Observations	62733	60125	58098	57170	56788	54995	53957	52696	51819
Δ_h**Investment**	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)*Lev Q2	-0.0001	0.0000	-0.0004	-0.0003	-0.0007	-0.0018*	-0.0019*	-0.0018*	-0.0008
	(-0.12)	(0.03)	(-0.46)	(-0.39)	(-0.71)	(-1.66)	(-1.87)	(-1.65)	(-0.76)
L.Bonds (PLBN)*Lev Q3	-0.0011*	-0.0013	-0.0012	-0.0007	-0.0013	-0.0037***	-0.0026**	-0.0024*	-0.0004
	(-1.90)	(-1.41)	(-1.21)	(-0.71)	(-1.24)	(-3.06)	(-2.23)	(-1.84)	(-0.32)
L.Bonds (PLBN)*Lev Q4	-0.0014**	-0.0020**	-0.0008	-0.0009	-0.0007	-0.0023*	-0.0001	0.0009	0.0011
	(-2.12)	(-2.02)	(-0.72)	(-0.78)	(-0.59)	(-1.67)	(-0.04)	(0.56)	(0.74)
L.Bonds (PLBN)*ROA Q2	0.0010**	0.0006	0.0020***	0.0003	0.0010	-0.0004	-0.0006	0.0004	0.0006
	(2.22)	(0.90)	(2.70)	(0.40)	(1.06)	(-0.39)	(-0.58)	(0.38)	(0.62)
L.Bonds (PLBN)*ROA Q3	0.0005	0.0003	0.0003	-0.0015*	-0.0002	-0.0007	-0.0010	-0.0007	-0.0008
	(0.87)	(0.33)	(0.39)	(-1.72)	(-0.25)	(-0.72)	(-0.93)	(-0.64)	(-0.70)
L.Bonds (PLBN)*ROA Q4	0.0007	0.0011	0.0004	-0.0009	0.0010	-0.0017	-0.0011	-0.0018	-0.0013
	(1.16)	(1.22)	(0.43)	(-0.94)	(0.91)	(-1.54)	(-0.96)	(-1.31)	(-0.96)
Observations	57488	54773	53130	52043	51678	49970	49143	47920	47059
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: Each column reports horizon h regressions for $h = 1, 2, \cdots, 8$. Panel A uses Δ_h log Total Liabilities; Panel B uses Δ_h Investment, where Investment is CAPEX divided by lagged total assets and Δ_h is the change from quarter $t-1$ to $t+h$. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Lev Q and ROA Q are quartile indicators for leverage and return on assets, with Q1 the lowest and Q4 the highest. Reported rows are coefficients on L.Bonds (PLBN) interacted with each quartile indicator, the omitted group is Q1. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

impact on investment by firms that are relatively more profitable.

Taken together, these results suggest that while the average real effects of capital controls are limited, they bind strongly for relatively more leveraged firms, which face persistent reductions in both total liabilities and investment. In contrast, more profitable firms manage to substitute the forgone bond financing and hence do not have to cut down on their investment plans. This pattern is consistent with a bond channel that transmits financial frictions into real activity primarily through leveraged firms. In the next section, we explore this substitution margin more closely by examining which additional sources of financing profitable firms rely on when bond markets are restricted, among other extensions.

5 Extensions

5.1 Substitution with Alternative Sources of Financing

Capital controls on bond inflows are associated with a contraction in bond issuance and, through this channel, with lower investment among firms with relatively higher leverage (see Table 6). By contrast, firms with relatively higher profitability experience a comparable decline in bond issuance but do not exhibit lower investment. This pattern suggests that more profitable firms are able to rely on alternative sources of financing to sustain investment. Consistent with earlier results, this appears to reflect, at least in part, a substitution from bond issuance toward other domestic financing sources, which explains why their total liabilities do not decline significantly. In this section, we explore whether such firms also draw on additional sources of funding beyond those previously documented.

We exploit the role of dividend payouts. Firms with high profitability generate relatively larger profits. Hence, one substitution channel they may exploit is reducing dividends payout, that can be especially attractive during periods characterized by high costs of external financing like those with capital controls in place. We test this conjecture in Table 7. We run annual regressions[19] with the dividend payout ratio—i.e., dividends over net income—as dependent variable. In column 1, the negative coefficient on $L.Bonds(PLBN)$ suggest that

[19]Data on dividends at the quarterly frequency display a notable extent of attrition. Therefore we exploit annual data.

under capital controls, firms generally reduce the payout ratio; the estimated coefficient is however statistically insignificant at conventional levels. In column 2, we condition the effects on firms' profitability. In line with our hypothesis, firms with relatively higher profitability undergo a significant cut in the payout ratio. Moreover, again in line with our conjecture, the fall in the payout ratio is increasing along firms' profitability, as indicated by the larger coefficient (in absolute terms) for firms in higher quartiles of the distribution of firm ROA.[20] Summing up, cutting dividend payouts is another buffer that more profitable firms in EMEs use in order not to cut down on investment when capital controls curtail their domestic bond issuance.

5.2 Alternative Definitions of Profitability & Efficiency

So far, we have explored ROA as a measure of firm profitability. We additionally consider two alternative metrics for robustness. In particular, we exploit returns on equity (ROE) and the average revenue product of capital (ARPK). ROE measures the return on shareholders' own funds, rather than on total assets, and is given by the ratio between net income and equity. ARPK is a measure of firm efficiency (Hsieh and Klenow, 2009; David and Venkateswaran, 2019), computed as total revenues over capital, where capital is given by the net book value of plant, property, and equipment. ARPK directly speaks to those models linking the enforcement of capital controls and other prudential policies to the (mis)allocation of capital across firms (Benigno and Fornaro, 2014; Bianchi and Mendoza, 2020; Andreasen, Bauducco, Dardati, and Mendoza, 2023).[21]

Table A.10 estimates the baseline regressions 1 and 2 for the average and heterogeneous effects of capital controls, though substituting ROA with ROE (columns 3 and 6) and ARPK (columns 2 and 5). Interestingly, the negative unconditional effect of capital controls on bond

[20] We also test two additional channels for substitution, namely trade credit by other non-financial firms (proxied using accounts payable) and usage of cash stocks (proxied by current accounts). The related results are shown in Tables A.6, A.7, A.8, and A.9 in the Appendix. In general, we do not find statistically significant results.

[21] Another direct measure would be firm's total factor productivity. Unfortunately, we cannot compute this measure as the Worldscope does not provide information on firm-level employment.

Table 7: Effect on Dividend payout ratio

Dividends/Net income	(1) Average effect	(2) Heterogeneity
L.Bonds (PLBN)	-0.000820	
	(-0.44)	
L.Bonds (PLBN)*ROA Q2		-0.00393**
		(-2.10)
L.Bonds (PLBN)*ROA Q3		-0.00658***
		(-3.23)
L.Bonds (PLBN)*ROA Q4		-0.00957***
		(-3.36)
Other Capital Controls, iMaPP	✓	–
Economy Controls	✓	–
Firm Controls	✓	✓
Firm FE	✓	✓
Sector*Year FE	✓	✓
Country*Year FE	×	✓
Observations	21712	21685
Adj. R-sq	0.711	0.721
Mean Div./Net Inc.	0.0515	0.0515
Std. dev. Div./Net Inc.	0.0709	0.0709

Notes: Regressions are estimated on the firm-year panel at the annual frequency. The dependent variable is the dividend payout ratio, defined as dividends over net income. L.Bonds (PLBN) equals 1 when, in the previous year, purchases by nonresidents of locally issued bonds are restricted, and 0 otherwise. Column 1 reports the average effect. Column 2 conditions on profitability using ROA quartile indicators, with Q1 omitted. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, return on assets (ROA), and previous year's dividend payout ratio. The symbol "-" denotes cases where a group of controls and/or fixed effects spanned out by the introduction of other controls and/or fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

issuance is robust to such modifications in columns 2 and 3. Next, in columns 6, firms with very high levels (fourth quartile) of ROE experience a relatively stronger cut in bond issuance. Results in columns 5 suggest that firms with relatively higher ARPK do not experience a statistically different ex-post reduction in bond issuance. Hence, while these findings are consistent with capital controls inhibiting profitable firms' bond issuance, they also display a certain degree of sensitivity to employing alternative (model-based) efficiency measures.

Overall, these findings corroborate the relative stronger effects of the prudential channel that operates through leverage.

5.3 Controlling for the Cumulative Stance of Macroprudential Policies

In this extension we assess robustness of our baseline results when we also control for the *stance* of macroprudential policy. We define it as the sum of the respective policy actions over time and formally quantify it as:

$$\text{Cumulative stance Var}_{t-2} = \sum_{q=0}^{t-2} \text{Var}_q$$

where Var could be any of the chosen 17 policy indices from the macroprudential policy variables taken from iMaPP dataset. $t = 0$ is taken to be the first quarter for which the information on particular macroprudential index is available. Notice that, as our baseline model includes the lagged (as of $t-1$) change in iMAPP, by further adding the cumulative stance up to $t-2$, we effectively control for both the stance and the latest innovation in macroprudential policy. Hence, our model accounts not only for the potential correlation between changes in capital controls and other macroprudential policies, but also for the possibility that capital controls are implemented heterogeneously across countries with differing macroprudential stances. For example, countries maintaining a tighter macroprudential framework may be less susceptible to capital inflow booms and busts, and therefore may have a reduced need to rely on capital controls.

We first consider an aggregate index, summing across all different policies. The results displayed in column 2 of Table 8 show that, if anything, the impact of capital controls on bond issuance becomes relatively stronger (i.e., more negative) after controlling for the cumulative macroprudential stance (as compared to the baseline results, reported in column 1 for easing the comparison).

Next, we consider indicators for different subsets of macroprudential policies. First, *Loan Targeted* tools encompass both demand-side and supply-side measures directly affecting loans.[22] Second, *Demand-side* tools specifically include limits on loan-to-value ratios (LTV) and debt-service-to-income ratios (DSTI). On the *supply side*, we consider loan-specific policies (*Supply Loan*) such as limits on credit growth (LCG), loan-loss provisions (LLP), loan restrictions (LoanR), loan-to-deposit ratios (LTD), and limits on foreign currency (LFC). Broader *Supply General* tools include reserve requirements (RR), liquidity requirements, and limits on foreign exchange positions (LFX). The *Supply Capital* category incorporates leverage limits (LVR), countercyclical capital buffers (CCB), capital conservation buffers (Conservation), and overall capital requirements (Capital). Finally, for an *Individual analysis*, we select the macroprudential tools exhibiting the highest variation within the sample: LTV, DSTI, LoanR, LCG, LLP, Capital, and Tax-related measures. In general, controlling for all such different subsets of indicators does not influence the statistical significance of the capital controls (see columns 3 to 8). Across nearly all the specifications, the impact of capital controls on bond issuance strengthens, if anything.

1(Domestic Bond Iss)	(1) Baseline	(2) Sum of all	(3) Loan Targeted	(4) Demand	(5) Supply Loan	(6) Supply general	(7) Supply Capital	(8) Individual
L.Bonds (PLBN)	-0.0169***	-0.0193***	-0.0226***	-0.0203***	-0.0180***	-0.0154***	-0.0191***	-0.0272***
	(-3.29)	(-3.61)	(-4.01)	(-3.65)	(-3.42)	(-2.94)	(-3.53)	(-4.64)
Other CC, iMaPP	✓	✓	✓	✓	✓	✓	✓	✓
Economy Controls	✓	✓	✓	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓
Observations	72332	72332	72332	72332	72332	72332	72332	72332
Adj. R-sq	0.127	0.127	0.128	0.127	0.128	0.127	0.128	0.128

t statistics in parentheses, Standard errors clustered at the firm level, * $p < .1$, ** $p < .05$, *** $p < .01$

Table 8: Regression results including macroprudential stance of an economy in addition to the baseline specification from before

[22] We distinguish demand-side and supply-side tools following the categorization in Alam et al. (2019).

5.4 The Effects of Capital Controls along the Financial Cycle

The effects of capital controls on capital allocation across firms may vary throughout the financial cycle. In this respect, the direction and composition of capital flows depend on both local and global financial conditions,[23] and the literature provides mixed evidence on whether looser financial conditions promote more or less capital inflows toward riskier and/or more efficient firms (Benigno, Converse, and Fornaro, 2015; Di Giovanni et al., 2022; Cingano and Hassan, 2022). Hence, whether the heterogeneous effects of capital controls—across firms with different profitability and leverage—-vary along the financial cycle is ultimately an empirical question, which we tackle in Table 9.

Column 1 employs an indicator of the local financial cycle, namely the (log) EMBI spread. We multiply such variable by minus one so that an increase denotes a looser local financial cycle.[24]. Interestingly, to start with, when the local cycle is looser, highly leveraged firms tend to disproportionately issue bonds—as indicated by the positive and statistically significant interaction on the coefficient $LEVQ4 * X$—whereas relatively more profitable firms do not (check the double interactions between ROA quartiles and X). Consistently, capital controls disproportionately cut bond issuance by highly leveraged firms, as visible from the negative and statistically significant triple interaction $LEVQ4 * L.Bonds(PLBN) * X$.

Next, in columns 2 and 3, we exploit two indicators of the global financial cycle. Column 2 exploits the broad US Dollar index, which correlates positively with the strength of the US Dollar and is a key driver of global credit conditions and asset prices (Avdjiev, Bruno, et al., 2019; Bruno, Shim, and Shin, 2022; Bruno and Shin, 2023). Column 3 exploits the US Dollar index against Advanced Economies currencies, a relatively more exogenous index with respect to the Emerging Markets local cycles (as compared to the broad Dollar index). In both cases, we express the variables in log and multiply by minus one. Note that from the Emerging Markets perspective, a weaker dollar (signaled by higher values of the rescaled

[23] See Miranda-Agrippino and Rey (2022) for a review of the literature on global financial cycles. For evidence on how local cycles interact with capital inflows, see e.g. Di Giovanni et al. (2022).

[24] We report summary statistics for the different index of financial cycle in the Appendix Table A.11

Table 9: Heterogeneous effects on bond issuance: firm profitability *vs* risk along local and global financial cycles.

Dep. Var. 1(Domestic Bond Iss.)	(1)	(2)	(3)
	Local Cycle	Global Cycle	
	X= (-1*)L.Log EMBI	X =(-1)*log BDI	X= (-1)*log UDI AE
Lev Q2 * L.Bonds (PLBN)	-0.0540	-0.793***	-0.399**
	(-1.22)	(-2.63)	(-2.00)
Lev Q3 * L.Bonds (PLBN)	-0.0306	-1.033***	-0.482**
	(-0.66)	(-3.23)	(-2.09)
Lev Q4 * L.Bonds (PLBN)	-0.111**	-0.849**	-0.509**
	(-2.36)	(-2.37)	(-2.27)
ROA Q2 * L.Bonds (PLBN)	-0.0468	-0.841***	-0.380*
	(-0.87)	(-2.83)	(-1.78)
ROA Q3 * L.Bonds (PLBN)	0.00152	-0.438	-0.0560
	(0.03)	(-1.36)	(-0.25)
ROA Q4 * L.Bonds (PLBN)	-0.0737	-1.096***	-0.469**
	(-1.43)	(-3.04)	(-2.12)
Lev Q2 * X	0.00631	0.0543	0.0306
	(0.82)	(1.11)	(0.82)
Lev Q3 * X	-0.00830	0.105**	0.0499
	(-1.03)	(2.13)	(1.16)
Lev Q4 * X	0.0152*	0.0335	0.0426
	(1.88)	(0.60)	(1.06)
ROA Q2 * X	-0.00450	0.0120	0.0176
	(-0.50)	(0.25)	(0.45)
ROA Q3 * X	-0.0182**	0.00764	-0.0250
	(-2.15)	(0.16)	(-0.62)
ROA Q4 * X	-0.000987	0.0953*	0.0534
	(-0.12)	(1.78)	(1.36)
Lev Q2 * L.Bonds (PLBN) * X	-0.00977	-0.173***	-0.0895**
	(-1.13)	(-2.63)	(-1.98)
Lev Q3 * L.Bonds (PLBN) * X	-0.00437	-0.223***	-0.106**
	(-0.49)	(-3.20)	(-2.03)
Lev Q4 * L.Bonds (PLBN) * X	-0.0185**	-0.183**	-0.112**
	(-2.06)	(-2.34)	(-2.21)
ROA Q2 * L.Bonds (PLBN) * X	-0.0110	-0.184***	-0.0873*
	(-1.05)	(-2.84)	(-1.80)
ROA Q3 * L.Bonds (PLBN) * X	-0.00142	-0.0963	-0.0131
	(-0.14)	(-1.37)	(-0.26)
ROA Q4 * L.Bonds (PLBN) * X	-0.0128	-0.237***	-0.104**
	(-1.31)	(-3.01)	(-2.06)
Firm Controls	✓	✓	✓
Firm FE	✓	✓	✓
Sector*Time FE	✓	✓	✓
Country*Time FE	✓	✓	✓
Observations	72233	60761	72233
Adj. R-sq	0.137	0.142	0.137

Notes: The dependent variable is a dummy variable equal to 1 if firm f issues a domestic bond in quarter t, and 0 otherwise. X is the financial cycle index named at the top of each column: in column 1 X is the negative of log EMBI, in column 2 the negative of log Broad Dollar Index, in column 3 the negative of log Dollar Index against advanced economies. Larger values of X indicate looser financial conditions. Lev Q and ROA Q are quartile indicators for leverage and return on assets, with Q1 the lowest and Q4 the highest; the omitted group is Q1. L.Bonds (PLBN) equals 1 when purchases by nonresidents of locally issued bonds are restricted in the previous quarter, 0 otherwise. Reported rows show coefficients on interactions of quartile indicators with L.Bonds (PLBN), X, and both. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

variables) denotes a looser global financial cycle.

Interestingly, results in column 2 using the broad Dollar index—similarly to those on local cycles in column 1—show that a looser global financial cycle implies higher bond issuance by highly leveraged firms. However, also highly profitable firms benefit more from a looser financial cycle in terms of higher frequency of bond issuance. Symmetrically, capital controls have a negative and stronger effect on bond issuance by both riskier and more profitable firms. Results are broadly similar in column 3 where we use the Dollar index vis-a-vis Advanced Economies currencies.

Overall, the results in this section confirm that capital controls raise a trade-off between capital allocation and financial stability. Such trade-off is not altered significantly by global financial cycles, whereas it tends to be less acute in periods of increased investors' appetite for local debt instruments (i.e., conditional on loosening the local financial cycle), when capital controls are especially effective on risky firms.

6 A Simple Model of Capital Controls and Firm Heterogeneity

This section develops a simple model of capital controls with firm heterogeneity. The model provides a parsimonious framework that rationalizes the two key channels identified in the empirical analysis. On the one hand, capital inflow controls serve a *prudential* role by curbing excessive external borrowing and reducing financial fragility. On the other hand, these policies may entail a *trade-off* with economic efficiency by distorting firms' scale and investment decisions.

The model relies on three key ingredients. First, firms are heterogeneous in their idiosyncratic productivity, which is imperfectly known at the time borrowing decisions are made. Second, optimistic beliefs held by firms and their foreign lenders lead to excessive external borrowing, increasing ex post financial fragility. Third, the government can impose a uniform capital control on external debt to curb excessive borrowing and improve financial stability. However, because it cannot distinguish high- from low-productivity firms, the policy prevents high-productivity firms from operating at their efficient scale, generating an efficiency cost. These ingredients are complementary to existing theoretical rationales for prudential capital controls, but focus on belief-driven overborrowing and firm-level heterogeneity, in the spirit of narratives emphasizing excessive optimism during capital inflow episodes Carmen M. Reinhart and K. S. Rogoff (2009) and recent formal models of sentiment-driven capital flows Benhima and L. Cordonier (2022).

6.1 Environment

Consider a two-period small open economy (SOE) model. Time is discrete, $t = 1, 2$. There is a unit mass of firms indexed by $i \in [0, 1]$. At $t = 1$ all firms are ex-ante identical. In period 2 each firm draws an idiosyncratic productivity type (θ) that can take on two values: high (H) or low (L). Formally:

$$\theta_i \in \{\theta_H, \theta_L\}, \qquad \theta_H > \theta_L > 0,$$

with probabilities

$$\Pr(\theta_i = \theta_H) = \lambda, \qquad \Pr(\theta_i = \theta_L) = 1 - \lambda, \quad \lambda \in (0, 1).$$

A key deviation from a traditional SOE model is that we assume firms and foreign lenders are over optimistic about the likelihood of ending up as high type. We formalize this by capturing beliefs as:

$$\Pr(\theta_i = \theta_H) = \tilde{\lambda}, \qquad \Pr(\theta_i = \theta_L) = 1 - \tilde{\lambda}, \quad \tilde{\lambda} \in (0, 1).$$

with $\tilde{\lambda} > \lambda$.

Aggregate productivity is realized in period 2 and takes two values: a good state ($\bar{A}$) and a bad state ($\underline{A}$). Formally:

$$A \in \{\bar{A}, \underline{A}\}, \qquad \bar{A} > \underline{A} > 0.$$

The probability of the each state is

$$\Pr\big(A = \bar{A}\big) = p, \qquad \Pr(A = \underline{A}) = 1 - p.$$

Agents, however, are also optimistic about how severe the bad state is. Formally, lenders and borrowers believe that in the bad state productivity is $\tilde{\underline{A}}$ with $\tilde{\underline{A}} > \underline{A}$, so the bad state is perceived to be milder than it truly is.

Firms borrow from risk neutral foreign lenders at an exogenous gross world rate, $R > 1$. Because of the small open economy assumption, borrowers take this rate as given. Furthermore, because the model will be calibrated in a way that, *ex-ante*, lenders assign a null probability of firms defaulting, there is no risk premium over R and all firms face the same constant rate. To further simplify the set up, there is no production in period 1. All borrowing finances capital for period 2 to be used in production. We turn next to firms' technology and financing restrictions.

6.2 Technology and Financing

At $t = 1$, before knowing its type, a firm chooses how much to borrow from foreign lenders, $d \geq 0$. Borrowing is done in order to accumulate capital that is also acquired from abroad at a unitary price: $k = d$. At $t = 2$, for a given aggregate productivity A and realized type θ_i, firm i produces

$$y_i(A, \theta_i) = A\theta_i d^{\alpha}, \qquad 0 < \alpha < 1.$$

The firm must repay its debt at the gross rate R. If revenues are insufficient, the firm defaults and produces zero. As mentioned, because lenders share the same optimistic beliefs as firms, the interest rate does not include a default premium.

Period 2 profit is

$$\pi_i(A, \theta_i; d) = \max\{A\theta_i d^\alpha - Rd,\, 0\}.$$

Default occurs whenever

$$A\theta_i d^\alpha < Rd. \tag{4}$$

6.3 Capital Inflow Control

The government can impose capital controls on inflows in the form of a tax $\tau \geq 0$ on foreign borrowing in period 1. The tax increases the effective cost of borrowing but does not affect the repayment obligation. Firms pay τd to the government when borrowing at $t = 1$.

6.4 Firm's Problem and Overborrowing Decisions

Given beliefs $(\tilde{\lambda}, \tilde{\underline{A}})$ and the capital control tax τ, all firms are ex ante identical and choose the same borrowing level $d \geq 0$ at $t = 1$.

Under these beliefs, expected profit from choosing d is

$$\begin{aligned}\tilde{\Pi}(d;\tau) = p\Big[\tilde{\lambda}\,\bar{A}\theta_H d^\alpha + (1-\tilde{\lambda})\,\bar{A}\theta_L d^\alpha\Big] \\ + (1-p)\Big[\tilde{\lambda}\,\tilde{\underline{A}}\theta_H d^\alpha + (1-\tilde{\lambda})\,\tilde{\underline{A}}\theta_L d^\alpha\Big] - (R+\tau)\,d.\end{aligned}$$

It is convenient to define the perceived productivity term as

$$\Phi(\tilde{\lambda}, \tilde{\underline{A}}) \equiv p\big[\tilde{\lambda}\,\bar{A}\theta_H + (1-\tilde{\lambda})\,\bar{A}\theta_L\big] + (1-p)\big[\tilde{\lambda}\,\tilde{\underline{A}}\theta_H + (1-\tilde{\lambda})\,\tilde{\underline{A}}\theta_L\big],$$

$$\Longrightarrow\ \tilde{\Pi}(d;\tau) = \Phi(\tilde{\lambda}, \tilde{\underline{A}})\,d^\alpha - (R+\tau)\,d.$$

The firm chooses d to maximize $\tilde{\Pi}(d;\tau)$, which yields the first order condition

$$\alpha\,\Phi(\tilde{\lambda},\underline{\tilde{A}})\,d^{\alpha-1}=R+\tau.$$

The optimal borrowing level as a function of the inflow tax is therefore

$$d(\tau)=\left[\frac{\alpha\,\Phi(\tilde{\lambda},\underline{\tilde{A}})}{R+\tau}\right]^{\frac{1}{1-\alpha}}. \tag{5}$$

This optimality condition implies some intuitive behaviors by firms. On one hand, $d(\tau)$ will be strictly decreasing in the strength of capital controls τ, and strictly increasing in the amount of optimism captured by the perceived productivity term $\Phi(\tilde{\lambda},\underline{\tilde{A}})$. The latter object, in turn, rises with optimism about the odds of being the high productivity type ($\tilde{\lambda}$) and how less severe the bad state is ($\underline{\tilde{A}}$).

It follows from the borrowing decision in (5) that low-productivity firms will *overborrow*, which can be quantified as the difference between the equilibrium level of debt chosen under uncertainty of their type and the debt level a low-productivity firm would choose under full information of its type.[25]

By contrast, high-productivity firms underborrow relative to the full-information benchmark, as they do not internalize their higher productivity when making borrowing decisions under uncertainty. Crucially, however, these two distortions are not symmetric when it comes to their implications on the macroeconomy. For overborrowing by low-productivity firms gives rise to default in equilibrium, generating disproportionately large economic costs. We turn to these costs next.

[25] From (5), a low-productivity firm that is only uncertain about aggregate TFP would choose debt level $d^L(\tau)=\left[\frac{\alpha\Gamma}{R+\tau}\right]^{\frac{1}{1-\alpha}}$, where $\Gamma=[\rho\bar{A}+(1-\rho)\underline{A}]\theta_L$. The level of overborrowing $(d(\tau)-d^L(\tau))$ can be shown to be proportional to $\Phi(\tilde{\lambda},\underline{\tilde{A}})-\Gamma$ which, assuming for simplicity that $\underline{\tilde{A}}=\underline{A}$, is $p\tilde{\lambda}\bar{A}(\theta_H-\theta_L)+(1-p)\tilde{\lambda}\bar{A}(\theta_H-\theta_L)>0$.

6.5 Default Region

Ex-post, profits for type $j \in \{H, L\}$ in state A are

$$\pi_j(A; d) = \max\{A\theta_j d^\alpha - Rd,\ 0\}.$$

Low type firms default in the bad state when

$$\underline{A}\theta_L d^\alpha < Rd.$$

The maximum borrowing level that a low type can repay in the bad state is

$$d^{ND} = \left[\frac{\underline{A}\theta_L}{R}\right]^{\frac{1}{1-\alpha}}. \tag{6}$$

If $d(\tau) > d^{ND}$, firms that realize as low type default when $A = \underline{A}$. High type firms do not default under the same borrowing level.

Optimism $(\tilde{\lambda}, \tilde{\underline{A}})$ raises the perceived productivity term $\Phi(\tilde{\lambda}, \tilde{\underline{A}})$, and therefore raises $d(0)$. If $d(0) > d^{ND}$, ex ante optimism leads to a default region among low type firms in the bad state.[26]

6.6 Government

The government's role is to set the capital control tax. The model is characterized by structural parameters $(\lambda, p, \bar{A}, \underline{A})$ that determine the distribution of firm types and aggregate states. For any choice of the inflow tax τ, the associated borrowing level $d(\tau)$ is the equilibrium outcome of firm and investor decisions. Policy affects resource allocation only through its effect on this borrowing choice.

A central issue in formulating the government's problem is, however, the information it

[26] For default to materialize only in low-productivity firms and not among high-productivity firms it further needs to be the case that parameters θ_L and θ_H are calibrated in a manner that guarantees that $\underline{A}\theta_L d^\alpha < Rd < \underline{A}\theta_H d^\alpha$. We work under such assumption.

possesses about the underlying economic environment. In particular, one may ask whether the government knows the true values of such structural parameters, or whether it shares the same optimistic beliefs as firms and their lenders (or different ones). While the degree of government information will matter for the precise formulation of the policy problem, the key economic forces shaping the optimal use of capital controls are present regardless of the government's informational advantage.

Two considerations are central. First, capital controls play a *prudential role*. By raising the cost of external borrowing, a sufficiently tight control can curb excessive debt accumulation by low-productivity firms and eliminate default in equilibrium. In doing so, capital controls reduce financial fragility and the associated deadweight costs of default. This prudential motive implies that, absent other considerations, there exists a strictly positive level of capital controls that improves welfare relative to laissez-faire.

Second, capital controls entail an *efficiency cost*. Because the government cannot condition policy on firm-level productivity, capital controls apply uniformly across firms. As a result, while they restrict excessive borrowing by low-productivity firms, they also further limit the ability of high-productivity firms to borrow and operate at their efficient scale. Tighter controls therefore distort investment and production decisions for the most productive firms, generating an efficiency loss.

The interaction of these two forces—prudential benefits and efficiency costs—implies a fundamental trade-off in the use of capital controls that arises independently of whether the government holds correct or biased beliefs about the underlying parameters. Such trade-off is formally stated in the following two Propositions.

Proposition 1. ***Prudential Role of Inflow Control***. *If optimism is strong enough that* $d(0) > d^{ND}$*, then there exists a unique* $\tau^{ND} > 0$ *such that*

$$d(\tau^{ND}) = d^{ND}.$$

At τ^{ND}, firms that realize as low type no longer default in the bad aggregate state.

Proof. From (5), $d(\tau)$ is continuous and strictly decreasing in τ. As $\tau \to \infty$, $d(\tau) \to 0$. If $d(0) > d^{ND}$ and $d(\infty) < d^{ND}$, the intermediate value theorem implies a unique τ^{ND} such that $d(\tau^{ND}) = d^{ND}$. At this tax, low types are just able to repay in the bad state and no longer default. □

Proposition 2. ***Efficiency Cost of a Uniform Control.*** *At τ^{ND}, borrowing $d(\tau^{ND})$ is strictly lower than under laissez faire:*

$$d(\tau^{ND}) < d(0).$$

Firms that realize as high type therefore operate below the borrowing level they would choose absent the inflow tax and without default, which generates an efficiency loss.

Proof. From (5), $d(\tau)$ is strictly decreasing in τ for all $\tau \geq 0$, so $d(\tau) < d(0)$. High type firms do not default in the bad state even at $d(0)$ when parameters are chosen so that $\underline{A}\theta_H d(0)^\alpha \geq Rd(0)$. Reducing d from $d(0)$ to $d(\tau^{ND})$ lowers their expected output and profits without providing any prudential benefit for them, so aggregate output is lower relative to the laissez faire benchmark. □

To make the policy trade-off explicit, we now consider a benchmark case in which the government is fully informed about the underlying economic environment, including the true productivity distribution and the probability of default-relevant states. Under this assumption, the government chooses the level of capital controls to maximize aggregate welfare, taking into account both the reduction in default costs and the distortionary effects on firm scale.

Aggregate welfare is defined as expected output net of debt repayments. For a given τ, this object is

$$\begin{aligned} \mathrm{W}(\tau) = p\Big[\lambda\big(\bar{A}\theta_H d(\tau)^\alpha - Rd(\tau)\big) + (1-\lambda)\big(\bar{A}\theta_L d(\tau)^\alpha - Rd(\tau)\big)\Big] \\ + (1-p)\Big[\lambda\big(\underline{A}\theta_H d(\tau)^\alpha - Rd(\tau)\big) + (1-\lambda)\,\pi_L(\underline{A}; d(\tau))\Big], \end{aligned}$$

where low type firms may default in the bad state and therefore generate

$$\pi_L(\underline{A}; d) = \max\{\underline{A}\theta_L d^\alpha - Rd,\ 0\}.$$

Tax revenue equals $\tau d(\tau)$. In this static setting it is a transfer within the domestic economy and does not enter the welfare measure. Including it directly would create a mechanical motive for high taxes that is unrelated to default or production.

The policy problem is

$$\arg\max_{\tau\in[0,1]} W(\tau) = \text{Payoff}(\tau) \tag{7}$$

This formulation allows us to characterize the welfare-maximizing level of capital controls formally, as stated in the following Proposition 3.

Proposition 3. ***Welfare-Maximizing Tax***. *Let $W(\tau)$ denote the government's welfare objective in (7). Under standard parameter restrictions ensuring that $\lim_{\tau\to\infty} W(\tau) < W(0)$, the function $W(\tau)$ is single-peaked. Therefore, there exists a unique welfare-maximizing inflow tax*

$$\tau^\star = \arg\max_{\tau\geq 0} W(\tau).$$

In general,

$$\tau^\star \neq \tau^{ND}.$$

The optimal policy balances the marginal reduction in financial fragility against the marginal increase in misallocation of high-type firms.

Proof. Since $d(\tau)$ is strictly decreasing and smooth in τ, and $W(\tau)$ is continuous, $W(\tau)$

achieves its maximum on any compact interval. For sufficiently large τ, both output and tax revenue fall, implying $W(\tau)$ eventually lies below $W(0)$. This, together with the monotonicity and single-crossing structure induced by $d(\tau)$, delivers a unique maximizer $\tau^\star$. Since eliminating default entirely may require raising τ beyond the point where marginal misallocation costs exceed the marginal reduction in fragility, $\tau^\star$ does not generally coincide with τ^{ND}. □

6.7 Numerical illustration and key metrics

This subsection illustrates the mechanisms of the model using a simple numerical example. The goal is not to quantitatively match the data, but illustrate how the model can qualitatively account for some of the main empirical findings in terms of the relationship between inflow controls and borrowing, as well as the main two channels pinned down empirically.

Borrowing and default. With ex ante identical firms, all firms choose the same borrowing level $d(\tau)$ at $t = 1$, given beliefs $(\tilde{\lambda}, \tilde{\underline{A}})$ and the inflow tax τ, according to (5).

For firms that realize as low type, the maximum level of debt that can be repaid in the bad aggregate state (d^{ND}) is determined by (6). If $d(\tau) > d^{ND}$, low type firms default when $A = \underline{A}$ and produce zero in that state.

Aggregate output. Expected output under the true probabilities (λ, p) is

$$\begin{aligned} Y(\tau) = p\Big[\lambda\, \bar{A}\theta_H d(\tau)^\alpha + (1-\lambda)\, \bar{A}\theta_L d(\tau)^\alpha\Big] \\ + (1-p)\Big[\lambda\, \underline{A}\theta_H d(\tau)^\alpha + (1-\lambda)\, \underline{A}\theta_L d(\tau)^\alpha\, \mathbf{1}\{d(\tau) \le d^{ND}\}\Big]. \end{aligned} \tag{8}$$

When $d(\tau) > d^{ND}$, low type firms default in the bad state and output in that state is produced only by high type firms.

Financial fragility. Financial fragility is defined as the expected loss of output in the bad aggregate state due to defaults by low type firms. This object is

$$\mathcal{F}(\tau) = (1-p)(1-\lambda)\,\underline{A}\theta_L d(\tau)^\alpha \cdot \mathbf{1}\{d(\tau) > d^{ND}\}. \tag{9}$$

For low values of τ, optimism pushes borrowing above the safe threshold, so fragility is positive. As τ increases and $d(\tau)$ falls below d^{ND}, fragility disappears.

Profits by firm type. For a given inflow tax τ, let $d(\tau)$ denote the common borrowing choice implied by (5). Under the true probabilities (λ, p), expected profits of a firm that realizes as high type are

$$\Pi_H(\tau) = p\big[\bar{A}\theta_H d(\tau)^\alpha - Rd(\tau)\big] + (1-p)\big[\underline{A}\theta_H d(\tau)^\alpha - Rd(\tau)\big], \tag{10}$$

while expected profits of a firm that realizes as low type are

$$\Pi_L(\tau) = p\big[\bar{A}\theta_L d(\tau)^\alpha - Rd(\tau)\big] + (1-p)\,\pi_L\big(\underline{A}; d(\tau)\big), \tag{11}$$

where

$$\pi_L(\underline{A}; d) = \max\{\underline{A}\theta_L d^\alpha - Rd,\ 0\}$$

captures default in the bad state whenever $d(\tau) > d^{ND}$. Aggregate expected profitability is

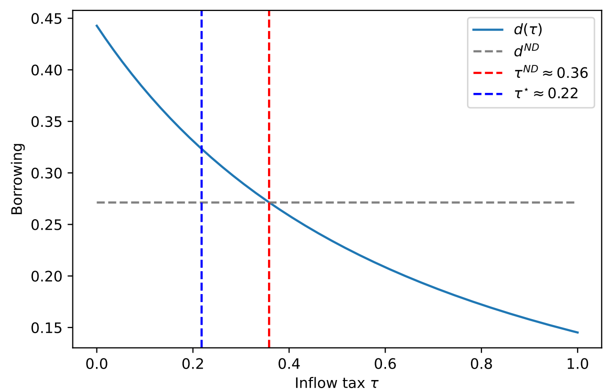
$$\Pi(\tau) = \lambda\,\Pi_H(\tau) + (1-\lambda)\,\Pi_L(\tau). \tag{12}$$

As τ increases from zero, borrowing falls. This raises $\Pi_L(\tau)$ by reducing default risk but lowers $\Pi_H(\tau)$ by forcing high type firms to operate at a smaller scale. The welfare maximizing inflow tax therefore balances these opposing forces.

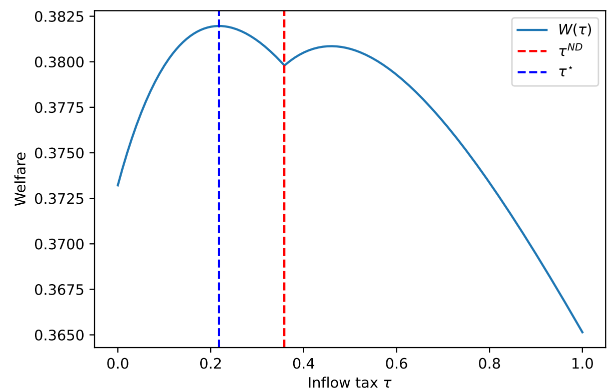
Illustration. To illustrate these mechanisms, we simulate the model under the following parameter values:

$$\alpha = 0.4, \quad R = 1.05, \quad \lambda = 0.5, \quad \theta_H = 1, \quad \theta_L = 0.6, \quad \bar{A} = 2.0, \quad \underline{A} = 0.8, \quad p = 0.5,$$
$$\tilde{\lambda} = 0.8, \quad \underline{\tilde{A}} = 1.5.$$

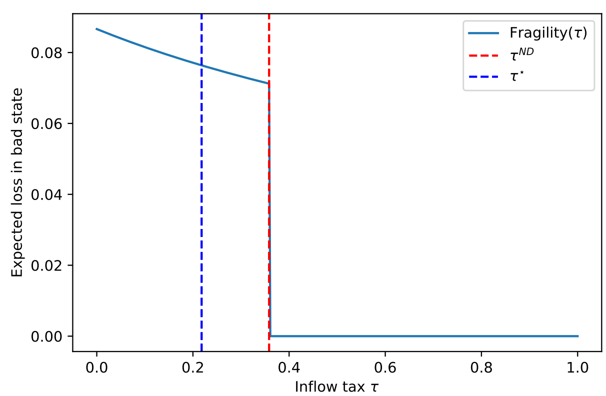
Figure 2 shows the variation in borrowing by each firm-type, welfare, financial fragility and profitability against the capital inflow tax τ, which is allowed to vary over the interval $[0, 1]$.



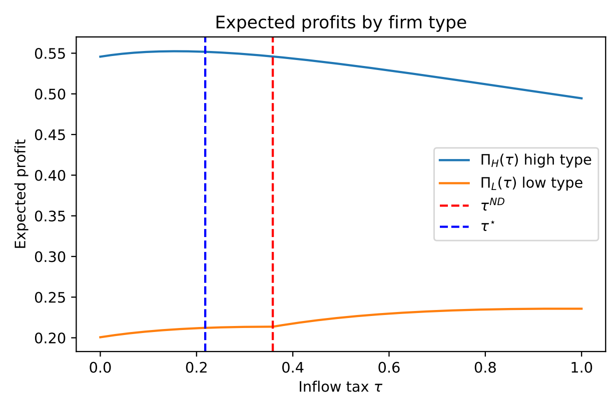
(a) Borrowing & Capital Controls



(b) Welfare



(c) Financial fragility



(d) Profitability by firm type

Figure 2: Numerical illustration of the model. The figure shows how the inflow tax affects borrowing, welfare, financial fragility, and profitability. Vertical dashed lines denote the no-default threshold τ^{ND} (red) and the welfare-maximizing inflow tax $\tau^{\star}$ (blue).

For a given degree of optimism, borrowing $d(\tau)$ is decreasing in the inflow tax, as shown in panel (a). As τ increases, borrowing falls below the safe threshold d^{ND}, eliminating default by low-productivity firms and driving financial fragility to zero (panel (c)). At the same time, tighter controls compress the scale of high-productivity firms, lowering their expected profits (panel (d)). These opposing forces generate a non-monotonic welfare profile (panel (b)): welfare initially rises as fragility is reduced, but eventually declines as efficiency losses dominate. The welfare-maximizing inflow tax $\tau^{\star}$ therefore lies below the level that fully eliminates default, balancing prudential gains against efficiency costs.

6.8 Mapping from Model to Empirical Results: Discussion

The model is intentionally stylized but designed to isolate the key mechanisms needed to interpret the empirical findings. It provides a unified framework linking capital inflow controls, firm-level borrowing decisions, financial fragility, and real outcomes under firm heterogeneity.

The model delivers three implications that map directly to the evidence. First, ex ante identical firms choose a common level of external borrowing, and under optimistic beliefs higher borrowing is privately attractive because it allows firms to scale up investment and production. This feature mirrors the empirical finding that capital inflows are associated with increased corporate borrowing, particularly through bond markets.

Second, optimism combined with imperfect information leads to excessive borrowing relative to true risks. When adverse aggregate conditions materialize, firms that realize as low productivity default, generating financial fragility and output losses. This mechanism is consistent with the empirical evidence that capital inflows disproportionately raise leverage and fragility among weaker firms.

Third, a uniform capital inflow control reduces financial fragility by lowering equilibrium borrowing and eliminating default among low-productivity firms. Because these firms are the ones for which excessive borrowing leads to default in adverse states, the prudential gains of the policy are concentrated precisely where financial vulnerabilities are most severe. At the same time, because policy cannot be targeted at the firm level, the same control also restricts borrowing by high-productivity firms that would not default even in the absence of regulation. These firms are therefore forced to operate below their efficient scale, leading to lower investment and profitability. As a result, the use of capital inflow controls generates a trade-off between reducing fragility among weaker firms and distorting real outcomes for stronger firms—a trade-off that closely mirrors the heterogeneous firm-level responses documented in the data.

Overall, the model clarifies why capital inflow controls can simultaneously reduce financial fragility and generate real effects, and why these effects are heterogeneous across firms. By linking optimism-driven borrowing, default risk, and uniform policy intervention, the model provides a disciplined interpretation of the empirical patterns and the central policy trade-off faced by regulators when managing capital inflows.

7 Conclusion

This paper examines the impact of capital controls on firms' domestic bond issuance in emerging markets. In doing so, it addresses critical questions about the trade-off between financial stability and efficiency that the use of these policy tools entails. Specifically, we explore whether capital controls reduce bond issuance, how their effects vary across firms with different risk profiles, and whether they ultimately constrain overall financing and investment. Our results reveal that capital controls significantly decrease the probability of domestic bond issuance, with effects concentrated among more leveraged firms, who face persistent reductions in liabilities and investment. By contrast, more profitable firms manage to substitute away from bond financing, cushioning the real effects.

To interpret these empirical patterns, we develop a simple model of capital inflow controls under firm heterogeneity. In the model, firms borrow externally under optimistic beliefs before productivity is realized, leading to excessive leverage and default risk among weaker firms in adverse states. A uniform capital inflow control reduces this financial fragility by curbing borrowing, but at the cost of constraining the scale of more productive firms that would not default even in the absence of regulation. The model thus formalizes a trade-off between financial stability and productive efficiency and provides a unified framework that rationalizes the heterogeneous firm-level responses documented in the data.

These findings underscore the heterogeneous firm-level impacts of capital controls and highlight the importance of considering both their prudential benefits and their potential costs when evaluating capital flow management policies. This trade-off, which emerges naturally in the model, emphasizes that the effectiveness of capital controls depends critically on firms' ability to substitute toward alternative financing channels. From a policy perspective, it is crucial that productive firms retain access to alternative sources of funding when bond markets are restricted. Ensuring that such firms can substitute into other financing channels is key to mitigating the growth costs of capital controls and preserving their effectiveness as prudential tools.

Our study opens up several avenues for future research. One potential direction is to empirically explore the interaction between the types of capital controls we analyze and other policy tools, such as macroprudential instruments and foreign exchange interventions. While theoretical discussions of these interactions have been developed in the literature (see, e.g., Basu et al., 2020, Adrian et al., 2021), there is still limited empirical evidence on their combined effects, making this a fruitful area for further investigation. A second direction is to extend the theoretical framework developed in this paper into a fully stochastic and quantitative setting, allowing the model to more closely match observed firm-level dynamics and policy variation over the financial cycle. Such extensions would help sharpen normative guidance on the optimal design and timing of capital inflow controls, further informing policymakers' efforts to balance financial stability and growth in emerging markets.

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Appendix – For Online Publication

Table A.1: List of countries along with timeline in our final sample

Country	Timeline
Argentina	2000Q2 - 2019Q4
Brazil	2000Q2 - 2019Q4
Chile	2001Q2 - 2019Q4
China	2001Q3 - 2019Q4
Colombia	2003Q2 - 2019Q4
Hungary	2001Q3 - 2019Q4
India	2013Q2 - 2019Q4
Indonesia	2007Q1 - 2019Q4
Kazakhstan	2015Q3 - 2018Q4
Malaysia	2000Q2 - 2019Q4
Mexico	1998Q2 - 2019Q4
Peru	2002Q1 - 2019Q4
Philippines	2001Q2 - 2019Q4
Poland	2005Q1 - 2019Q4
Russian Fed	2002Q1 - 2019Q4
Thailand	1999Q3 - 2019Q1
Turkey	2004Q4 - 2019Q4
Vietnam	2006Q2 - 2019Q4

Table A.2: Variable Definitions

Variable	**Definition**	**Source**
1(Domestic bond issuance)	Dummy equal to 1 if the firm issues a domestic bond in a given quarter.	SDC Platinum New Issues
Leverage (%)	Total debt as a percentage of total assets defined as: (Short-Term Debt + Long-Term Debt) / Total Assets × 100.	Worldscope Fundamentals Quarterly (FQ)
ROA	Return on assets: ((Net Income + Interest Expense × (1 - Tax Rate)) / Average Total Assets) × 100.	Worldscope Fundamentals Annual
Size	Log of total assets measured in USD.	Worldscope FQ
Liquidity	Log of the ratio of cash and equivalents to current assets.	Worldscope FQ
Bonds (PLBN)	Controls on nonresident bond purchases. =1 if control is imposed; 0 otherwise.	Fernández, Klein, et al. (2016)
Equity (PLBN)	Controls on nonresident equity purchases. =1 if control is imposed.	Fernández, Klein, et al. (2016)
Money Market (PLBN)	Controls on nonresident purchases of money market instruments.	Fernández, Klein, et al. (2016)
Bonds (SIAR)	Controls on residents issuing bonds abroad.	Fernández, Klein, et al. (2016)
Collective Inv. (PLBN)	Controls on nonresident collective investment purchases.	Fernández, Klein, et al. (2016)
Derivatives (PLBN)	Controls on nonresident derivatives purchases.	Fernández, Klein, et al. (2016)
Real Estate (PLBN)	Controls on nonresident real estate purchases.	Fernández, Klein, et al. (2016)
Financial Credits (Inflows)	Inflow restrictions on financial credit.	Fernández, Klein, et al. (2016)
Direct Investment (Inflows)	Inflow restrictions on FDI.	Fernández, Klein, et al. (2016)
iMaPP Index	Composite index of 17 macro-prudential policy indices by a country. Higher values = more restrictions.	Alam et al. (2019)
Real GDP growth	Quarterly real GDP growth rate.	IMF WEO
Inflation (CPI)	Year-over-year change in consumer prices.	IMF WEO
Exchange Rate	Log of nominal USD exchange rate.	IMF IFS
Overall Financial Development	Composite index of financial institutions and markets.	IMF Financial Development Index database
EMBI spread	Quarterly Emerging Markets Bond Index (EMBI) spread. Regressions use change in this spread as a control.	J.P. Morgan

[27] We define a capital control switch as a year-over-year change in the binary indicator capturing the

Table A.3: Descriptive statistics of new bond issues in our final sample

Observations: 72,332	Mean	Median	Std. Dev.	p25	p75
Issues					
# bonds per firm	6.21	5.00	5.20	2.00	9.00
# bonds per country	205	59	448.87	4.75	107
Principal amount (Millions USD)	227.74	114.77	485.36	58.19	235.12
Maturity (years)	3.60	3.00	3.29	1.00	5.00
Bonds (PLBN)					
Total switches[27](from 0 to 1 or 1 to 0)					19
Countries that switch					11
Average switches per country (excluding zero switches)					1.73
Average switches per country (including zero switches)					1.06
# of switches from 0 to 1 (tightening)					10
# of switches from 1 to 0 (loosening)					9

Table A.4: Correlations between capital controls measures

	Bonds	Bonds (SIAR)	Collective Inv.	Derivatives	Equity	Money Market	Real Estate	FCI	DII
Bonds (PLBN)	1.00								
Bonds (SIAR)	0.52	1.00							
Collective Inv. (PLBN)	0.70	0.38	1.00						
Derivatives (PLBN)	0.48	0.34	0.43	1.00					
Equity (PLBN)	0.52	0.07	0.46	0.59	1.00				
Money Market (PLBN)	0.89	0.51	0.74	0.50	0.59	1.00			
Real Estate (PLBN)	0.33	0.40	0.27	0.37	0.24	0.31	1.00		
Financial credits (Inflows)	0.36	0.33	0.31	0.44	0.18	0.25	0.45	1.00	0.09
Direct investment (Inflows)	0.23	0.22	0.32	0.18	0.20	0.22	0.44	0.09	1.00

Notes: Pairwise Pearson correlations among binary capital control indicators, computed at the country quarter level on the sample used in the regressions. PLBN indicates restrictions on purchases by nonresidents of locally issued instruments. SIAR indicates restrictions on foreign issues of bonds by residents. FCI is financial credit inflows. DII is direct investment inflows. Other labels refer to the corresponding inflow categories. Only the lower triangle and the diagonal are shown.

presence of a specific capital flow restriction. Given the dummy nature of these variables, a switch reflects either a tightening of capital controls (a transition from 0 to 1) or a loosening (a transition from 1 to 0) relative to the previous year.

Table A.5: Summary statistics of real variables at all horizons.

	Mean	Median	Std. Dev.	p25	p75	N
(log) Total Liabilities (h=0)	22.809	22.344	2.586	21.131	23.856	62834
(log) Total Liabilities (h=1)	22.853	22.383	2.566	21.188	23.880	60267
(log) Total Liabilities (h=2)	22.898	22.436	2.546	21.254	23.918	58237
(log) Total Liabilities (h=3)	22.920	22.454	2.541	21.272	23.927	57303
(log) Total Liabilities (h=4)	22.939	22.489	2.527	21.315	23.953	56921
(log) Total Liabilities (h=5)	22.961	22.503	2.518	21.336	23.963	55134
(log) Total Liabilities (h=6)	22.972	22.533	2.503	21.361	23.959	54092
(log) Total Liabilities (h=7)	22.991	22.552	2.492	21.398	23.969	52850
(log) Total Liabilities (h=8)	23.006	22.579	2.476	21.423	23.981	51960
Investment (h=0)	0.018	0.011	0.023	0.003	0.025	59087
Investment (h=1)	0.019	0.012	0.022	0.004	0.025	56197
Investment (h=2)	0.018	0.012	0.021	0.004	0.025	54845
Investment (h=3)	0.018	0.011	0.021	0.004	0.024	54056
Investment (h=4)	0.017	0.011	0.020	0.004	0.023	53931
Investment (h=5)	0.017	0.011	0.020	0.004	0.023	52349
Investment (h=6)	0.016	0.011	0.020	0.003	0.022	51584
Investment (h=7)	0.016	0.010	0.019	0.003	0.022	50514
Investment (h=8)	0.016	0.010	0.019	0.003	0.022	49735

Notes: This table shows the summary statistics for the levels of real variables: (log) Total Liabilities and Investment ($\equiv$ CAPEX/(lagged) Total Assets) at horizons, $h = 0, 1 \cdots, 8$. Missing quarterly observations are filled by linear interpolation within firm to align variables across horizons. The interpolated series have distributions that are essentially the same as in the raw data.

A.1 Exploring substitution channels

Table A.6: Current Accounts and Capital Controls on Bond PLBN

Δ_h log(Current Accounts)	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)	-0.0132**	-0.00864	-0.00861	-0.0111	0.0141	0.00849	0.0331**	0.0421**	0.0686***
	(-2.34)	(-1.08)	(-0.80)	(-0.94)	(1.06)	(0.55)	(2.00)	(2.30)	(3.50)
Other Capital Controls, iMaPP	✓	✓	✓	✓	✓	✓	✓	✓	✓
Economy Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	62801	60192	58152	57224	56842	55048	53997	52748	51866

Notes: Each column reports horizon h regressions for $h = 1, 2, \cdots, 8$. Dependent variables are Δ_h (log) Current Accounts and Δ_h is the change from quarter $t-1$ to $t+h$. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.7: Heterogeneity with Current Accounts and Capital Controls on Bond PLBN

Δ_h(log) Current Assets	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)*Lev Q2	0.00153	-0.0147	-0.0290*	-0.0244	-0.0268	-0.00593	-0.0114	0.00522	-0.00948
	(0.21)	(-1.35)	(-1.76)	(-1.31)	(-1.18)	(-0.24)	(-0.50)	(0.23)	(-0.38)
L.Bonds (PLBN)*Lev Q3	-0.0225**	-0.0383***	-0.0582***	-0.0574***	-0.0666***	-0.0647***	-0.0698***	-0.0594**	-0.0717***
	(-2.58)	(-3.00)	(-3.28)	(-3.03)	(-3.04)	(-2.68)	(-2.96)	(-2.38)	(-2.65)
L.Bonds (PLBN)*Lev Q4	-0.0215**	-0.0383***	-0.0734***	-0.0856***	-0.0943***	-0.0882***	-0.104***	-0.0940***	-0.115***
	(-2.36)	(-2.74)	(-4.05)	(-4.34)	(-3.97)	(-3.27)	(-3.85)	(-3.20)	(-3.47)
L.Bonds (PLBN)*ROA Q2	-0.00315	-0.0106	-0.00109	-0.00423	-0.0129	-0.00911	-0.0125	0.000635	0.00487
	(-0.49)	(-1.12)	(-0.09)	(-0.29)	(-0.83)	(-0.54)	(-0.69)	(0.03)	(0.22)
L.Bonds (PLBN)*ROA Q3	0.000939	-0.00395	0.00291	0.00262	0.00608	0.00450	0.00523	0.0238	0.0305
	(0.12)	(-0.35)	(0.21)	(0.15)	(0.36)	(0.24)	(0.26)	(1.10)	(1.28)
L.Bonds (PLBN)*ROA Q4	0.00773	-0.000880	0.0174	0.0190	0.00230	0.00541	0.000203	-0.000482	0.00866
	(0.86)	(-0.07)	(1.11)	(1.03)	(0.12)	(0.25)	(0.01)	(-0.02)	(0.32)
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	62700	60092	58055	57135	56750	54959	53907	52657	51774

Notes: Each column reports horizon h regressions for $h = 1, 2, \cdots, 8$. Dependent variables are Δ_h (log) Current Accounts and Δ_h is the change from quarter $t-1$ to $t+h$. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Lev Q and ROA Q are quartile indicators for leverage and return on assets, with Q1 the lowest and Q4 the highest. Reported rows are coefficients on L.Bonds (PLBN) interacted with each quartile indicator, the omitted group is Q1. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.8: Accounts Payable and Capital Controls on Bond PLBN

Δ_h log(Accounts Payable)	(1) h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)	0.0228	0.00826	-0.0103	-0.0499	-0.0426	-0.0701*	-0.0571	-0.0282	-0.0538
	(0.90)	(0.33)	(-0.39)	(-1.65)	(-1.32)	(-1.79)	(-1.39)	(-0.66)	(-1.14)
Other Capital Controls, iMaPP	✓	✓	✓	✓	✓	✓	✓	✓	✓
Economy Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	46389	43049	41768	40949	40216	38674	37982	36938	35969

t statistics in parentheses
Standard errors clustered at the firm level
* $p < .1$, ** $p < .05$, *** $p < .01$

Notes: Each column reports horizon h regressions for $h = 1, 2, \cdots, 8$. Dependent variables are Δ_h (log) Accounts Payable and Δ_h is the change from quarter $t-1$ to $t+h$. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Other Capital Control include (lagged) restrictions on capital inflows through equity, money market, collective investment, derivatives, real estates, financial credits, direct investment and on foreign issue of bonds by residents. The lagged iMaPP index captures country-level domestic macroprudential policy. Economy-level controls include lagged quarterly real GDP growth, CPI inflation, the log of the nominal bilateral exchange rate against the dollar, the overall financial development index, and the lagged change in the EMBI spread. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.9: Heterogeneity with Accounts Payable and Capital Controls on Bond PLBN

Δ_h log(Accounts Payable)	h=0	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8
L.Bonds (PLBN)*Lev Q2	0.00490	0.0107	0.0430	0.0171	0.0490	0.0142	0.0492	0.0279	0.00358
	(0.28)	(0.38)	(1.37)	(0.58)	(1.35)	(0.33)	(1.15)	(0.60)	(0.07)
L.Bonds (PLBN)*Lev Q3	0.0123	0.0233	0.0493	0.0258	0.0119	-0.00915	0.0296	-0.0480	-0.0187
	(0.52)	(0.71)	(1.38)	(0.80)	(0.29)	(-0.19)	(0.61)	(-0.86)	(-0.30)
L.Bonds (PLBN)*Lev Q4	0.00424	-0.00789	0.0102	-0.00812	-0.00657	-0.0165	-0.0185	-0.0649	-0.0742
	(0.19)	(-0.26)	(0.27)	(-0.22)	(-0.14)	(-0.27)	(-0.27)	(-0.89)	(-0.87)
L.Bonds (PLBN)*ROA Q2	-0.0445***	-0.0795***	-0.0217	-0.0918***	-0.0356	-0.0261	0.0109	0.0202	0.0205
	(-3.05)	(-3.21)	(-0.80)	(-3.13)	(-1.06)	(-0.67)	(0.26)	(0.49)	(0.45)
L.Bonds (PLBN)*ROA Q3	-0.0174	-0.0233	0.00825	-0.0528*	-0.0186	0.00895	-0.00950	-0.0134	-0.0249
	(-1.11)	(-0.95)	(0.28)	(-1.71)	(-0.51)	(0.23)	(-0.23)	(-0.31)	(-0.50)
L.Bonds (PLBN)*ROA Q4	0.0143	-0.0174	0.0224	-0.0131	-0.0300	-0.00527	-0.00435	0.0257	0.0126
	(0.82)	(-0.69)	(0.76)	(-0.44)	(-0.87)	(-0.14)	(-0.11)	(0.59)	(0.25)
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country*Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	46284	42944	41673	40857	40123	38584	37897	36852	35886

Notes: Each column reports horizon h regressions for $h = 1, 2, \cdots, 8$. Dependent variables are Δ_h (log) Accounts Payable and Δ_h is the change from quarter $t-1$ to $t+h$. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. Lev Q and ROA Q are quartile indicators for leverage and return on assets, with Q1 the lowest and Q4 the highest. Reported rows are coefficients on L.Bonds (PLBN) interacted with each quartile indicator, the omitted group is Q1. Firm-level controls include lagged values of size (log of total assets), leverage, liquidity, and return on assets (ROA). Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.10: Baseline and heterogeneity results with alternative measures of productivity

bois: 1(Domestic bond Iss)	(1) Baseline (ROA)	(2) ARPK	(3) ROE	(4) Baseline (ROA)	(5) ARPK	(6) ROE
L.Bonds (PLBN)	-0.0169***	-0.0170***	-0.0180***			
	(-3.29)	(-3.31)	(-3.46)			
L.Bonds (PLBN)*Lev Q2				-0.00368	-0.00252	-0.00331
				(-0.67)	(-0.46)	(-0.60)
L.Bonds (PLBN)*Lev Q3				-0.0122**	-0.0111*	-0.0122**
				(-2.05)	(-1.88)	(-2.02)
L.Bonds (PLBN)*Lev Q4				-0.0137**	-0.0136**	-0.0144**
				(-2.11)	(-2.11)	(-2.10)
L.Bonds (PLBN)****Efficiency*** Q2				0.00542	-0.00515	0.00411
				(0.93)	(-0.79)	(0.71)
L.Bonds (PLBN)****Efficiency*** Q3				0.00221	-0.00450	-0.00496
				(0.37)	(-0.62)	(-0.83)
L.Bonds (PLBN)****Efficiency*** Q4				-0.0107*	-0.00255	-0.0139**
				(-1.71)	(-0.32)	(-2.20)
Other Capital Controls, iMaPP	✓	✓	✓	–	–	–
Economy Controls	✓	✓	✓	–	–	–
Firm Controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Sector*Time FE	✓	✓	✓	✓	✓	✓
Country*Time FE	×	×	×	✓	✓	✓
Observations	72332	71985	71240	72233	71886	71141
Adj. R-sq	0.127	0.127	0.127	0.137	0.137	0.137

Notes: The dependent variable is a dummy that equals one if the firm issues a domestic currency bond in the quarter. L.Bonds (PLBN) is a lagged dummy variable with value 1 if capital controls on purchases by nonresidents of locally-issued bond are imposed in a given country, and with value 0 otherwise. ARPK is average revenue product of capital, ROE is return on equity. Quartile indicators Q2 to Q4 are defined by the measure named in the column header, Q1 is omitted. Columns 1 to 3 report baseline regression specification with different efficiency measures in controls, columns 4 to 6 report interactions with leverage and efficiency quartiles. The sets of controls shown by check marks are included as indicated. Firm-level controls include lagged values of size (log of total assets) and liquidity. The symbol "-" denotes cases where a group of controls and/or fixed effects spanned out by the introduction of other controls and/or fixed effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table A.11: Summary Statistics for Indexes of the Local and Global Financial Cycles

X	Obs	Mean	Std. Dev.	Median	p25	p75
(-1)*L.Log EMBI	72,332	-5.04	0.61	-5.09	-5.37	-4.70
(-1)*log BDI	60,847	-4.60	0.10	-4.58	-4.71	-4.53
(-1)*log UDI AE	72,332	-4.42	0.11	-4.41	-4.50	-4.32