Crowding Out and Banking Crises*

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Abstract

This paper studies the effect of government issuance on firm issuance during banking crises using transaction-level bond and loan data from 66 countries between 1991 and 2017. Governments rarely issue loans, preferring to issue in bond markets. In contrast, firms receive most of their financing from banks. During banking crises, as the supply of domestic loans decreases, firms switch to issuing bonds in domestic markets. The paper uses a novel instrument based on maturing debt to overcome the potential endogeneity of government issuance. The findings show that firms must compete with the government for funds in the domestic bond market and are crowded out from this market as a result. This happens not only in developing countries, but in advanced countries as well. The paper also shows that firms with the ability to tap international debt markets switch to these markets when crowding out occurs in domestic bond markets. Lastly, the paper shows that more developed domestic bond markets mitigate, but do not eliminate, the degree to which crowding out occurs.

Keywords: crowding out, banking crises, debt market switching, development of debt markets
JEL Classifications: E44, E51, F30, F32, F34, G01, G10, G30, H63

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1 Introduction

Global government debt has grown to record high levels over the past decade, beginning with the Global Financial Crisis in 2008 and culminating in a spike in 2020 with the onset of the COVID-19 pandemic (Kose et al. (2022)). More broadly, Figure 1a shows that government debt issuance surges at the start of banking crises and continues to rise as the crisis unfolds.[1] During banking crises, as the financial system deteriorates, credit availability evaporates, making access to financing much more challenging and exacerbating the crisis. Since governments increase their borrowing during these periods to both stabilize the banking system and support the economy, it is important to understand the extent to which firms are crowded out of debt markets by the government.

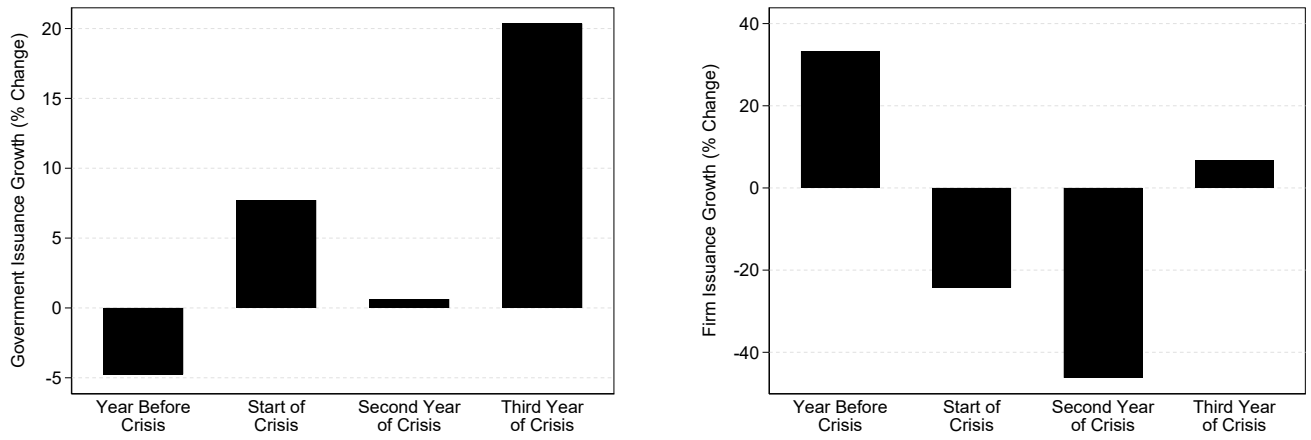
This paper studies the effect of government issuance on firm issuance during banking crises and finds that firms are crowded out of the domestic bond market during banking crises, both in advanced and developing countries. To establish this new fact, I construct a new dataset based on transaction-level bond and loan data combined with firm balance sheet characteristics from 66 advanced and developing countries for the 1991-2017 period. This dataset allows me to examine whether crowding out occurs in four distinct markets — the domestic bond market, the domestic loan market, the international bond market, and the international loan market — while controlling for firm characteristics that affect firm demand for credit. To identify this crowding out effect, I use maturing sovereign debt as a novel instrument for government issuance. I find that a one standard deviation increase in government issuance (as a percentage of trend GDP) decreases firm issuance (as a percentage of assets) by 1.26 percentage points during banking crises. This effect is substantial, implying that government issuance reduces firm issuance by approximately 41% relative to non-crisis periods.

Since the early 1990s, there have been numerous banking crises. These periods were associated with sizable government debt issuance as governments sought to stabilize the banking system through bank bailouts. The surge in government borrowing during these periods is dramatic. Government issuance (as a percentage of trend GDP) increases by approximately 8% at the onset of a banking crisis and continues to rise, compared to a nearly 5% decline in the year before a crisis starts (Figure 1a). In contrast, firm issuance (as a percentage of trend GDP) declines sharply once a banking crisis begins, following a 33% increase in the year prior to the crisis (Figure 1b). This pattern suggests that as governments increase borrowing to stabilize the financial system, firms face growing constraints in accessing debt markets.

The textbook definition of crowding out occurs when a fiscal deficit is financed by issuing debt which competes with firms' demand for loanable funds. The increase in government demand for borrowing raises total demand for funding which puts upward pressure on its price. The resulting upward pressure on interest rates then leads to a reduction in firm borrowing. According to this

1. Although banking crises are not a hallmark of the COVID-19 pandemic, this period is associated with heightened financial distress, especially in the first half of 2020.

Figure 1: Government and Firm Issuance during Banking Crises



(a) Government Issuance (% of GDP)

(b) Firm Issuance (% of GDP)

Note: This figure presents the median growth rate of government and firm issuance in the year before a banking crisis and during the first three years of the crisis. Panel (a) displays government issuance as a percentage of trend GDP, while Panel (b) presents firm issuance as a percentage of trend GDP. Both panels cover the countries in my sample (seen in Table 14) over the 1991-2017 period. Issuance includes bonds (domestic and international) as well as syndicated loans (domestic and international).

definition, the increase in the stock of government debt (i.e., positive net issuance of debt) is the driver of crowding out. This is not the only definition of crowding out. The question of crowding out has been asked in several different contexts using correspondingly different definitions (see, for example, Blinder and Solow (1973), Friedman (1978), and Pinardon-Touati (2021)). In this paper, I investigate a particular version of crowding out by examining the impact of gross government issuance on gross firm issuance. In other words, I define crowding out as a decrease in firm gross issuance caused by an increase in government gross issuance.[2]

The question of whether a sharp increase in government borrowing adversely affects firms' ability to access financing is an important one, given that crowding out can have lasting adverse effects on the economy and contribute to the anemic recoveries typically observed after banking crises (see, for example, Cerra and Saxena (2008) and Boissay et al. (2016)). This is perhaps one reason why previous episodes of large government borrowing have prompted much research on the effect of government borrowing on firm issuance.

As a first step in my analysis, I assemble a suitable dataset. I construct a novel dataset containing the universe of new bond issues and syndicated loans for 66 countries (31 advanced and 35 developing) over the 1991-2017 period. Much of the crowding out literature has concentrated on the domestic loan market. By using rich data on new issuance that distinguishes between domestic and international markets, I am able to study four markets: the domestic loan market, the domestic bond market, the international loan market, and the international bond market. Also included in

2. As the literature on capital flows illustrates, both net and gross capital flows matter. Net flows can directly impact real outcomes such as investment and saving. Gross flows matter for liquidity, solvency, and risk premia.

my dataset are balance sheet firm characteristics. I organize the data as an unbalanced firm-level panel of quarterly observations. I aggregate the transaction-level data at the firm-quarter level by summing the amount raised in each market in each quarter. To be included in my sample, firms are required to have non-missing firm characteristics during the year prior to issuance. This so that these characteristics are not affected by the economic conditions at the time of issuance. My starting sample consists of 87,979 firm-quarters.

To assess whether government issuance constrains firms' access to capital markets, I examine how firms access markets during crisis and non-crisis periods. During non-crisis periods, firms mainly secure funding using bank loans. Even without higher government issuance, firms may still be unable to obtain loans during a banking crisis when the domestic banking system is in distress, and may be forced to seek out alternative sources of funding in order to keep operating. Indeed, both Adrian et al. (2013) and Cortina et al. (2021) find that firms shift their borrowing to the bond market during banking crises. Importantly, during non-crisis periods, governments mostly tap bond markets whereas firms mostly tap the syndicated loan market. Switching to bond markets during banking crises means that firms will need to compete with governments for bond financing.

The identification of crowding out is faced with two main challenges. First, I must isolate the behavior of firm credit supply in order to ensure that a contraction in issuance is driven by a reduction in credit supply and not by a reduction in credit demand. Observing an increase in government issuance and a decrease in firm issuance is insufficient evidence of crowding out. Crisis periods may be characterized by a decrease in firm issuance simply from the fact that the economic downturn reduces the amount of investment opportunities. A decrease in firm issuance for this reason would be caused by a decrease in credit demanded. Second, government issuance reacts endogenously to current economic conditions. Governments may need to borrow more as economic stress reduces tax revenue or to fund programs that combat the economic downturn.

To address the first identification challenge of isolating the supply of credit to firms, I restrict my sample to quarters in which firms issue a positive amount of debt. The idea is that if a firm issues debt, it has a positive demand for credit and changes in the amount of issuance are due to changes in credit supply. Note that, by only including quarters in which firms issue debt, I do not include quarters in which a firm may have demanded credit but was unable to obtain it. In this sense, my estimates represent a lower bound of the effect of government issuance on the contraction in firm issuance. As a further quality check, I control for time-varying firm characteristics that have been identified in the literature as important drivers of credit demand (see, for example, Houston and James (1996); Denis and Mihov (2003); Adrian et al. (2013)). This addresses the possibility that the behavior of firm credit during banking crises reflects factors unrelated to the crisis itself. I also present evidence on how the price and quantity of bonds and loans evolve during banking crises to help disentangle shocks to credit demand from shocks to credit supply.

To address the second identification challenge coming from the potential endogeneity of government issuance, I use a novel instrument based on the amount of maturing debt. In particular,

I use the amount of maturing sovereign bond debt as an instrument for government bond issuance and the amount of maturing sovereign loan debt as an instrument for government loan issuance. I argue that maturing debt is exogenous to current economic conditions and a large determinant of how much governments need to issue. My case for exogeneity stems from the fact that the amount of maturing debt is the result of choices made years ago by previous governments and, as such, is exogenous to current economic conditions. I argue that maturing debt is a large determinant of new debt issuance because large amounts of maturing debt will exert pressure on the government to enter debt markets to issue again. I show that this measure is not only highly correlated with government issuance, but that it is also uncorrelated with the cyclical component of GDP for both bonds and loans in domestic and international markets.

My main findings can be summarized in five main points. First, crowding out does not occur outside banking crises. This is because when the financial system is functioning smoothly, firms mostly borrow from banks and do not have to compete for bond financing with the government. Second, consistent with previous literature, I find that during banking crises firms decrease their loan financing and increase their bond financing. Aggregate descriptive evidence shows that the price and quantity of loans and bonds change in a manner consistent with a negative shock to bank credit supply and an increase in firm bond demand during banking crises.

Third, I find that as debt markets fracture and segment during a banking crisis, government bond issuance in the domestic market crowds out firm issuance in that market. I find that a one standard deviation increase in domestic government bond issuance decreases firm issuance by around 41% compared to the non-crisis mean. In addition, I show that crowding out in the domestic bond market occurs in both advanced and developing countries, albeit at different intensities. This result is also consistent with price and quantity movements during banking crises which suggest that there is an outward shift in government bond demand leading to an inward shift in bond supply to firms.

Fourth, I show that firms with the ability to tap international debt markets switch to these markets during banking crises, thereby mitigating the crowding out that these firms experience in the domestic bond market. Fifth, I show that more developed domestic bond markets mitigate, but do not eliminate, crowding out. As such, by fostering domestic bond market development, countries may have a way to mitigate crowding out during periods of distress in their banking system.

Related Literature. This paper contributes to three strands of literature: the literature on the relationship between sovereign and firm borrowing, the literature on firm issuance during crises, and the literature on the benefits of domestic debt market development.

First, it is related to the literature documenting the relationship between sovereign and firm borrowing. Friedman (1978) examines whether debt-financed deficits crowd out private sector investment, showing that when there are unemployed resources in the economy, such deficits may not crowd out any private investment and may even crowd in some. Blinder and Solow (1973)

show that that fiscal policy financed by bond issuance increases the wealth of the private sector, which raises both the demand for consumption as well as the demand for money. They show that the wealth effects are an additional source of crowding out. Pinardon-Touati (2021) documents a decline in corporate credit from debt-financed local government spending which leads to a decline in the output multiplier of local government spending. I add to this literature by examining the relationship between government and firm issuance using gross capital flows. Crucially, I show that under this definition, government issuance does not reduce firm issuance when the financial system is stable.

In addition to studying a different form of government-firm credit interaction, my paper also contributes to the literature on the crowding out of firm debt, which has received particular attention following the European Debt Crisis. On the one hand, there is a line of research stressing the negative effect of large bank holdings of domestic sovereign debt on firm credit. For example, Broner et al. (2014) propose a model with creditor discrimination and crowding out effects that accounts for the reallocation of credit from the private sector to the government observed in the euro zone periphery during the European Sovereign Debt crisis. Becker and Ivashina (2018), Ongena et al. (2019), Gennaioli et al. (2018), and Altavilla et al. (2017) provide empirical evidence consistent with this reallocation of credit. On the other hand, another line of research highlights how changes in sovereign risk exposure affect bank balance sheets. For example, Crosignani (2017) proposes a model in which banks risk-shift using domestic government bonds as these assets promise the highest payoff in the no-default state and limited liability protects banks' equity holders in case of sovereign default. As sovereign risk increases, banks reduce credit to the private sector to increase their holdings of domestic government bonds. Empirically, Bottero et al. (2020) and Popov and Van Horen (2015) analyze the effect of balance sheet exposure to impaired sovereign debt on lending to corporate borrowers. They find a direct link between deteriorating creditworthiness of sovereign debt and a contraction in lending by banks holding such debt on their balance sheet. I add to this literature by documenting a large crowding out effect in the domestic bond market during banking crises using a new instrumental variable that addresses endogeneity concerns regarding government issuance.

I also contribute to this literature by examining developing countries. While the papers discussed above examine only advanced countries, my dataset contains 35 developing countries alongside 31 advanced countries, which allows me to examine the relationship between sovereign and firm borrowing in developing countries as well. Bouis (2019) studies the relationship between banks' holdings of domestic sovereign securities and credit growth to the private sector using macroeconomic data in emerging market and developing economies. This paper finds that higher banks' holdings of government debt are associated with lower credit growth to the private sector. Williams (2018) uses a natural experiment to document the effect of an increase in capital inflows to the sovereign debt market on private credit availability in Colombia. The paper finds that as foreign investors become more willing to purchase sovereign debt, the reliance on local financial institutions is reduced, freeing up resources for the private sector. I add to this literature by con-

structing a new dataset using transaction-level debt issuance data for a multitude of developing countries. I document that crowding out of firm issuance occurs not only in advanced countries, but in developing ones as well.

My paper also contributes to the literature on the relationship between corporate credit and crises. Gennaioli et al. (2014) study the link between government default and financial fragility by building a model in which governments cannot shield the domestic financial system from the consequences of a default. Their model predicts that government defaults should lead to declines in private credit, and these declines should be larger in countries where financial institutions are more developed and banks hold more government bonds. Arteta and Hale (2008) and Das et al. (2010) provide empirical evidence consistent with the contraction of private credit during sovereign crises. Adrian et al. (2013) and Cortina et al. (2021) study the effect of banking crises on private credit. Both document that firms switch from issuing in loan markets to issuing in bond markets as the former collapses during banking crises. Cortina et al. (2021) further document the additional switching from the domestic market to international markets during domestic financial crashes. I add to this literature by documenting that crowding out of firm issuance only occurs during banking crises, when financial markets are in distress. I also document that firms with access to international markets switch to issuing in these markets when they are crowded out in the domestic bond market during banking crises.

Lastly, my paper contributes to the literature on the benefits of domestic debt market development. Tobias et al. (2021) document the benefits of developing domestic bond markets. For example, developing these markets will reduce the need of turning to international credit markets to obtain financing. Since developing countries tend to borrow in foreign currencies in international bond markets, borrowing in these markets can leave countries exposed to volatile exchange rate movements. By developing domestic markets, not only can countries reduce this exposure, but they can also make their economy more resilient to sudden movements in international capital flows. As such, a developed domestic debt market can form the basis of a robust financial system to support growth, and the productive use and allocation of savings. Burger et al. (2012) highlight key drivers and constraints of bond market development. Their analysis suggests that high inflation volatility presents a serious obstacle to bond market development. However, they find that pursuing creditor-friendly policies as well as strengthening the legal rights of borrowers can enable bond market development. I add to this literature by showing that developed domestic bond markets help mitigate the crowding out observed during banking crises.

The remainder of this paper is organized as follows. Section 2 presents my data. Section 3 presents stylized results as well as evidence on shocks to the demand and supply of credit during banking crises. Section 4 presents my empirical methodology and the instrumental variable. Section 5 presents my results. Section 6 concludes.

2 Data and Summary Statistics

2.1 Data

For this study, I use transaction-level data on bonds and syndicated loans issued in domestic and international markets between 1991 and 2020. I focus on the private sector and the government. In the private sector, I only include non-financial corporate issuances.[3] Government issuances comprise of issuances by national, local, and regional governments as well as government agencies and regional agencies.[4,5] I restrict my sample to 66 countries.[6]

The data on bonds comes from Refinitiv's Securities Data Company (SDC) Platinum, which provides information on the issuance characteristics of publicly and privately placed bonds.[7] These characteristics include amount issued, market of issuance, issue date, credit rating, firm sector, firm's ownership structure, firm's nation as well as a firm's parent company and parent company's nation. While data for issues in the U.S. start in the 1970s, coverage of other markets starts later, with most regional databases starting in 1991. For this reason, I restrict my sample to start in 1991. The sample includes 210,090 bond issuances by 40,363 firms and entities. Of the 210,090 bond issuances, 137,814 are issued by the non-financial firms while 72,276 are issued by the government. Of the 40,363 firms and entities, 29,391 are non-financial firms while 10,972 are government firms and entities.

The syndicated loan data in my database is from Thomson Reuters' Loan Pricing Corporation Dealscan. The Dealscan database contains comprehensive global historical information on loan pricing and contract details, terms, and conditions. For the equivalent period and countries that I use from my bonds dataset, there are 259,656 loans, of which 256,819 are for non-financial firms and 2,837 are for the government.

To study how firms borrow in different markets, I divide both bonds and syndicated loans by market location (domestic or international). I classify corporate bond issuances as domestic or international by comparing the location of the issuance with the residence of the issuing firm. Thus, domestic issuances are those issued by firms in their local markets and international issuances are those issued by firms abroad. The dataset includes 147,063 domestic bond issuances and 63,027 international bond issuances. To classify syndicated loans as either domestic or international, I compare the nationality of the lead banks that arrange the deal with the issuing firm's nationality.

3. Non-financial firms are those with a Standard Industrial Classification (SIC) code between 0 and 5,999 and between 6,800 and 9,099. Financial firms, those with an SIC code between 6,000 and 6,800, are excluded from my study.

4. Government entities are identified as those with an SIC code between 9,100 and 9729.

5. State-owned enterprises, defined as firms with direct state ownership of 50 percent or more, are included in the sample as firm issuances. Over the 1991–2020 period, for the countries in my sample, they accounted for 17 percent of total annual gross bond issuance in advanced economies and 18 percent in developing economies.

6. The list of countries is shown in appendix A.

7. Cortina et al. (2021), who use the same data sources, provide an assessment of the worldwide coverage of these data sources. They compare these datasets with other databases on debt transactions and outstanding debt, such as Dealogic and the BIS Debt Securities Statistics. They find that the coverage is fairly similar, both in terms of levels and time variation.

Domestic loans are therefore those loans in which only domestic banks lead the syndication, whereas international syndicated loans entail the participation of at least one foreign bank in the lead arranging banks participating in the deal. The dataset includes 168,776 domestic loan issuances and 90,880 international loan issuances.

I study the effects of crowding out in both advanced and developing countries. I distinguish between these different countries because advanced countries are typically more financially developed than developing countries. To classify countries as advanced and developing, I use the World Bank's classification of countries as of 2019: advanced countries are those with a gross national income per capita in 2018 of $12,376 or more. All other countries are classified as developing. My dataset consists of 31 advanced countries and 35 developing countries.

Throughout my analysis, I also include time-varying firm characteristics as controls. For these firm characteristics, I use the Worldscope Database. Worldscope provides detailed annual financial statement data on public companies globally. I follow previous literature (Houston and James (1996); Denis and Mihov (2003); Adrian et al. (2013)) when choosing which firm characteristics to add as controls in my analysis. I use size, tangibility (considered as proxies for information asymmetry), profitability (which proxies for project quality), and leverage.[8] These variables have been identified as important drivers of credit demand.

I organize the data as an unbalanced firm-level panel of quarterly observations. I aggregate the firm-transaction data by summing the amount raised in each market in each quarter. The four markets I examine are the domestic bond market, the domestic loan market, the international bond market, and the international loan market. To be included in my sample, firms are required to have non-missing firm characteristics during the year prior to issuance. This ensures that these characteristics are not affected by economic conditions at the time of issuance. Throughout the paper, the main dependent variable will be firm issuance. As a way of making the results comparable across firms, I scale each firm's issuance by its previous year's assets. The main independent variable throughout this paper is government issuance. Similarly, to make it comparable across countries, I scale government issuance by trend GDP. I scale by trend GDP since this is the component of GDP independent of current economic conditions.[9] My starting sample consists of 87,979 firm-quarters.

To study domestic banking crises, I merge my debt issuance data with Laeven and Valencia's (2018) banking crises database. They define a banking crisis as an event that meets two conditions. First, there must be significant signs of financial distress in the banking system, such as bank runs, losses in the banking system, and bank liquidations.[10] Second, there must be significant banking policy intervention measures in response to the significant losses in the banking system, such

8. The definitions are provided in Table 15.

9. I compute trend GDP by using the Hodrick-Prescott (HP) filter.

10. Losses are considered severe when either (i) a country's banking system exhibits significant losses resulting in a share of non-performing loans above 20 percent of total loans or bank closures of at least 20 percent of banking system assets or (ii) fiscal restructuring costs of the banking sector exceed 5 percent of GDP.

Table 1: Summary Statistics: Firm Issuance

	Domestic Market		International Market		Total	
	Mean	SD	Mean	SD	Mean	SD
Non-Crisis						
Firm Bond Issuance	3.08	4.45	5.82	6.95	4.04	5.56
Firm Loan Issuance	10.45	16.29	13.75	22.44	11.67	18.43
Banking Crises						
Firm Bond Issuance	3.24	3.99	3.87	5.76	3.53	4.64
Firm Loan Issuance	4.38	12.89	13.53	21.68	7.55	16.85
Whole Sample						
Firm Bond Issuance	3.11	4.39	5.61	6.85	3.97	5.45
Firm Loan Issuance	9.82	16.08	13.73	22.35	11.24	18.32

Note: This table presents summary statistics for firm bond and loan issuance in domestic and international markets during non-crisis periods, banking crisis periods, and the whole sample period. Issuance is presented as a percentage of firms' assets and is 95% winsorized.

as bank holidays or bank nationalizations.[11] This database covers 151 banking crisis episodes around the world for the 1970-2017 period. For my sample, I capture crises in both advanced and developing countries, including those in Latin America and East Asia in the 1990s and early 2000s, as well as the Global Financial Crisis in the late 2000s. Overall, the average length of a banking crisis is 3.4 years. However, this varies by region. For example, in Latin America, the average crisis length is 2.8 years, while in Western Europe, it is 3.75 years.

I also examine whether domestic bond markets mitigate crowding out using data from the Financial Development Structure Database. Further details are provided in the section discussing the results on bond market development.

2.2 Summary Statistics

Firm Issuance. Table 1 presents the average and standard deviation of firm issuance (as a percentage of previous years firms' assets) in both domestic and international markets for bonds and loans.[12] The table is divided between crisis and non-crisis, as well as the full sample period. There are three patterns of firm issuance.

First, firms rely more heavily on loan markets than on bond markets in non-crisis periods. Across both domestic and international markets, firms issue approximately 7 percentage points more in loans than in bonds. Second, during banking crises, firm issuance falls in every market

11. Policy interventions in the banking sector are considered significant if at least three of the following measures have been used: (i) deposit freezes and/or bank holidays (ii) significant bank nationalizations (iii) bank restructuring fiscal costs (at least 3 percent of GDP) (iv) extensive liquidity support (at least 5 percent of deposits and liabilities to nonresidents) (v) significant guarantees put in place (vi) significant asset purchases (at least 5 percent of GDP).

12. The equivalent tables divided between advanced and developing countries are Tables 16 and 17, respectively, in Appendix C.

Table 2: Firm Issuance and Characteristics

	Do not issue during Banking Crises	Issue during Banking Crises	Difference
Firm Characteristics			
Size	7.13	8.68	1.56***
Profitability	0.07	0.10	0.02
Tangibility	0.40	0.41	0.01***
Leverage	0.33	0.38	0.05***
Issuance			
Loan Issuance	199.10	210.72	11.62**
Bond Issuance	163.54	202.91	39.38***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents means of firm characteristics as well as firms' issuance. I test for significant differences between firms that only issue during non-crisis periods and firms that are able to issue during banking crises. Only non-crisis periods are included since banking crises can affect the issuance of loans and bonds. Issuance is in millions of 2010 U.S. dollars. Firm characteristics are defined in Table 15 in Appendix B. Issuance is 95% winsorized.

except for the domestic bond market. The largest drop occurs in the domestic loan market, which falls by about 6 percentage points—a 58% decrease relative to the non-crisis average. Issuance in international bond markets falls by roughly 2 percentage points, while international loan issuance declines marginally. Third, domestic bond issuance increases during banking crises as the domestic loan market collapses and firms need to rely more heavily on bonds. However, this increase is not sufficient to offset the decline in other markets, resulting in an overall reduction in total firm issuance during banking crises.

Firm Characteristics. Table 2 presents average firm characteristics and issuance amounts, comparing firms that issue only during non-crisis periods with those able to issue during banking crises. Only non-crisis periods are included, as banking crises can affect both firm issuance behavior and firm characteristics.

The main difference between these two groups is firm size: firms that issue during banking crises are, on average, 1.56 percentage points larger. There is no statistically significant difference in profitability. Although tangibility and leverage differ significantly across the two groups, the magnitudes of these differences are small.

In terms of issuance, firms that are able to issue during banking crises issue more in both bonds and loans, on average, than those that do not. This may reflect the fact that firms that issue during banking crises are larger and require more financing to fund their projects.

Government Issuance. Table 3 presents summary statistics for government bond and loan issuance (as a percentage of trend GDP) in domestic and international markets during both non-crisis and crisis periods.[13] Two key patterns emerge.

First, governments make minimal use of the syndicated loan market, issuing on average just

13. The equivalent tables for advanced and developing countries are Tables 18 and 19, respectively, in Appendix D.

Table 3: Summary Statistics: Government Issuance

	Domestic Market		International Market		Total	
	Mean	SD	Mean	SD	Mean	SD
Non-Crisis						
Gov. Bond Issuance	0.6651	1.5949	0.6978	1.4192	1.5770	2.7343
Gov. Loan Issuance	0.0003	0.0016	0.0024	0.0100	0.0124	0.0446
Banking Crises						
Gov. Bond Issuance	0.6030	1.5815	0.9039	1.6826	1.7721	3.0639
Gov. Loan Issuance	0.0005	0.0019	0.0037	0.0121	0.0199	0.0563
Whole Sample						
Gov. Bond Issuance	0.6585	1.5935	0.7196	1.4505	1.5975	2.7712
Gov. Loan Issuance	0.0004	0.0016	0.0025	0.0102	0.0132	0.0460

Note: This table presents summary statistics for government bond and loan issuance in domestic and international markets during normal periods and banking crises. Government Issuance is reported as a percentage of trend GDP. Bond issuance is 95% winsorized, while loan issuance is 99% winsorized due to a more concentrated distribution.

0.0004% domestically and 0.003% internationally. Meanwhile, bond markets are used much more heavily, with average issuance of 0.66% in the domestic market and 0.72% in international markets. Second, government bond issuance increases overall during banking crises, with a rise in international issuance and only a marginal decline in domestic issuance. This indicates that even during banking crises, governments continue to rely heavily on domestic bond markets.

3 Evolution of Issuance during Banking Crises

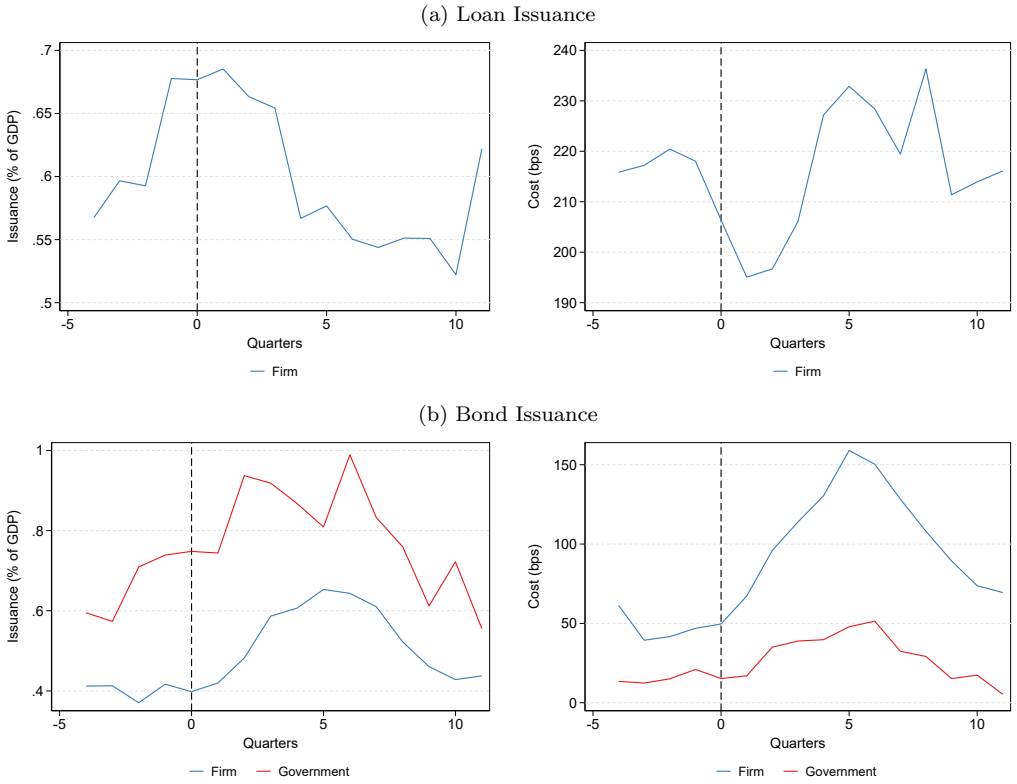
In this section, I present stylized facts on firm and sovereign issuance variables aggregated at the country level and then averaged across all the countries in my sample. In particular, I examine amount issued (as a percentage of GDP) and the cost of issuance.[14] I examine these two variables because a simultaneous analysis of quantities and prices will help disentangle shocks to demand from shocks to supply, an important distinction for interpreting my empirical results.

I study how the amount issued and cost evolve around banking crises, covering four quarters before and the first twelve quarters after a banking crisis begins. To address the high volatility of quarterly debt issuance data, I smooth each variable using a five-quarter moving average centered on the current quarter (two lags and two leads). I examine bond and loan issuance in both domestic and international markets.[15]

14. I measure the cost of loans with the all-in-drawn spread, which is defined as total (recurring fees plus interest) spread paid over 6 month LIBOR for each dollar drawn down. I measure the cost of bonds with the spread to benchmark, which is defined by SDC as the number of basis points over the comparable maturity treasury.

15. Since governments rarely borrow through syndicated loans, I exclude the quantity and cost of government loans from the analysis.

Figure 2: Domestic Issuance during Banking Crises



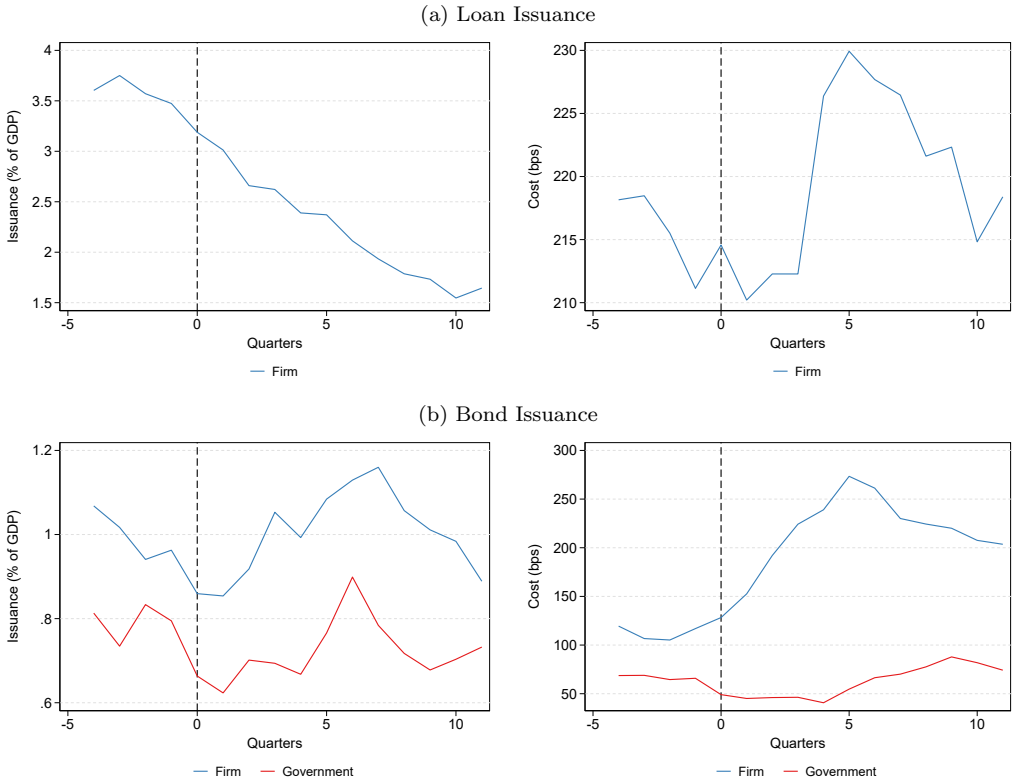
Note: This figure shows the evolution of several key issuance variables for both the government and firms in domestic markets during banking crises. For each group of countries, I calculate the average for each variable during the four quarters before a banking crises as well as the first ten quarters of a banking crises. The dotted vertical line represents the start of a crisis. Panel 2b shows the average amount issued (as a percentage of GDP) and cost (in bps) of bond issuance. Panel 2a shows the average amount issued (as a percentage of GDP) and cost (in bps) of loan issuance.

3.1 Domestic Issuance

The evolution of domestic issuance is presented in Figure 2. Panel 2a shows the amount and the cost of domestic firm loan issuance. While loan issuance increases in the year preceding a banking crisis, it drops sharply in the first two years of the crisis as the banking system deteriorates. At the same time, the cost of domestic loans increases by approximately 20 percent one year into a crisis.

Panel 2b shows the amount issued and the cost of domestic bond issuance. In the year leading up to a banking crisis, government bond issuance begins to rise, while firm issuance remains relatively stable. During this pre-crisis period, the cost of bond issuance for both governments and firms doesn't change either. Once a crisis begins, both government and firm bond issuance rise sharply, with each increasing by nearly 50 percent within the first year of the crisis. At the same time, the cost of both government and firm bond issuance increases as well. However, the relative price, measured as the spread between the two, widens substantially, increasing from around 25 bps to approximately 100 bps. This indicates that issuing bonds in the domestic market becomes significantly more expensive for firms relative to governments during banking crises.

Figure 3: International Issuance during Banking Crises



Note: This figure shows the evolution of several key issuance variables for both the government and firms in international markets during banking crises. For each group of countries, I calculate the average for each variable during the four quarters before a banking crises as well as the first ten quarters of a banking crises. The dotted vertical line represents the start of a crisis. Panel 3b shows the average amount issued (as a percentage of GDP) and cost (in bps) of bond issuance. Panel 3a shows the average amount issued (as a percentage of GDP) and cost (in bps) of loan issuance.

3.2 International Issuance

Figure 3 shows the evolution of international issuance. Panel 3a presents the amount and cost of international firm loan issuance. In the year prior to a banking crisis, firms heavily tap international loan markets, issuing roughly five times more than in the domestic market. While issuance remains stable leading up to the crisis, it collapses once the crisis begins—falling by approximately 25 percent within the first year. This decrease is accompanied by a sharp rise in the cost of borrowing, similar to the pattern observed in domestic loan markets.

Panel 3b displays the amount and cost of international bond issuance. In the year before a crisis, both government and firm bond issuance decline. However, much like domestic bond issuance, both government and firm international bond issuance increase during a banking crisis. At the same time, the cost of firm bond issuance rises significantly, while the cost for governments remains relatively stable. As a result, the spread between the price of firm and government issuance widens substantially, increasing from around 75 bps at the onset of the crisis to 225 bps one year in.

3.3 Demand and Supply Shocks

The previous evidence on bond and loan issuance across domestic and international markets gives two conclusions about firm credit during banking crises. First, firms increase their reliance on bond markets as access to bank loans contracts. Second, credit spreads increase sharply for both loans and bonds. Together, these patterns point to a contraction in bank credit supply and an increase in demand for bond financing as firms seek alternative sources of financing. This, in turn, increases the cost of both loans and bonds.

Banking crises are also associated with a rise in government bond issuance. In the domestic bond market, both the cost and quantity of government bond issuance increase, signaling an outward shift in demand for bond credit. In international markets, while bond issuance increases, the cost of bond financing remains relatively stable, suggesting that both demand and supply have shifted outward. This combination of higher demand and greater supply keeps prices stable while allowing issuance volumes to expand.

In section 5, I provide further insight while also discussing the interaction between government issuance and firm issuance during banking crises when I present my main empirical result.

4 Empirical Methodology

The main challenge I face in my empirical methodology is the identification of crowding out. This requires a two-pronged approach. First, I must show that a decline in firm issuance as a result of an increase in government issuance is driven by a decrease in firm credit supply and not firm credit demand. Second, I must find an instrumental variable for government issuance which is relevant and exogenous to current economic conditions.

It is crucial to show that a contraction in firm issuance is driven by a reduction in credit supplied and not by a reduction of credit demanded since crisis periods may be characterized by both an increase of government issuance and a decrease in firm issuance, and simply observing this is insufficient evidence of crowding out. This is because it may simply be the case that while governments are expanding their issuance during banking crises to combat the economic downfall, firms may simply have less demand to issue debt since there may be fewer investment opportunities. To isolate the behavior of firm credit supply, I only include quarters in which firms issue debt. Intuitively, if a firm issues debt, it has a positive demand for debt, and thus, changes in its amount of issuance are informative about the supply of credit.[16] To further control for changes in the behavior of firm credit during banking crises due to factors unrelated to the crisis itself, I include firm characteristics that have been identified by previous literature (Houston and James (1996); Denis and Mihov (2003); Adrian et al. (2013)) which affect firm demand for credit. This methodology does miss firms with positive demand for debt that cannot issue either a loan or a

16. I follow a similar methodology as that used in Becker and Ivashina (2014) and Becker and Ivashina (2018).

bond. However, not including these cases in my sample biases the estimate of my coefficient of interest towards zero. Thus, inclusion of these observations would strengthen my findings.

I predict that a negative impact of government issuance on firm issuance will occur during banking crises. In non-crisis periods, governments and firms prefer different debt instruments: governments issue bonds and firms issue loans. However, during periods of financial stress, such as banking crises, loan supply decreases. With firms needing another avenue to borrow, they switch to issuing bonds. This may overburden the bond market, as now the government and firms compete for the same funds. To test this, I estimate the following equation:

$$\begin{aligned} I_{i,k,t} = \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} + \\ \beta_3 BankingCrises_{k,t} \times GovIss_{k,t} + \\ X'_{i,t}\eta + Z'_{k,t}\gamma + \alpha_t + \alpha_i + \epsilon_{i,t} \end{aligned} \tag{1}$$

where $I_{i,k,t}$ is issuance (bond or loan) as a percentage of previous years' firm assets for firm i in country k in quarter t, $BankingCrises_{k,t}$ is an indicator variable equal to one if country k is experiencing a banking crisis in the current year and zero otherwise, and $GovIss_{k,t}$ is government issuance (bond or loan) as a percentage of trend GDP of country k in quarter t.[17] $X'_{i,t}$ are firm controls in case firms' fundamentals change over time and influence their demand for debt.[18] I also include firm and year-quarter fixed effects.

I estimate equation 1 across four distinct markets: domestic bond market, international bond market, domestic loan market, and international loan market. In each, I assess how government issuance affects firm issuance within the same market. In line with previous literature (Adrian et al. (2013) and Cortina et al. (2021)), I predict that β_1 will be negative in the domestic loan market and positive in the domestic bond market as firms must find alternative sources of funding when the banking system collapses, and switch to issuing bonds.

The key prediction is that β_3 will be negative in the domestic bond market, as I expect crowding out to occur specifically in periods and countries experiencing financial stress. While previous literature, such as Becker and Ivashina (2018), document crowding out in the domestic loan market driven by domestic banks holding large amounts of their country's sovereign debt, my focus is on the effect of gross government issuance on gross firm issuance. Given that governments rely heavily on bond markets and rarely issue in loan markets, even during banking crises, I do not expect a significant effect in the domestic loan market. However, when firms are forced to shift away from loan financing during banking crises, they must increasingly compete with the government for access to bond financing, potentially resulting in crowding out in the domestic bond market.

17. I normalize firm issuance by assets as a way of controlling for firm size since larger firms, on average, issue larger amounts. Similarly, I normalize government issuance by trend GDP to control for the size of different countries.

18. The firm characteristics I include are tangibility, profitability, and leverage. Definitions are provided in Table 15 in Appendix B.

Table 4: Instrument Exogeneity: Maturing Government Debt

	Cyclical GDP
Domestic Maturing Government Loan Debt	0.0111
International Maturing Government Loan Debt	-0.0137
Domestic Maturing Government Bond Debt	-0.0173
International Maturing Government Bond Debt	-0.00361

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the correlation between the cyclical component of GDP and maturing government debt in domestic and international bond and loan markets for the 1991-2017 period. Government bond issuance is 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution.

4.1 Instrumental Variable

There is a potential endogeneity concern with my variable of interest in equation 1. If government issuance is used to finance countercyclical fiscal policy, it will be correlated with current economic conditions. For example, governments may need to borrow to finance their spending to counteract a crisis. Thus, a negative coefficient on the interaction between government issuance and banking crises may simply reflect the correlation between government issuance and omitted variables that capture the effects of the state of the economy on firm issuance. In this section, I present my instrumental variable to overcome this endogeneity problem.

I take advantage of my transaction-level data to pick two instruments (one for loan issuance and one for bond issuance) based on maturing debt. In particular, the instrumental variables I use are amount of maturing sovereign bond debt for bonds and the amount of maturing sovereign loan debt for loans.[19] My identification relies on the fact that the amount of maturing sovereign debt is predetermined because it is the outcome of choices typically made years ago by previous governments. Since these amounts are predetermined, they are exogenous to current economic conditions. Also, maturing debt is a large determinant of new debt issues since large amounts of maturing debt exert pressure on governments to enter debt markets to issue again. Thus, this identification strategy allows me to cleanly distinguish crowding out from other variables behind changes in firm issuance.

For the variables I chose to be valid instruments, they need to satisfy two requirements:

$$\text{Instrument Exogeneity: } Cov(IV, \epsilon) = 0 \tag{2}$$

19. Ongena et al. (2019) use a similar identification method in their paper on moral suasion during the European Sovereign Debt Crisis. They construct a dummy variable of high need months by comparing the amount of maturing debt in a month to the country-specific median.

Table 5: Instrument Relevance: Maturing Government Debt

	Dom. Gov. Bond Issuance	Int. Gov. Bond Issuance	Dom. Gov. Loan Issuance	Int. Gov. Loan Issuance
Domestic Maturing Government Bond Debt	0.351***			
International Maturing Government Bond Debt		0.225***		
Domestic Maturing Government Loan Debt			0.127***	
International Maturing Government Loan Debt				0.202***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the correlation between government loan and bond issuance and their respective instrument in domestic and international markets for the 1991-2017 period. Government bond issuance is 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution.

and

$$\text{Instrument Relevance: } Cov(IV, GovIss) \neq 0. \tag{3}$$

As I stated previously, maturing government bond and loan debt are predetermined since they are the choices of previous governments made years ago, making them exogenous to current economic conditions. To confirm their exogeneity, in Table 4, I report the correlation between each instrument and the cyclical component of GDP, which captures current economic conditions. I present these correlations separately for the domestic and international markets. None of the four correlations is statistically different from zero, supporting the validity of the instruments.

I chose these instrumental variables because the amount of maturing debt effectively reflects a government's financing needs in a given period. When large amounts of debt mature, governments are more likely to seek new financing. To confirm this, Table 5 presents the correlations between my instrumental variables and government issuance of bonds and loans in both domestic and international markets. As expected, the instrumental variables are positively correlated with the corresponding issuance variables, with the strongest relationship observed in the domestic bond market.

A potential concern with using these instrumental variables is that during a banking crisis, the maturity of bonds and loans may shorten. So, for example, governments may simply be rolling over debt year over year. Thus, my instruments may capture a government's countercyclical fiscal policy used to combat a banking crisis. If this is the case, maturing debt will no longer be exogenous to current economic conditions. As a way of testing for this, I present in Tables 6 and 7 the average maturity (in years) of sovereign bonds and loans during non-crisis periods and banking crises. On average, the maturity of government bonds decreases during a banking crisis in the domestic market while it increases in international markets. The maturity of government loans, on the other hand, does not change during banking crises in either the domestic or international markets. Crucially, for both bonds and loans in either market, the average maturity does not fall

Table 6: Average Government Bond Maturity

	Non-Crisis Periods	Banking Crises	Difference
Domestic Market	10.38	8.00	-2.38^{***}
International Market	7.36	7.87	0.51^{***}

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the average maturity (in years) of bonds in domestic and international markets during non-crisis periods and banking crises. I test for significant differences between the two periods.

below 6 years. Given that banking crises in my sample last an average of 3.4 years, maturing debt is unlikely to be endogenous to current economic conditions, even during banking crises.

5 Results

In this section, I present my empirical results. I start by presenting my main result on crowding out during banking crises. Since there are endogeneity issues with my main explanatory variable, I present the two stage least square estimates using my instruments for government issuance. Finally, I examine whether access to international markets allows firms to avoid crowding out, and whether more developed local bond markets help mitigate its effects.

5.1 Crowding Out during Banking Crises

In this section, I present my main findings. Table 8 reports the estimates of equation 1. The four columns correspond to the four debt markets studied: the first two focus on bonds, while the last two examine loans. Within each pair, one column covers domestic issuance and the other international issuance. In each case, firm and government issuance are in the same market. For instance, the first column analyzes the effect of domestic government bond issuance on domestic firm bond issuance. Table 8 yields three main results.

First, consistent with previous literature, domestic firm loan issuance decreases and domestic bond issuance increases during banking crises. During a banking crises, bank loan supply decreases as the banking system collapses. This is a major shock to firms since firms' primary source of funding is through loans (on average, firms issue 9.82% of their assets in loans compared to only 3.11% in bonds). During banking crises, domestic firm loan issuance decreases by 3.04 percentage points. This is approximately a 30% decrease from the average domestic loan issuance during non-crisis periods. Firms in search of alternative forms of financing, switch to bond financing in an attempt to offset the loss of funding in the loan market. During banking crises, firms increase their domestic bond issuance by 1.03 percentage points. This is approximately a 33% increase from the mean domestic firm bond issuance during non-crisis periods.

This result is consistent with the evidence from quantities and prices of loan and bond issuance during banking crises presented in section 3. During a banking crises, a sharp decrease in domestic

Table 7: Average Government Loan Maturity

	Non-Crisis Periods	Banking Crises	Difference
Domestic Market	7.90	6.93	−0.98
International Market	7.86	9.39	1.54*

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the average maturity (in years) of loans in domestic and international markets during non-crisis periods and banking crises. I test for significant differences between the two periods.

loan financing is accompanied by a sharp increase in the cost of loans. This points to a negative supply shock to bank credit. In need of an alternative source of funding, firms start to tap the bond market in larger quantities. At the same time, the cost of bond credit rises sharply, suggesting that the demand curve for bond financing shifts out as a response to the inward shift in the bank credit supply curve.

Second, in non-crisis periods, domestic government issuance has a positive effect on firm issuance, both in the bond and loan markets. This means that government issuance helps create a debt market for firms. In the domestic bond market, a one standard deviation increase in government bond issuance (1.59 percentage points) increases firm bond issuance by 0.26 percentage points, an 8.5% increase over the mean domestic bond issuance during non-crisis periods. In the domestic loan market, however, the effect is much less significant: a one standard deviation increase in government loan issuance (0.002 percentage points) increases firm loan issuance by 0.01 percentage points, which is only a 0.10% increase over the mean domestic loan issuance during non-crisis periods. This is expected since governments rarely issue in the syndicated loan market.[20]

Third, domestic government bond issuance has a large negative effect on firm domestic bond issuance during banking crises. This result is of particular interest. Previous literature (Becker and Ivashina (2018); Bouis (2019); Popov and Van Horen (2015)) has documented how banks with larger amounts of sovereign debt decrease their lending during periods in which there are financial shocks to the economy, such as sovereign debt crisis. However, in terms of accessing debt markets for new debt issues, it is important to examine the domestic bond market. When financial markets are breaking down during banking crises and firms are forced to switch to bond financing, they must compete with governments that heavily tap these markets. With my methodology, I am able to explicitly identify the crowding out effect of government issuance on firm issuance in the domestic bond market during banking crises. This result is purely driven by a negative supply shock. I find that a one standard deviation (1.59 percentage points) increase in domestic government bond issuance decreases domestic firm bond issuance by 1.26 percentage points. This represents a substantial decline in domestic firm bond issuance given that bond issuance is, on

20. There is also a statistically significant (at the 5% level) negative effect of international government loan issuance on international firm loan issuance during non-crisis periods. A one standard deviation increase in international government loan issuance (0.01 percentage points) decreases international firm loan issuance by 0.04 percentage points (a 0.27% decrease from the non-crisis average.)

Table 8: Crowding Out during Banking Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crises	1.032**	-0.958**	-3.044**	1.128
	(2.43)	(-2.37)	(-2.59)	(0.92)
Dom. Gov. Bond Issuance	0.164*			
	(1.99)			
Banking Crises × Dom. Gov. Bond Issuance	-0.797***			
	(-2.76)			
Int. Gov. Bond Issuance		-0.235		
		(-1.47)		
Banking Crises × Int. Gov. Bond Issuance		0.266		
		(1.03)		
Dom. Gov. Loan Issuance			5.401**	
			(2.56)	
Banking Crises × Dom. Gov. Loan Issuance			-0.248	
			(-0.06)	
Int. Gov. Loan Issuance				-3.657**
				(-2.44)
Banking Crises × Int. Gov. Loan Issuance				13.715
				(1.60)
N	12,280	4,125	12,504	3,983
R-squared	0.65	0.56	0.73	0.63
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The dependent variable is firm bond issuance in columns (1) and (2) and firm loan issuance in columns (3) and (4), all measured as a percentage of firms' previous year's assets. Banking Crises is a dummy variable equal to one if a firm's country is experiencing a a banking crisis in the current year and zero otherwise. Government Issuance is is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with banking crises reported in the Laeven and Valencia Crisis Database, while the non-crisis periods covers all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

average, 3.08% of firms' assets during non-crisis periods. This represents a 41% decrease from the non-crisis average.

This result is also consistent with price and quantity evidence from section 3. During banking crises, government bond issuance and cost increase during banking crises. This indicates that the

Table 9: IV: Crowding Out during Banking Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crises	2.394**	0.824	-1.974	4.064
	(2.42)	(0.03)	(-1.60)	(1.17)
Dom. Gov. Bond Issuance	0.997			
	(1.48)			
Banking Crises × Dom. Gov. Bond Issuance	-1.786***			
	(-3.34)			
Int. Gov. Bond Issuance		-2.584		
		(-0.10)		
Banking Crises × Int. Gov. Bond Issuance		-1.028		
		(-0.05)		
Dom. Gov. Loan Issuance			16.380***	
			(3.57)	
Banking Crises × Dom. Gov. Loan Issuance			109.116***	
			(2.80)	
Int. Gov. Loan Issuance				-26.564**
				(-2.52)
Banking Crises × Int. Gov. Loan Issuance				-133.528
				(-0.55)
N	12,280	4,125	12,504	3,983
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes
F-stat Weak Instrument	9.41	0.01	203.96	1.59

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The dependent variable is firm bond issuance in columns (1) and (2) and firm loan issuance in columns (3) and (4), all measured as a percentage of firms' previous year's assets. Banking Crises is a dummy variable equal to one if a firm's country is experiencing a a banking crisis in the current year and zero otherwise. Government Issuance is is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with banking crises reported in the Laeven and Valencia Crisis Database, while the non-crisis periods covers all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

demand curve for government bond financing shifts outward. This outward shift in the government demand curve causes a negative shock to firm bond supply as investors buy government bonds. This supply shock reduces the amount of corporate bond financing while increasing the cost even more than the increase caused by the outward shift in firm bond demand.

Table 10: Firms with Access to International Markets

	Only Issue Domestically	Access to International Markets	Difference
Firm Characteristics			
Size	6.81	8.46	1.64***
Profitability	0.06	0.10	0.05*
Tangibility	0.38	0.42	0.04***
Leverage	0.35	0.35	−0.00
Issuance			
Loan Issuance	131.85	246.65	114.80***
Bond Issuance	93.85	229.04	135.19***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents means of firm characteristics as well as firms' issuance. I test for significant differences between firms that only issue in the domestic market and firms that are able to issue in international markets. Only non-crisis periods are included since banking crises can affect the issuance of loans and bonds. Issuance is in millions of 2010 U.S. dollars. Firm characteristics are defined in Table 15 in Appendix B. Issuance is 95% winsorized.

I find that crowding out in the domestic bond market occurs in both advanced and developing countries, as seen in Tables 20 and 21, respectively, in appendix E. In advanced countries, a one standard deviation increase (2.13 percentage points) decreases firm issuance by 1.37 percentage points. This is a 57% decrease from the non-crisis period average in advanced countries. The effect is slightly larger in developing countries: a one standard deviation increase (0.36 percentage points) decreases firm issuance by 2.06 percentage points. This is a 29% decrease from the non-crisis period average in developing countries.

As I mentioned previously, there is a potential endogeneity concern regarding government issuance. Therefore, I estimate equation 1 using two-stage least squares with the instrumental variables I presented in section 4.1. Table 9 presents the results. Almost all the coefficients mirror (in magnitude and statistical significance) the coefficients from my original estimation in Table 8. The only significant change is the coefficient on the banking crises dummy in the domestic loan market. Although still negative, the coefficient is no longer statistically significant. Importantly, the crowding out effect in the domestic bond market remains. The last of row of Table 9 reports the first stage Kleibergen-Paap rk Wald F statistics for weak instruments.[21] I compare these against the Stock and Yogo (2005) critical values (shown in Table 22 in Appendix F) to test whether my instruments are weak. My instrument works extremely well for both domestic bond and domestic loan issuance.

5.2 Shifting to International Bond Markets

In this section, I examine whether firms that have access to international credit markets are more likely to switch to these markets when crowded out of the domestic bond market. A firm

21. When the standard errors are clustered, the Cragg-Donald-based weak instruments test is no longer valid.

qualifies as having access to international markets in a certain period if they are currently issuing or have previously issued in international debt markets. I examine the behavior of this type of firm to study whether they are able to escape the crowding out that occurs in the domestic bond market during banking crises by switching to international markets.

Table 10 presents a comparison between firms that only have access to domestic credit markets and firms that have access to international markets. I compare firm characteristics and issuance (as a percentage of previous years' firms' assets). Most noticeably, firms with access to international markets are larger, on average, than firms with no international market access. However, the rest of the firm characteristics are approximately the same across the two types of firms.[22] In terms of issuance, firms that only issue in domestic markets issue less on average than firms that have access to international markets. This may simply be because firms with access to international markets are, on average, larger and may have greater funding needs.

To study the behavior of firms with international market access during periods of large government bond issuance and banking crises, I examine how these firms choose between domestic and international markets during these periods. To do this, I estimate the following discrete choice logit model of firms' market issuance decisions:

$$\begin{aligned} DomesticMarket_{i,k,t} = {} & \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} + \\ & \beta_3 BankingCrises_{k,t} \times GovIss_{k,t} + \\ & X'_{i,t}\eta + Z'_{k,t}\gamma + \alpha_t + \alpha_i + \epsilon_{i,t} \end{aligned} \tag{4}$$

where $DomesticMarket_{i,k,t}$ is an indicator variable that equals one if firm i in country k in period t issues debt in the domestic market and 0 if the firm issues debt in international markets. $BankingCrises_{k,t}$ is an indicator variable equal to one if country k is experiencing a banking crisis in year t and zero otherwise. $GovIss_{k,t}$ is government issuance as a percentage of trend GDP of country k in period t. I also include firm characteristics as well as firm and quarter fixed effects.[23] I estimate this regression for both bonds and syndicated loans, and examine how domestic and international government issuance affects market choice for firms. The results are presented in table 11.[24] The first two columns explore market choice in the bond market while the last two do the same for the loan market. For both bonds and loans, I examine the effect of both domestic (columns 1 and 3) and international (columns 2 and 4) government issuance on market choice.

To interpret the coefficients, note that the dependent variable equals one when a firm issues in the domestic market and zero when it issues internationally. A positive coefficient therefore indi-

22. The only other firm characteristic in which there is a statistically significant difference is tangibility. Tangibility, in addition to size, is a proxy for information asymmetry. Thus, it is natural that firms with access to international markets have larger values for this variable.

23. In these estimations, I include all firm controls since my dependent variable no longer depends on assets.

24. I also estimate a linear probability model. The results, presented in Table 23 in Appendix G, are very similar to the logit estimations.

Table 11: Market Choice during Banking Crises

	Bond Market Choice		Loan Market Choice	
	(1)	(2)	(3)	(4)
Banking Crises	0.52	0.38	0.72**	0.46*
	(1.24)	(0.82)	(2.57)	(1.74)
Dom. Gov. Bond Issuance	0.26***			
	(3.12)			
Banking Crises ×	-0.29**			
Dom. Gov. Bond Issuance	(-2.32)			
Int. Gov. Bond Issuance		-0.00		
		(-0.01)		
Banking Crises ×		-0.31		
Int. Gov. Bond Issuance		(-1.34)		
Dom. Gov. Loan Issuance			3.61***	
			(4.25)	
Banking Crises ×			-3.69	
Dom. Gov. Loan Issuance			(-0.76)	
Int. Gov. Loan Issuance				-2.12***
				(-3.63)
Banking Crises ×				1.33
Int. Gov. Loan Issuance				(0.71)
N	3,814	3,814	6,270	6,270
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table shows the logit regression results analyzing market choice during a banking crisis. The dependent variable in the first two columns is an indicator variable that equals one if a firm issues a domestic bond in a given quarter and 0 otherwise. In the last two columns, the dependent variable follows the same definition but applies to loans. Banking Crises is an indicator variable equal to one if a firm's country is experiencing a banking crisis in the current year and zero otherwise. Government Issuance is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with banking crises reported in the Laeven and Valencia Crisis Database, while the non-crisis periods covers all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

cates that government issuance is associated with a greater likelihood of firms issuing domestically, while a negative coefficient implies a shift toward international markets.

There are two main results from Table 11. First, during non-crisis periods, increasing either domestic government bond or loan issuance increases the probability that firms with access to international markets issue in domestic markets. This is consistent with the result in my main

estimations that during non-crisis periods, higher domestic government issuance increases the amount of domestic firm issuance in the domestic bond and loan markets.

Second, during banking crises, the reverse occurs for domestic bond issuance: as domestic government bond issuance increases during banking crises, the probability of firms issuing bonds in domestic markets decreases. This implies that when firms are crowded out of the domestic bond market during periods of financial stress, firms with access to international markets switch to these markets as a way of escaping the crowding out.

5.3 Developing Domestic Bond Markets

In the previous section, I showed that firms with access to international markets tap these markets when they are crowded out in the domestic market. However, not every firm has the ability to tap external markets. In this section, I examine if there is a way to mitigate crowding out. In particular, I examine whether the development of domestic bond markets affects the crowding out that occurs in these markets during banking crises. To do this, I estimate a model similar to the one in equation 1. This time, I interact the previous variables with a variable encapsulating the development level of domestic bond markets. The equation I estimate is:

$$\begin{aligned} I_{i,k,t} = {} & \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} \; + \; \beta_3 DevDomBondMarket_{k,t} + \\ & \beta_4 BankingCrises_{k,t} \times GovIss_{k,t} + \\ & \beta_5 BankingCrises_{k,t} \times DevDomBondMarket_{k,t} + \\ & \beta_6 DevDomBondMarket_{k,t} \times GovIss_{k,t} + \\ & \beta_7 BankingCrises_{k,t} \times DevDomBondMarket_{k,t} \times GovIss_{k,t} + \\ & X'_{i,t}\eta + Z'_{k,t}\gamma + \alpha_t + \alpha_i + \epsilon_{i,t} \end{aligned} \tag{5}$$

where the additional variable, $DevDomBondMarket_{k,t}$, is a dummy variable equal to one if country k in period t has a developed domestic bond market, and zero otherwise.

To construct the developed domestic bond market dummy variable, I use data from the Financial Development Structure Database (FDSD).[25] This database provides annual firm and government outstanding domestic bond debt (both as a percentage of GDP). I then sum these variables together to get total domestic bond debt (as a percentage of GDP), which is what I use to construct my variable of interest in the equation 5. While I use issuance in the rest of my paper, it is not appropriate for the purpose of constructing this variable since even at the annual level, issuance, as a flow variable, is very volatile and does not show the proper level of development of domestic

25. FDSD only includes data on a subset of my sample. The advanced economies covered are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The developing economies covered are Argentina, Brazil, Chile, Colombia, India, Indonesia, Malaysia, Mexico, Peru, Philippines, South Africa, Thailand, and Turkey.

Table 12: Development of Domestic Bond Markets

	Whole Period		1990s		2000s		2010s	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
East Asia								
Total	67.7	60.1	44.8	36.8	68.8	58.1	93.3	74.2
Firm	29.9	25.0	20.9	18.9	31.2	25.9	38.8	26.8
Government	37.3	41.4	24.3	21.1	37.6	38.5	53.9	57.2
Eastern Europe and Central Asia								
Total	21.4	18.9	11.6	5.8	20.1	19.9	30.2	20.8
Firm	3.6	4.9	0.6	0.4	2.7	2.5	6.9	6.5
Government	18.9	15.8	12.7	8.8	19.8	18.3	24.9	16.5
Latin America								
Total	28.5	23.1	13.0	9.9	32.4	20.9	39.8	26.5
Firm	10.0	10.3	4.3	4.9	10.2	8.5	15.4	13.0
Government	18.6	16.8	8.7	7.9	22.2	17.8	24.5	17.8
Middle East and Africa								
Total	53.5	11.3	50.8	6.3	47.5	10.5	62.7	9.0
Firm	16.8	6.8	14.6	4.9	13.9	7.2	22.0	4.0
Government	34.3	8.8	36.6	5.8	33.7	7.1	40.8	6.0
North America and Pacific								
Total	99.8	33.3	95.1	29.8	105.1	39.7	103.7	27.4
Firm	52.4	29.3	43.6	25.5	64.9	33.5	49.9	22.2
Government	47.3	18.1	51.5	17.1	40.2	18.2	53.8	15.9
Western Europe								
Total	74.9	41.2	69.3	36.4	74.1	39.8	94.8	50.1
Firm	37.1	33.6	29.6	22.8	37.1	34.6	58.3	44.6
Government	37.7	20.6	39.3	22.6	37.1	19.4	36.4	17.3

Note: This table shows the region averages and standard deviations of total, firm, and government domestic bond debt (all as a percentage of GDP) for the 1991-2017 period as well as broken down by decades. Data is taken from the Financial Development Structure Database.

bond markets. Outstanding bond debt, as a stock variable, is much less volatile and fulfills this purpose since it gives an accurate sense of how large domestic bond markets are at any particular moment. Once normalized by GDP, domestic bond debt allows me to compare the development of domestic bond markets across countries. The cutoff that I use to create my developed domestic bond market dummy is the median (51.66% of GDP) domestic bond market debt across countries and time.

Table 12 presents the mean and standard deviation of domestic bond debt (as a percentage of GDP) across regions and time periods. Three interesting facts are seen in this table. First, there is considerable variation across countries in different regions. For example, in the column for the whole period, average values range from 21.4% in Eastern Europe and Central Asia to 99.8% in North America and the Pacific. There is also quite a bit of variation across countries

Table 13: Mitigating Effects of Developed Domestic Bond Markets

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Dev. Dom. Bond Mar.	-1.063	-1.402**	-6.834***	-2.010**
	(-0.96)	(-2.16)	(-2.75)	(-2.33)
Banking Crises × Dev. Dom. Bond Mar.	1.670**	1.853*	-2.953	-3.131
	(2.43)	(1.85)	(-0.52)	(-1.35)
Banking Crises × Dom. Gov. Bond Issuance	-9.616***			
	(-3.42)			
Banking Crises × Dev. Dom. Bond Mar. × Dom. Gov. Bond Issuance	8.426***			
	(3.02)			
Banking Crises × Int. Gov. Bond Issuance		1.235**		
		(2.48)		
Banking Crises × Dev. Dom. Bond Mar. × Int. Gov. Bond Issuance		-1.201*		
		(-1.81)		
Banking Crises × Dom. Gov. Loan Issuance			-47.388**	
			(-2.37)	
Banking Crises × Dev. Dom. Bond Mar. × Dom. Gov. Loan Issuance			-3.578	
			(-0.11)	
Banking Crises × Int. Gov. Loan Issuance				46.333
				(0.79)
Banking Crises × Dev. Dom. Bond Mar. × Int. Gov. Loan Issuance				-40.781
				(-0.70)
N	9,591	3,094	11,460	2,891
R-squared	0.66	0.57	0.74	0.65
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The dependent variable is firm bond issuance in columns (1) and (2), and firm loan issuance in columns (3) and (4), all measured as a percentage of firms' previous year's assets. Banking Crises is a dummy variable equal to one if a firm's country is experiencing a banking crises in the current year and zero otherwise. Government Issuance is is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. Standard errors are heteroskedasticity-robust and clustered by country. This table presents the abridged regression results. Table 24 in Appendix H presents the full results.

with the same level of development. For example, the countries in Latin America and East Asia are, for the most part, developing countries. However, countries in East Asia have significantly more developed domestic bond markets, with average domestic bond debt at 67.7% compared to

28.5% in Latin America.

Second, there is also a lot of variation across time. For example, the average in East Asia jumps from 44.8% in the 1990s to 93.3% in the 2010s (an increase of 48.5 percentage points). Although these increases in domestic bond debt occur all over the world, they occur in varying degrees. While East Asian countries are at the top of spectrum when it comes to developing local bond markets, other countries haven't been as successful. For example, Latin American countries as well as Eastern European and Central Asian countries, on average, only increased their amount of domestic bond debt by approximately 27 and 19 percentage points, respectively.

Third, consistent with domestic bond issuance data, domestic government bond debt is, on average, larger than domestic firm bond debt. Gradually, however, the gap between the two decreases over time. In every region, domestic government bond debt was higher than domestic firm bond debt in the 1990s. However, in the 2000s and 2010s, firm bond debt equaled or surpassed government bond debt in several regions. For example, in countries in North America in the 2000s, domestic firm bond debt exceeded domestic government bond debt by 24.7 percentage points. In the 2010s, in countries in Western Europe, domestic firm bond debt exceeded domestic government bond debt by 21.9 percentage points.

Table 13 presents the estimations of equation 5. There are three important results from this table. First, with the introduction of the developed domestic bond market dummy, I observe that firms in countries with developed domestic debt markets issue less in international bond markets as well as in domestic and international loan markets compared to countries with underdeveloped bond markets. Second, firms in countries with developed domestic bond markets make greater use of these markets during banking crises by issuing more in these markets during banking crises. Third, and most importantly, while crowding out in the domestic bond market occurs in all countries, countries with developed domestic bond markets are able to mitigate, but not eliminate, crowding out in the domestic bond market.

This result leads to a very important policy implication. Developed domestic debt markets are already considered important for a myriad of reasons. For example, a domestic bond market can make an economy more resilient to sudden movements in international capital flows. Also, since developing countries usually borrow in foreign currencies in international markets, they are exposed to volatile exchange rate movements. I argue that mitigating crowding out during banking crises is yet another reason for countries to implement policies that help expand their domestic bond markets.

6 Conclusion

This paper investigates the adverse effect of high levels of government issuance on firm issuance. For my study, I use transaction-level bond and loan data for a group of 66 countries for the 1991-2017 period. This allows me to examine four distinct credit markets: the domestic bond market, the domestic loan market, the international bond market, and the international loan market.

To identify crowding out, I use a multi-faceted approach. First, to isolate the behavior of firm credit supply, I only include quarters in which firms issue debt. By only including periods in which firms issue, I make sure that firms have a positive demand for debt. Thus, changes in the amount they issue are informative about credit supply. Second, I use a novel instrument based on maturing government debt to eliminate endogeneity concerns with government issuance. I argue that my instrument is exogenous because the amount of maturing debt is the outcome of choices made years ago by previous governments and, as such, is exogenous to current economic conditions.

Using this methodology, I have five main findings. First, I find no crowding out effect during non-crisis periods when the financial system is not under duress. Second, consistent with previous literature, I find that during banking crises firms decrease their loan financing and increase their bond financing. Third, I find that firms are crowded out in the domestic bond market during banking crises in advanced and developing countries. Fourth, I find that firms with access to international credit markets use these markets when crowing out occurs in the domestic bond market. Fifth, I find that countries with developed domestic bond markets are able to mitigate, but not completely eliminate, crowding out during banking crises.

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Appendix

A Sample Countries

Table 14: Sample Countries

Advanced Countries	Developing Countries
Australia	Argentina
Austria	Bolivia
Belgium	Brazil
Canada	Bulgaria
Czech Republic	Chile
Denmark	Colombia
Finland	Costa Rica
France	Dominican Republic
Germany	Ecuador
Greece	Egypt
Hong Kong	El Salvador
Hungary	Guatemala
Iceland	Honduras
Ireland	India
Israel	Indonesia
Italy	Jamaica
Japan	Kazakhstan
Netherlands	Laos
New Zealand	Malaysia
Norway	Mexico
Poland	Nicaragua
Portugal	Pakistan
Saudi Arabia	Panama
South Korea	Paraguay
Spain	Peru
Sweden	Philippines
Switzerland	Romania
Taiwan	Russia
United Arab Emirates	South Africa
United Kingdom	Thailand
United States	Turkey
	Ukraine
	Uruguay
	Venezuela
	Vietnam

Note: This table shows the countries studied in my sample. It is divided into advanced and developing countries using the Worlds Bank's 2018 threshold of $12,696 GDP per capita. There are 31 advanced countries and 35 developing countries.

B Controls

Table 15: Firm Level Variable Description

Variable	Definition
Size	ln(Assets), expressed in 2010 millions of US$
Tangibility	Net property, plant and equipment / Assets
Profitability	Operating income before depreciation / Assets
Leverage	Debt / Assets

Note: This table provides a detailed description of my variable construction. These firm characteristics are taken from the Worldscope database.

C Firm Issuance in Advanced and Developing Countries

Table 16: Summary Statistics: Firm Issuance (Advanced Countries)

	Domestic Market		International Market		Total	
	Mean	SD	Mean	SD	Mean	SD
Non-Crisis						
Firm Bond Issuance	2.38	3.71	5.83	6.87	3.54	5.20
Firm Loan Issuance	10.55	16.13	13.85	23.01	11.70	18.37
Banking Crises						
Firm Bond Issuance	2.86	3.40	3.53	5.36	3.12	4.02
Firm Loan Issuance	4.06	12.29	13.66	22.71	7.05	16.62
Whole Sample						
Firm Bond Issuance	2.45	3.67	5.60	6.77	3.49	5.06
Firm Loan Issuance	9.87	15.90	13.83	22.98	11.22	18.25

Note: This table presents summary statistics for firm bond and loan issuance in domestic and international markets during non-crisis periods, banking crisis periods, and the whole sample period. Issuance is presented as a percentage of firms' assets and is 95% winsorized.

Table 17: Summary Statistics: Firm Issuance (Developing Countries)

	Domestic Market		International Market		Total	
	Mean	SD	Mean	SD	Mean	SD
Non-Crisis						
Firm Bond Issuance	7.15	5.93	5.77	7.39	6.94	6.62
Firm Loan Issuance	8.67	18.81	13.19	18.80	11.34	19.09
Banking Crises						
Firm Bond Issuance	8.30	6.83	5.28	7.05	7.00	7.34
Firm Loan Issuance	12.10	21.70	12.87	15.76	12.92	18.40
Whole Sample						
Firm Bond Issuance	7.22	6.00	5.70	7.34	6.95	6.69
Firm Loan Issuance	8.95	19.07	13.14	18.43	11.51	19.01

Note: This table presents summary statistics for firm bond and loan issuance in domestic and international markets during non-crisis periods, banking crisis periods, and the whole sample period. Issuance is presented as a percentage of firms' assets and is 95% winsorized.

D Government Issuance in Advanced and Developing Countries

Table 18: Summary Statistics: Government Issuance (Advanced Countries)

	Domestic Market		International Market		Total	
	Mean	SD	Mean	SD	Mean	SD
Non-Crisis						
Gov. Bond Issuance	1.4756	2.1371	0.9119	1.5040	2.7211	3.2279
Gov. Loan Issuance	0.0006	0.0021	0.0024	0.0099	0.0150	0.0480
Banking Crises						
Gov. Bond Issuance	1.1079	2.0351	1.2165	1.9112	2.7595	3.6463
Gov. Loan Issuance	0.0005	0.0020	0.0038	0.0122	0.0187	0.0537
Whole Sample						
Gov. Bond Issuance	1.4289	2.1276	0.9505	1.5645	2.7259	3.2830
Gov. Loan Issuance	0.0006	0.0021	0.0026	0.0103	0.0155	0.0488

Note: This table presents summary statistics for government bond and loan issuance in domestic and international markets during normal periods and banking crises. Government Issuance is reported as a percentage of trend GDP. Bond issuance is 95% winsorized, while loan issuance is 99% winsorized due to a more concentrated distribution.

Table 19: Summary Statistics: Government Issuance (Developing Countries)

	Domestic Market		International Market		Total	
	Mean	SD	Mean	SD	Mean	SD
Non-Crisis						
Gov. Bond Issuance	0.0500	0.3629	0.5354	1.3287	0.7063	1.8666
Gov. Loan Issuance	0.0002	0.0011	0.0024	0.0100	0.0104	0.0417
Banking Crises						
Gov. Bond Issuance	0.0294	0.1567	0.5489	1.2918	0.6506	1.6136
Gov. Loan Issuance	0.0004	0.0018	0.0035	0.0120	0.0214	0.0592
Whole Sample						
Gov. Bond Issuance	0.0481	0.3496	0.5366	1.3253	0.7014	1.8455
Gov. Loan Issuance	0.0002	0.0012	0.0025	0.0102	0.0114	0.0436

Note: This table presents summary statistics for government bond and loan issuance in domestic and international markets during normal periods and banking crises. Government Issuance is reported as a percentage of trend GDP. Bond issuance is 95% winsorized, while loan issuance is 99% winsorized due to a more concentrated distribution.

E Crowding Out during Banking Crises: Advanced and Developing Countries

Table 20: Crowding Out during Banking Crises (Advanced Countries)

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crises	0.701*	-0.793*	-3.240**	0.808
	(1.93)	(-2.05)	(-2.56)	(0.56)
Dom. Gov. Bond Issuance	0.015			
	(0.34)			
Banking Crises × Dom. Gov. Bond Issuance	-0.642**			
	(-2.11)			
Int. Gov. Bond Issuance		-0.079		
		(-0.49)		
Banking Crises × Int. Gov. Bond Issuance		0.209		
		(0.77)		
Dom. Gov. Loan Issuance			5.379*	
			(1.86)	
Banking Crises × Dom. Gov. Loan Issuance			99.072*	
			(1.77)	
Int. Gov. Loan Issuance				-6.416
				(-0.29)
Banking Crises × Int. Gov. Loan Issuance				80.530
				(1.46)
N	10,475	3,601	11,896	3,453
R-squared	0.57	0.56	0.74	0.63
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The dependent variable is firm bond issuance in columns (1) and (2) and firm loan issuance in columns (3) and (4), all measured as a percentage of firms' previous year's assets. Banking Crises is a dummy variable equal to one if a firm's country is experiencing a a banking crisis in the current year and zero otherwise. Government Issuance is is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with banking crises reported in the Laeven and Valencia Crisis Database, while the non-crisis periods covers all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Table 21: Crowding Out during Banking Crises (Developing Countries)

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crises	1.466*	-2.693	-4.893	9.705**
	(1.78)	(-1.46)	(-0.70)	(2.52)
Dom. Gov. Bond Issuance	-0.415			
	(-0.98)			
Banking Crises × Dom. Gov. Bond Issuance	-5.714**			
	(-2.28)			
Int. Gov. Bond Issuance		-0.189		
		(-0.44)		
Banking Crises × Int. Gov. Bond Issuance		-1.125		
		(-0.99)		
Dom. Gov. Loan Issuance			68.705**	
			(2.36)	
Banking Crises × Dom. Gov. Loan Issuance			-65.160*	
			(-2.08)	
Int. Gov. Loan Issuance				-49.833**
				(-2.50)
Banking Crises × Int. Gov. Loan Issuance				0.000
				(.)
N	1,805	520	606	528
R-squared	0.64	0.65	0.71	0.77
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The dependent variable is firm bond issuance in columns (1) and (2) and firm loan issuance in columns (3) and (4), all measured as a percentage of firms' previous year's assets. Banking Crises is a dummy variable equal to one if a firm's country is experiencing a a banking crisis in the current year and zero otherwise. Government Issuance is is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with banking crises reported in the Laeven and Valencia Crisis Database, while the non-crisis periods covers all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

F Weak Instrument Critical Values

Table 22: Critical Values for Weak Instruments

	Critical Values
10% maximal IV size	7.03
15% maximal IV size	4.58
20% maximal IV size	3.95
25% maximal IV size	3.63

Note: The critical values are for two endogenous regressors and two instrumental variables. The values are taken from Stock and Yogo (2005).

G Linear Probability Model: Market Switching

Table 23: Market Choice during Banking Crises

	Bond Market Choice		Loan Market Choice	
	(1)	(2)	(3)	(4)
Banking Crises	0.06*	0.04	0.09**	0.04
	(1.97)	(1.52)	(2.26)	(1.55)
Dom. Gov. Bond Issuance	0.02**			
	(2.07)			
Banking Crises ×	-0.03**			
Dom. Gov. Bond Issuance	(-2.43)			
Int. Gov. Bond Issuance		-0.01		
		(-0.63)		
Banking Crises ×		-0.03		
Int. Gov. Bond Issuance		(-1.18)		
Dom. Gov. Loan Issuance			0.36***	
			(3.17)	
Banking Crises ×			-0.35	
Dom. Gov. Loan Issuance			(-1.05)	
Int. Gov. Loan Issuance				-0.27***
				(-4.59)
Banking Crises ×				0.16
Int. Gov. Loan Issuance				(1.08)
N	9,131	9,131	11,789	11,789
R-squared	0.69	0.69	0.60	0.60
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table shows the linear probability regression results analyzing market choice during a banking crisis. The dependent variable in the first two columns is an indicator variable that equals one if a firm issues a domestic bond in a given quarter and 0 otherwise. In the last two columns, the dependent variable follows the same definition but applies to loans. Banking Crises is an indicator variable equal to one if a firm's country is experiencing a banking crisis in the current year and zero otherwise. Government Issuance is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with banking crises reported in the Laeven and Valencia Crisis Database, while the non-crisis periods covers all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

H Full Regression: Developed Domestic Bond Markets

Table 24: Mitigating Effects of Developed Domestic Bond Markets

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crises	0.363	-2.272**	-1.457	3.196
	(0.52)	(-2.60)	(-0.26)	(1.48)
Dev. Dom. Bond Mar.	-1.063	-1.402**	-6.834***	-2.010**
	(-0.96)	(-2.16)	(-2.75)	(-2.33)
Banking Crises × Dev. Dom. Bond Mar.	1.670**	1.853*	-2.953	-3.131
	(2.43)	(1.85)	(-0.52)	(-1.35)
Dom. Gov. Bond Issuance	-0.050			
	(-0.20)			
Banking Crises × Dom. Gov. Bond Issuance	-9.616***			
	(-3.42)			
Dev. Dom. Bond Mar. × Dom. Gov. Bond Issuance	0.393			
	(1.25)			
Banking Crises × Dev. Dom. Bond Mar. × Dom. Gov. Bond Issuance	8.426***			
	(3.02)			
Int. Gov. Bond Issuance		-0.675**		
		(-2.70)		
Banking Crises × Int. Gov. Bond Issuance		1.235**		
		(2.48)		
Dev. Dom. Bond Mar. × Int. Gov. Bond Issuance		0.667**		
		(2.11)		
Banking Crises × Dev. Dom. Bond Mar. × Int. Gov. Bond Issuance		-1.201*		
		(-1.81)		
Dom. Gov. Loan Issuance			49.158**	
			(2.57)	
Banking Crises × Dom. Gov. Loan Issuance			-47.388**	
			(-2.37)	

Continued on next page

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Dev. Dom. Bond Mar. × Dom. Gov. Loan Issuance			-44.534**	
			(-2.35)	
Banking Crises × Dev. Dom. Bond Mar. × Dom. Gov. Loan Issuance			-3.578	
			(-0.11)	
Int. Gov. Loan Issuance				-0.189
				(-0.06)
Banking Crises × Int. Gov. Loan Issuance				46.333
				(0.79)
Dev. Dom. Bond Mar. × Int. Gov. Loan Issuance				-2.552
				(-0.60)
Banking Crises × Dev. Dom. Bond Mar. × Int. Gov. Loan Issuance				-40.781
				(-0.70)
N	9,591	3,094	11,460	2,891
R-squared	0.66	0.57	0.74	0.65
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: The dependent variable is firm bond issuance in columns (1) and (2), and firm loan issuance in columns (3) and (4), all measured as a percentage of firms' previous year's assets. Banking Crises is a dummy variable equal to one if a firm's country is experiencing a banking crises in the current year and zero otherwise. Government Issuance is is reported as a percentage of trend GDP. Firm issuance and government bond issuance are 95% winsorized, while government loan issuance is 99% winsorized due to a more concentrated distribution. Standard errors are heteroskedasticity-robust and clustered by country. This table presents the full regression results for Table 13.