

Crowding Out and Banking Crises*

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Abstract

This paper studies the effect of government debt issuance on firm issuance during banking crises using transaction-level bond and loan data from 66 countries between 1991 and 2017. To address the potential endogeneity of government issuance, I use a novel instrument based on maturing sovereign debt. The findings show that governments crowd firms out of the domestic bond market. 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, more developed domestic bond markets mitigate, but do not eliminate, crowding out.

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 decades, beginning with the Global Financial Crisis in 2008 and culminating in a surge in 2020 with the onset of the COVID-19 pandemic (Kose et al. 2022). More specifically, government debt issuance surges at the start of banking crises and continues to grow as the crisis unfolds (Figure 1a). During banking crises, as the financial system deteriorates, credit availability declines, making access to financing much more challenging. As governments increase their borrowing during these periods to stabilize the banking system and support the economy, it is important to understand whether firms are crowded out of debt markets by the government.

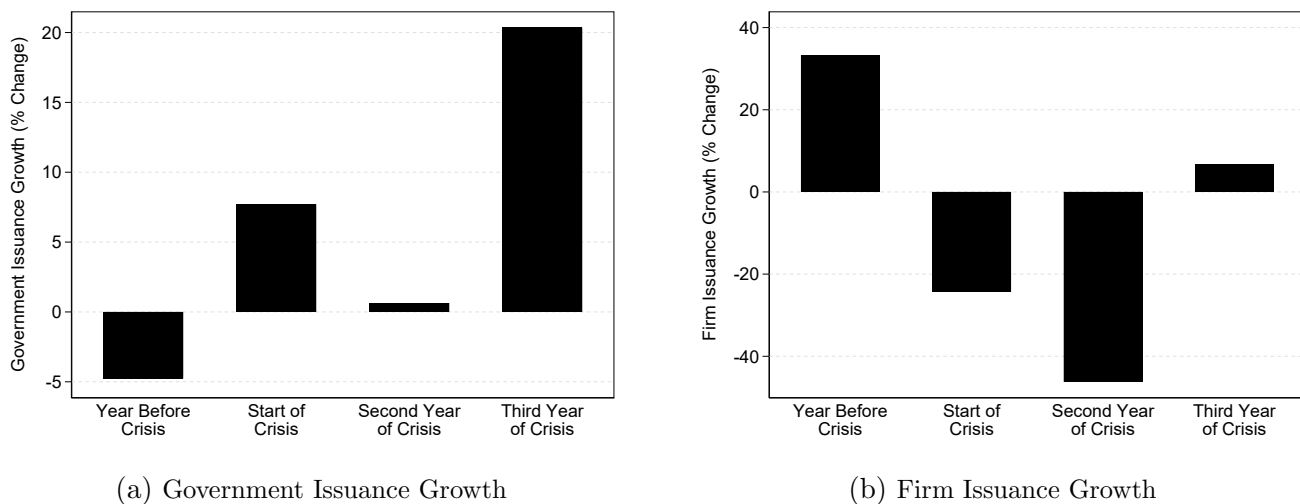
This paper studies the effect of government issuance on firm issuance during banking crises and finds that firms are crowded out of the domestic bond market during banking crises, both in advanced and developing countries. To establish this new fact, I construct a new dataset based on transaction-level 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 crowding out, I use maturing sovereign debt as a novel instrument for government issuance.

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 may face growing constraints in accessing debt markets.

The definition of crowding out used in this paper differs from the textbook definition. The textbook definition of crowding out focuses on the stock of government debt. Under this definition, crowding out occurs when a fiscal deficit is financed by issuing debt. The resulting increase in the stock of government debt, or positive net issuance, raises total demand for funding and puts upward pressure on interest rates, reducing firm borrowing. Although widely used, 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)).

I define crowding out as a decrease in firm gross issuance caused by an increase in government gross issuance. Gross issuance is important because it captures the flow of new debt financing that investors must absorb, regardless of whether that issuance increases the borrower’s stock of debt

Figure 1: Government and Firm Issuance during Banking Crises



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. Issuance is measured as a percentage of trend GDP before growth rates are calculated. Panel (a) shows the growth rate of government issuance, while Panel (b) shows the growth rate of firm issuance. Both panels cover the countries in my sample (seen in Table 14) over the 1991-2017 period. Issuance includes domestic and international bonds as well as domestic and international syndicated loans.

Alt text: Two bar charts show median growth in government and firm debt issuance around banking crises. Government issuance falls in the year before a crisis, rises at the start of the crisis, remains slightly positive in the second year, and rises sharply in the third year. Firm issuance increases strongly in the year before a crisis, falls sharply in the first and second years of the crisis, and partially recovers in the third year.

or refinances maturing debt.¹ This measure is useful for studying competition in debt markets because it fully captures the amount of financing that governments and firms demand.

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)).

As a first step in my analysis, I assemble a novel dataset containing the universe of new bond issuances 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 my dataset are firm balance sheet characteristics. I aggregate the data as a quarterly firm panel by summing the amounts raised in each market and quarter. To be included in my sample, firms are required

1. This distinction parallels the literature on capital flows, which emphasizes that both net and gross flows matter. Net flows measure the overall balance between inflows and outflows, while gross flows measure the total volume of financing moving through markets. Net flows are linked to saving and investment, while gross flows are important for liquidity, balance-sheet exposures, and risk premia (Obstfeld 2012; Disyatat 2021; Forbes and Warnock 2012; Broner et al. 2013; Rey 2015).

to have non-missing firm characteristics during the year prior to issuance. The sample consists of 87,979 firm-quarters.

To assess whether government issuance constrains firms' access to capital markets, I examine how firms access debt markets during crisis and non-crisis periods. During non-crisis periods, firms mainly secure funding through bank loans. During a banking crisis, however, firms may be unable to obtain loans as the domestic banking system comes under stress and may turn to alternative sources of funding to continue 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. When firms switch to bond markets during banking crises, they therefore compete more directly with governments for bond financing.

This competition matters because debt markets are not perfectly integrated. If investors and intermediaries could freely reallocate funds across markets, an increase in government borrowing in the domestic bond market would be offset by funds flowing in from other markets, limiting its effect on firm issuance. However, prior work shows that different debt markets provide distinct types of financing and are only imperfect substitutes, in part because they rely on different investor and intermediary bases.² Bank loans are characterized by close monitoring, relationship lending, and greater scope for renegotiation, while bonds are held by a broader and more dispersed investor base (Diamond 1991; Chemmanur and Fulghieri 1994; Bolton and Scharfstein 1996; Bolton and Freixas 2000; Hackbarth et al. 2007; Roberts and Sufi 2009; Schwert 2020). Consistent with these differences, firms sort across bank debt, non-bank private debt, and public debt markets depending on borrower characteristics and credit quality (Denis and Mihov 2003). When firms shift from loans to domestic bonds during banking crises, their ability to issue depends on conditions in the domestic bond market, where governments are large issuers. In that market, corporate issuance competes with government issuance for the same pool of investors, reducing the funding available to firms.³

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

2. Even within bond markets, domestic and international issuance differ in currency denomination, issue size, maturity, and pricing (Gozzi et al. 2015).

3. This mechanism is distinct from a bank-balance-sheet channel in which banks reduce lending to firms in order to purchase government bonds. Bond issuance is absorbed by a broader fixed-income investor base that, aside from banks, includes institutional investors, investment funds, insurance companies, and pension funds. Evidence on sovereign-debt holdings shows that government bonds are held by a heterogeneous set of domestic and foreign investors (Arslanalp and Tsuda 2014a, 2014b). Evidence from the United States, Euro Area, and Japan shows that domestic central banks held around 20% of government bonds in 2025 and remained the largest domestic holders of government bonds, while banks and other monetary financial institutions held around 15% of corporate bonds since 2017 (OECD 2026). Consistent with this broader investor-base view, Fang et al. (2025) find that private nonbank investors absorb a disproportionate share of increases in sovereign debt relative to banks.

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, so changes in the amount of issuance are informative about the supply of credit available to the firm. 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. To further address the possibility that changes in issuance reflect shifts in credit demand rather than changes in credit supply, I control for time-varying firm characteristics that have been identified in the literature as important drivers of firms' demand for credit (see, for example, Houston and James (1996); Denis and Mihov (2003); Adrian et al. (2013)). 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 an important determinant of how much governments need to issue. The 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 key 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. In non-crisis periods, firms rely mainly on bank loans, while governments rely mainly on bond markets. As a result, firms and governments generally do not compete for the same source of debt financing.

Second, consistent with previous literature, I find that firms shift away from loans and toward bonds during banking crises. 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 during banking crises, domestic government bond issuance crowds out domestic firm bond issuance. Specifically, average domestic government bond issuance during banking

crises reduces domestic firm bond issuance by about 40% relative to banking crises with no domestic government bond issuance. 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 sovereign borrowing and firm credit, the literature on firm financing during crises, and the literature on domestic bond market development.

First, the paper relates to the literature on sovereign borrowing and firm credit. The crowding-out literature studies whether debt-financed fiscal policy reduces private investment or firm credit, and through which mechanisms this occurs. Friedman (1978) shows that when there are unemployed resources in the economy, debt-financed deficits need not crowd out private investment and may even crowd it in. Blinder and Solow (1973) show that bond-financed fiscal policy can raise private-sector wealth, which in turn affects both consumption demand and money demand. By raising money demand and putting upward pressure on interest rates, these wealth effects can create an additional channel through which fiscal policy crowds out private investment. More recently, Pinardon-Touati (2021) documents a decline in corporate credit following debt-financed local government spending, which lowers the output multiplier of local government spending. I contribute to this literature by studying a different form of crowding out: the effect of gross government issuance on gross firm issuance across debt markets. Under this definition, I show that government issuance does not reduce firm issuance when the financial system is stable, but does so during banking crises.

The paper is also related to work on sovereign debt, banks, and private credit, which received particular attention after the European sovereign debt crisis. One strand of this literature emphasizes the negative effect of banks' exposure to domestic sovereign debt on firm credit. Broner et al. (2014) propose a model with creditor discrimination and crowding-out effects to account for the reallocation of credit from the private sector to the government observed in the euro-area 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 banks reallocating toward sovereign debt and reducing credit to the private sector. A related line of research emphasizes how sovereign risk exposure affects bank balance sheets and lending. Crosignani (2017) proposes a model in which banks risk-shift by increasing their holdings of do-

mestic government bonds. As sovereign risk increases, banks reduce credit to the private sector and 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 that deteriorating sovereign creditworthiness leads banks exposed to impaired sovereign debt to contract lending. My paper differs from this work by focusing on gross debt issuance across markets rather than on banks' sovereign exposures and lending portfolios. I show that during banking crises, crowding out occurs directly in the domestic bond market, where firms and governments compete for investors' funds.

This paper further contributes by studying both advanced and developing countries. Much of the existing evidence on sovereign debt and firm credit comes from advanced economies, especially the euro-area sovereign debt crisis. Evidence from developing countries is more limited. Bouis (2019) studies emerging market and developing economies using macroeconomic data and finds that higher bank holdings of government securities are associated with lower private-sector credit growth. Williams (2018) uses a natural experiment in Colombia to show that foreign investor demand for sovereign debt can free domestic financial resources for the private sector. I add to this literature by constructing transaction-level debt issuance data covering both advanced and developing countries and showing that crowding out of firm issuance occurs not only in advanced economies, but also in developing ones.

Second, the paper contributes to the literature on corporate credit during crises. Gennaioli et al. (2014) study the link between sovereign default and financial fragility, showing that government defaults can reduce private credit, especially in countries where financial institutions are more developed and banks are more exposed to government bonds. Arteta and Hale (2008) and Das et al. (2010) provide empirical evidence that sovereign crises and sovereign default risk reduce private-sector access to external capital markets. Adrian et al. (2013) and Cortina et al. (2021) study firm financing during financial crises and show that firms switch from loan markets to bond markets as bank credit contracts. Cortina et al. (2021) also document switching from domestic to international markets during domestic financial crashes. I build on this work by showing that, during banking crises, firms' shift from loans to bonds brings them into direct competition with governments in the domestic bond market, where government issuance crowds out firm issuance. I also show that firms with access to international markets respond by switching their issuance abroad.

Lastly, the paper contributes to the literature on domestic bond market development. Prior work emphasizes that domestic bond markets can reduce reliance on international borrowing and therefore limit exposure to foreign-currency debt, sudden stops, and movements in global capital flows (Tobias et al. 2021). Burger et al. (2012) highlight the drivers and constraints of local currency bond market development. In particular, they show that high inflation volatility is an obstacle to bond market development, while stronger creditor rights and investor-friendly institutions support the growth of local currency bond markets. I contribute to this literature by identifying an additional benefit of domestic bond market development: deeper domestic bond markets mitigate,

although they do not eliminate, crowding out during banking crises.

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.⁴ Government issuance consists of issuances by national, local, and regional governments as well as government agencies and regional agencies.^{5,6} I restrict my sample to 66 countries.⁷

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.⁸ 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 issuances 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

4. 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 6,799, are excluded from my study.

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

6. 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.

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

8. 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.

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. 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.⁹ 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. The sample includes firm-quarters in which the firm issues in at least one debt market. Within these firm-quarters, issuance in a given market is positive when the firm issues in that market. If a firm issues debt in a given quarter but does not issue in a market it has previously used, I record issuance in that market as zero.¹⁰ In these cases, the zero reflects an accessible market that the firm did not use in that quarter. I do not assign zero issuance to markets in which the firm has not previously issued. To be included in the sample, firms must have non-missing firm characteristics in the year prior to issuance. Firm fundamentals are available only at the annual frequency, so I assign prior-year firm characteristics to each firm-quarter observation. This ensures that the controls are predetermined relative to issuance decisions and are not affected by economic conditions at the time of issuance. Throughout the paper, the main dependent variable is firm issuance. To make the results comparable across firms, I scale each firm’s issuance by its previous-year assets. The main independent variable throughout this paper

9. The definitions are provided in Table 15.

10. Previous use is defined relative to the current quarter. A firm is treated as having used a market only if I observe issuance in that market before the current quarter. Therefore, a firm is not assigned zero issuance in a market before its first observed issuance in that market.

is government issuance. Similarly, to make it comparable across countries, I scale government issuance by trend GDP.¹¹ Scaling by trend GDP reduces the influence of contemporaneous cyclical fluctuations in GDP. 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.¹² Laeven and Valencia (2018) 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.¹³ Second, there must be significant banking policy intervention measures in response to the significant losses in the banking system, such as bank holidays or bank nationalizations.¹⁴ This database covers 151 banking crisis episodes around the world for the 1970–2017 period. Since the banking crisis database ends in 2017, the analysis is restricted to the 1991–2017 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 firms’ previous-year assets) in both domestic and international markets for bonds and loans.¹⁵ 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

11. Since government issuance is observed at the quarterly frequency while GDP is measured annually, I annualize quarterly government issuance before scaling it by trend GDP. I compute trend GDP using the Hodrick-Prescott filter with smoothing parameter $\lambda = 100$, the standard value for annual data.

12. Since banking crisis episodes are identified using externally dated crisis chronologies rather than being constructed from the firm-level issuance outcomes analyzed in this paper, I treat banking crises as predetermined country-level events relative to firm issuance. This mitigates concerns that the crisis indicator is mechanically driven by individual firms’ issuance decisions: firms may adjust issuance in response to a banking crisis, but a single firm’s issuance decision is unlikely to determine whether a country-year is classified as a systemic banking crisis.

13. 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.

14. 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).

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

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 full sample period. Issuance is expressed as a percentage of firms' assets and is winsorized at the 99th percentile.

more in loans than in bonds. Second, during banking crises, firm issuance falls in every market 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 have log assets that are, on average, 1.56 higher. 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.¹⁶ Two key patterns emerge.

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

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 winsorized at the 99th percentile.

First, governments make minimal use of the syndicated loan market, issuing on average just 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.¹⁷ 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.¹⁸

D.

17. 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.

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

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 non-crisis periods and banking crises. Government Issuance is reported as a percentage of trend GDP. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. Government loan issuance is winsorized at the 99th percentile.

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.¹⁹

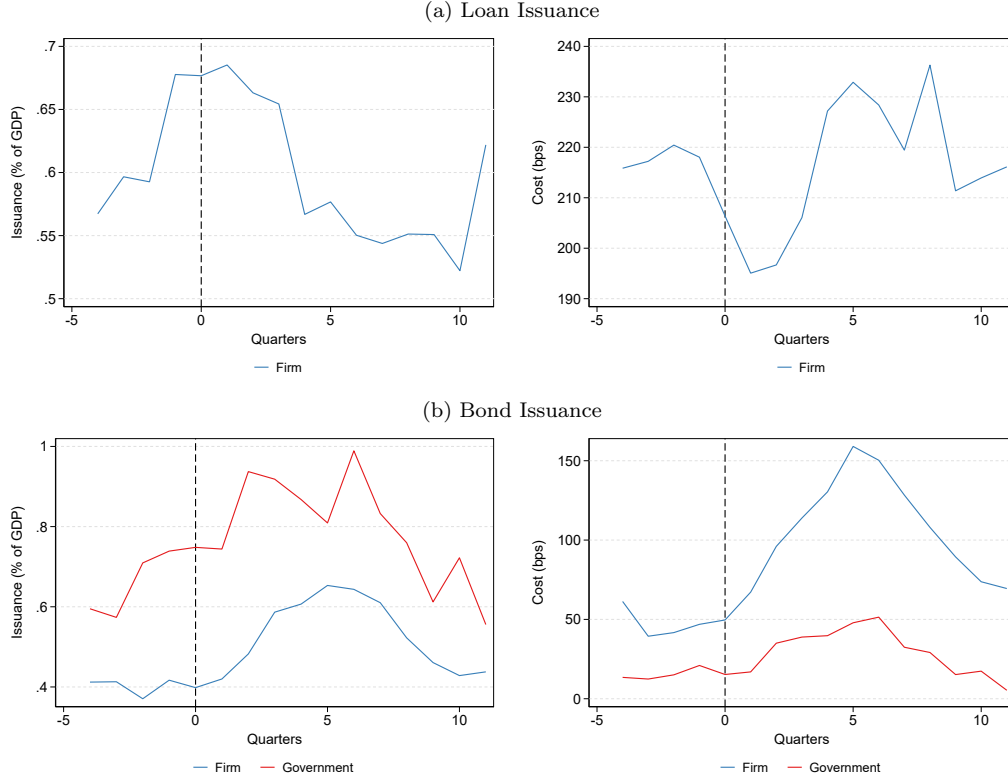
Panel 2b shows the amount issued and the cost of domestic bond issuance. In the year leading up to a banking crisis, government bond issuance begins to rise, while firm issuance remains relatively stable. During this pre-crisis period, the cost of bond issuance remains relatively stable for both governments and firms. Once a crisis begins, both government and firm bond issuance rise sharply within the first year of the crisis, with government issuance increasing by roughly one-quarter and firm issuance increasing by nearly 50 percent.²⁰ At the same time, the cost of both government and firm bond issuance increases as well. However, the difference between firm and government borrowing costs 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.

loans from the analysis.

19. This corresponds to an increase of about 40 basis points, from roughly 195 basis points at the start of the crisis to roughly 235 basis points one year into the crisis.

20. Government bond issuance rises from roughly 0.75 percent of GDP at the onset of the crisis to about 0.95 percent four quarters later, while firm bond issuance rises from roughly 0.4 percent to about 0.6 percent of GDP over the same period.

Figure 2: Domestic Issuance during Banking Crises



Note: This figure shows the evolution of issuance and issuance costs for governments and firms in domestic markets around banking crises. For each variable, I calculate the average during the four quarters before a banking crisis and the first twelve quarters after the crisis begins. Each series is smoothed using a five-quarter moving average centered on the current quarter, using two lags and two leads. The dotted vertical line represents the start of a banking crisis. Panel 2a shows loan issuance as a percentage of GDP and the cost of loan issuance in basis points. Panel 2b shows bond issuance as a percentage of GDP and the cost of bond issuance in basis points.

Alt text: Four line charts show domestic firm and government issuance and issuance costs around banking crises, from four quarters before the crisis to twelve quarters after. Domestic firm loan issuance declines after the start of the crisis while loan costs rise. In domestic bond markets, both firm and government issuance increase after the crisis begins, but firm bond costs rise much more sharply than government bond costs.

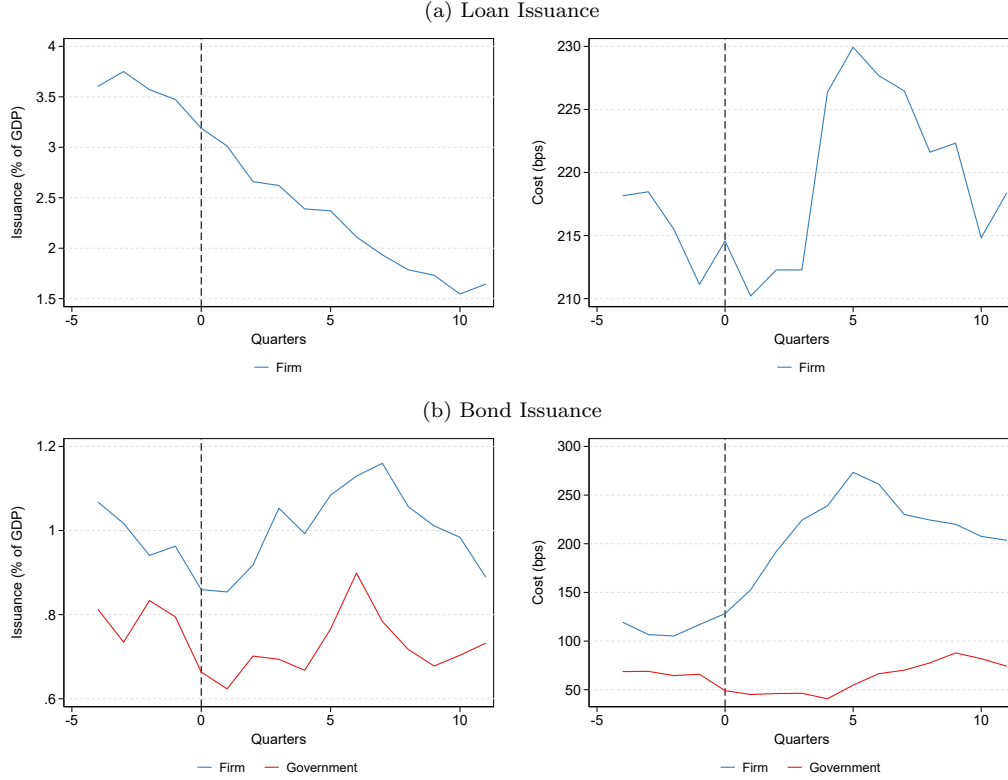
3.2 International Issuance

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, with issuance around 3.5 percent of GDP. Issuance begins to decline before the crisis starts and continues to fall once the crisis begins, decreasing by approximately 30 percent within the first year.²¹ 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

21. International firm loan issuance falls from roughly 3.5 percent of GDP at the onset of the crisis to about 2.5 percent four quarters later.

Figure 3: International Issuance during Banking Crises



Note: This figure shows the evolution of issuance and issuance costs for governments and firms in international markets around banking crises. For each variable, I calculate the average during the four quarters before a banking crisis and the first twelve quarters after the crisis begins. Each series is smoothed using a five-quarter moving average centered on the current quarter, using two lags and two leads. The dotted vertical line represents the start of a crisis. Panel 3a shows loan issuance as a percentage of GDP and the cost of loan issuance in basis points. Panel 3b shows bond issuance as a percentage of GDP and the cost of bond issuance in basis points.

Alt text: Four line charts show international firm and government issuance and issuance costs around banking crises, from four quarters before the crisis to twelve quarters after. International firm loan issuance declines steadily after the start of the crisis while loan costs rise. In international bond markets, firm issuance increases after the crisis begins and then declines, while government issuance also rises temporarily. Firm bond costs increase sharply, while government bond costs remain relatively stable.

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 200 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.

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 identification of crowding out poses two challenges. First, any change in firm issuance following an increase in government issuance must be driven by a change in firm credit supply and not firm credit demand. Second, government issuance is endogenous to current economic conditions, which can bias the estimates. Below I explain in detail how I address each of these challenges.

It is crucial to show that any contraction in firm issuance is driven by a reduction in credit supply rather than a reduction in credit demand. Crisis periods may be characterized by both higher government issuance and lower firm issuance, and simply observing this pattern is insufficient evidence of crowding out. This is because, while governments may increase issuance during banking crises to respond to deteriorating economic conditions, firms may demand less debt as the downturn reduces investment opportunities. To isolate the behavior of firm credit supply, I only include firm-quarters in which the firm issues debt in at least one market. Intuitively, if a firm issues debt, it reveals positive demand for debt, so changes in the amount and market composition of issuance are informative about the supply of credit available to the firm.²² If a firm issues debt in one market in a given quarter, but does not issue in another market that it has used before, I record issuance in the unused market as zero.²³ To further control for changes in firm credit demand, I include firm characteristics that have been identified by previous literature as important drivers of credit demand (Houston and James 1996; Denis and Mihov 2003; Adrian et al. 2013). It is worth pointing out that this methodology does not include firms with positive demand for debt that are unable to issue either a loan or a bond. In that sense, my estimates likely understate the total effect of government issuance on firm financing.

I predict that government issuance will have a negative effect on firm issuance during banking crises. In non-crisis periods, governments and firms tend to rely on different sources of debt financ-

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

23. As described in Section 2.1, market access is defined using only past issuance. This avoids treating firms as having access to a market before they are observed issuing in that market.

ing. Governments rely primarily on bond markets, while firms, especially in domestic markets, rely heavily on bank loans. During banking crises, however, loan supply contracts as the banking system comes under stress. Firms seeking alternative financing therefore shift toward bond issuance. This can overburden the domestic bond market, as governments and firms compete for the same pool of funds. Since debt markets are not perfectly integrated, the additional demand for bonds is unlikely to be fully offset by funding from other markets. To test this prediction, I estimate the following equation:

$$\begin{aligned}
I_{i,k,t} = & \beta_1 \text{BankingCrisis}_{k,t} + \beta_2 \text{GovIss}_{k,t} + \\
& \beta_3 \text{BankingCrisis}_{k,t} \times \text{GovIss}_{k,t} + \\
& X'_{i,t-1} \eta + \alpha_t + \alpha_i + \epsilon_{i,k,t}
\end{aligned} \tag{1}$$

where $I_{i,k,t}$ is the bond or loan issuance of firm i in country k and quarter t . $I_{i,k,t}$ is defined as $\log \left(1 + \frac{\text{AmountIssued}_{i,k,t}}{\text{Assets}_{i,t-1}} \right)$. $\text{BankingCrisis}_{k,t}$ is an indicator variable equal to one if country k is experiencing a banking crisis in the current year, and zero otherwise. $\text{GovIss}_{k,t}$ is bond or loan government issuance in country k and quarter t . It is defined as $\log \left(1 + \frac{\text{AmountIssued}_{k,t}}{\text{TrendGDP}_{k,t}} \right)$.²⁴ $X'_{i,t-1}$ are firm controls that account for changes in firm fundamentals that may influence firms' demand for debt.²⁵ 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 specification, government issuance is measured in the same market as firm issuance. This allows me to test whether government borrowing crowds out firm borrowing when both sectors compete for the same funds.

In line with previous literature (Adrian et al. (2013) and Cortina et al. (2021)), I expect banking crises to be associated with a shift in firm financing away from domestic loans and toward domestic bonds. Comparing the coefficient on $\text{BankingCrisis}_{k,t}$ across markets provides descriptive evidence on this shift.²⁶ In particular, a negative coefficient in the domestic loan market, together with a positive coefficient in the domestic bond market, would be consistent with firms relying relatively more on bond markets when bank credit contracts.

The key prediction is that government issuance crowds out firm issuance in the domestic bond market during banking crises. The coefficient β_2 captures the relationship between government issuance and firm issuance outside banking crises, while β_3 captures whether this relationship changes during crises. A negative β_3 in the domestic bond market would indicate that government

24. I normalize firm issuance by assets to account for differences in firm size, since larger firms issue larger amounts on average. Similarly, I normalize government issuance by trend GDP to account for differences in country size. I then apply a $\log(1+x)$ transformation, which reduces the influence of very large issuance episodes while preserving observations with zero issuance.

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

26. Because equation 1 includes an interaction term, the effect of a banking crisis at a given level of government issuance is $\beta_1 + \beta_3 \text{GovIss}_{k,t}$, rather than β_1 alone.

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. Maturing government bond debt is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution, while maturing government loan debt is winsorized at the 99th percentile.

issuance has a more negative effect on firm bond issuance during banking crises than in normal periods. However, crowding out during crises requires the total effect of government issuance during banking crises, $\beta_2 + \beta_3$, to be negative. The main prediction is therefore that $\beta_3 < 0$ and $\beta_2 + \beta_3 < 0$ in the domestic bond market. This would indicate that, when firms seek to substitute away from bank loans and toward bond financing, government issuance reduces their ability to raise funds in the domestic bond market.

This mechanism complements the domestic-bank balance sheet channel emphasized in previous work. For example, Becker and Ivashina (2018) document crowding out in domestic loan markets when banks hold large amounts of their own government’s sovereign debt. My paper studies a different margin: gross issuance flows and competition within the bond market. Since governments rely primarily on bond issuance and rarely borrow through loan markets, I do not expect government issuance to have a large direct effect on firm issuance in the domestic loan market. The prediction is instead that crowding out should be most visible in the domestic bond market during banking crises, when firms’ demand for bond financing rises at the same time that governments are placing debt in that market.

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 approach to overcome this endogeneity problem.

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 corresponding instruments in domestic and international markets for the 1991-2017 period. Government bond issuance and maturing bond debt are winsorized at the 95th percentile to limit the influence of extreme observations in their highly right-skewed distributions, while government loan issuance and maturing loan debt are winsorized at the 99th percentile.

I take advantage of transaction-level data to construct instruments based on maturing sovereign debt, both for loan issuance and for bond issuance. In particular, the instrumental variables are the amount of maturing sovereign bond debt for bonds and the amount of maturing sovereign loan debt for loans.²⁷ I argue that the amount of maturing sovereign debt is exogenous to current economic conditions because it reflects borrowing decisions typically made years earlier by previous governments. I also argue that maturing debt is a good predictor of new government issuance, since large amounts of maturing debt will exert pressure on governments to enter debt markets to issue again. This identification strategy therefore allows me to cleanly distinguish crowding out from confounding drivers of firm issuance.

This strategy also helps distinguish crowding out from a generic flight-to-quality mechanism, in which investors reduce exposure to corporate bonds during crises and reallocate toward safer assets, including sovereign debt. Without an instrument, government issuance during banking crises may be correlated with contemporaneous increases in risk aversion that also reduce firm issuance. By instrumenting government issuance with maturing government debt, I isolate variation in sovereign issuance driven by predetermined refinancing needs. Therefore, the estimated effect comes from crisis episodes in which governments are induced to issue more because debt comes due, rather than from crisis-time investor reallocation alone.

For the instrument to be valid, it must satisfy two requirements. First, it must be exogenous: maturing government debt must be unrelated to current economic conditions that may affect firm issuance. Second, it must be relevant: maturing government debt must be correlated with government issuance.

27. 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 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.

To establish exogeneity, Table 4 reports 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. To establish relevance, Table 5 presents the correlations between my instrumental variables and government issuance of bonds and loans in both domestic and international markets. 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. For loans, maturity does not change significantly during banking crises in domestic markets, while it increases in international markets. Crucially, for both bonds and loans in either market, the average maturity does not fall 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

This section reports the empirical results. Section 5.1 presents the main result on crowding out during banking crises using OLS as well as the two-stage least squares estimates using my instruments for government issuance. Section 5.2 examines whether access to international markets allows firms to avoid crowding out. Finally, section 5.3 investigates whether more developed local bond markets help mitigate its effects.

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.

5.1 Crowding Out during Banking Crises

Table 8 reports the baseline OLS estimates from 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. The table yields three main results.

First, consistent with previous literature, firms shift away from domestic loans and toward domestic bonds during banking crises. The coefficients on the banking crisis indicator from columns 1 and 3 show that domestic firm loan issuance decreases while domestic bond issuance increases during banking crises. During a banking crisis, bank loan supply contracts as the banking system comes under stress. This is a major shock to firms since loans are their primary source of funding in normal times: during non-crisis periods, firms issue 10.45% of their assets in domestic loans compared to only 3.08% in domestic bonds. To provide a sense of magnitude, the coefficients imply that domestic loan issuance falls from 10.45% to 6.32% of assets, a decline of 4.13 percentage points, or approximately 40%. At the same time, domestic bond issuance increases from 3.08% to 4.82% of assets, an increase of 1.74 percentage points, or approximately 57%.²⁸ As bank credit contracts, firms turn to bond financing to partially offset the loss of loan funding.

This result is consistent with the quantity and price evidence presented in Section 3. During banking crises, the decline in domestic loan issuance is accompanied by a sharp increase in the cost of loans, pointing to a negative shock to bank credit supply. As firms search for alternative sources of funding, they increase their reliance on domestic bond markets. At the same time, the cost of bond financing also rises, suggesting that the demand for bond financing shifts outward as firms substitute away from bank loans. Together, the regression results and the price-quantity evidence point to a contraction in domestic loan supply and a shift toward domestic bond financing during

28. Since the specification includes government issuance and its interaction with the banking crisis indicator, the coefficient on the banking crisis indicator captures the effect of a banking crisis when government issuance is equal to zero. I use this baseline case only to provide an intuitive interpretation of the coefficients. The implied magnitudes are calculated as follows. For a banking crisis coefficient β , the implied level of issuance during a banking crisis is $(1 + y_0) \exp(\beta) - 1$, where y_0 is the non-crisis mean of issuance. For domestic loans, using $y_0 = 10.45$ and $\beta = -0.447$ gives $(1 + 10.45) \exp(-0.447) - 1 = 6.32$. For domestic bonds, using $y_0 = 3.08$ and $\beta = 0.356$ gives $(1 + 3.08) \exp(0.356) - 1 = 4.82$.

Table 8: Crowding Out during Banking Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crisis	0.356*** (3.66)	-0.181* (-1.81)	-0.447*** (-3.93)	0.161* (1.79)
Dom. Gov. Bond Issuance	0.044 (1.35)			
Banking Crisis × Dom. Gov. Bond Issuance	-0.497*** (-3.27)			
Int. Gov. Bond Issuance		-0.090 (-1.44)		
Banking Crisis × Int. Gov. Bond Issuance		0.090 (0.69)		
Dom. Gov. Loan Issuance			0.642*** (2.74)	
Banking Crisis × Dom. Gov. Loan Issuance			0.084 (0.22)	
Int. Gov. Loan Issuance				-0.220 (-0.89)
Banking Crisis × Int. Gov. Loan Issuance				0.990 (0.80)
N	12,280	4,125	12,504	3,983
R-squared	0.67	0.56	0.75	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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed 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 cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

banking crises.

Second, during non-crisis periods, domestic government issuance does not crowd out domestic firm issuance. In column 1, the coefficient on domestic government bond issuance is positive but small and statistically insignificant, indicating that domestic government bond issuance has little relationship with domestic firm bond issuance during non-crisis periods. In column 3, the coefficient on domestic government loan issuance is positive and statistically significant. However, the effect is economically small because governments rarely issue in the syndicated loan market.²⁹ Overall, these estimates are consistent with the fact that, when the banking system is functioning normally, firms and governments rely primarily on different debt markets, so domestic government issuance does not reduce domestic firm issuance during non-crisis periods.

Third, and most importantly, domestic government bond issuance crowds out domestic firm bond issuance during banking crises.³⁰ This is seen in column 1, where the interaction between banking crises and domestic government bond issuance is negative and statistically significant. This result is of particular interest because previous literature (Becker and Ivashina 2018; Bouis 2019; Popov and Van Horen 2015) has documented how banks with larger holdings of sovereign debt reduce lending during periods of financial stress, such as sovereign debt crises. However, in terms of access to debt financing, it is also important to examine the domestic bond market. When financial markets come under stress during banking crises and firms switch to bond financing, they compete with governments that heavily tap this market. Since funding in the domestic bond market is not perfectly integrated with other debt markets, higher government bond issuance reduces the financing available to corporate issuers.

Since government issuance may respond endogenously to current economic conditions, Table 9 presents the IV estimates using maturing government debt as an instrument for government issuance. The IV estimates preserve the market-switching pattern from the OLS results. These estimates also confirm the baseline crowding-out result and are my preferred estimates for quantifying the economic magnitude of crowding out. The last row of Table 9 reports the first-stage Kleibergen-Paap rk Wald F statistics used to assess weak-instrument concerns.³¹ The domestic-market specifications in columns 1 and 3 have strong first stages and the F statistics exceed the

29. A one standard deviation increase in domestic government loan issuance during non-crisis periods is an increase from 0.0003% to 0.0019% of trend GDP. The implied change in firm issuance is calculated as $y_1 = (1 + y_0) \exp(\beta \Delta \log(1 + x)) - 1$, where y_0 is the non-crisis mean of domestic firm loan issuance, β is the coefficient on domestic government loan issuance, and $\Delta \log(1 + x)$ is the change in transformed government issuance. Using $y_0 = 10.45$, $\beta = 0.642$, and $\Delta \log(1 + x) = \log(1 + 0.0019) - \log(1 + 0.0003)$ gives $y_1 = 10.46$. Thus, a one standard deviation increase in domestic government loan issuance raises domestic firm loan issuance from 10.45% to about 10.46% of assets.

30. I also estimate analogous crowding-out regressions for bad times, defined as country-years in which annual GDP growth falls below the country-specific median growth rate over the sample, as well as for currency crises, inflation crises, domestic debt crises, and foreign debt crises, with the latter four crisis definitions taken from Reinhart and Rogoff (2011). The results, reported in Appendix E, do not show the same negative domestic bond-market crowding-out effect.

31. When standard errors are clustered, the Cragg-Donald-based weak-instrument test is no longer valid. I therefore report the Kleibergen-Paap rk Wald F statistic and interpret it as a first-stage diagnostic.

Table 9: IV: Crowding Out during Banking Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crisis	0.380*	0.054	-0.296**	0.207
	(1.95)	(0.03)	(-2.43)	(1.07)
Dom. Gov. Bond Issuance	-0.041			
	(-0.17)			
Banking Crisis × Dom. Gov. Bond Issuance	-0.807***			
	(-3.04)			
Int. Gov. Bond Issuance		-0.612		
		(-0.29)		
Banking Crisis × Int. Gov. Bond Issuance		-0.192		
		(-0.07)		
Dom. Gov. Loan Issuance			2.155***	
			(4.48)	
Banking Crisis × Dom. Gov. Loan Issuance			4.444	
			(1.14)	
Int. Gov. Loan Issuance				-0.983
				(-1.16)
Banking Crisis × Int. Gov. Loan Issuance				-1.278
				(-0.10)
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	11.99	0.13	253.39	1.62

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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Government issuance and its interaction with Banking Crisis are instrumented using maturing government debt and its interaction with Banking Crisis. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed 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 cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Stock and Yogo (2005) critical value of 7.03.^{32,33}

The magnitude is economically meaningful. Domestic firm bond issuance averages 3.08% of assets during non-crisis periods. Using this value as the baseline, the IV estimates imply that, absent domestic government bond issuance, a banking crisis raises domestic firm bond issuance from 3.08% to 4.97% of assets. This captures the crisis-induced shift by firms into domestic bonds. However, evaluated at the average level of domestic government bond issuance during banking crises, domestic firm bond issuance decreases by 1.97 percentage points relative to the crisis-only benchmark, falling from 4.97% to 3.00% of assets. This implies substantial crowding out: average domestic government bond issuance during banking crises reduces domestic firm bond issuance by about 40% relative to the crisis-only benchmark.³⁴

This result is also consistent with the price and quantity evidence in Section 3. During banking crises, government bond issuance increases at the same time that the cost of government bond financing rises. This pattern indicates an outward shift in government demand for domestic bond financing. As investors absorb more government bonds, the supply of bond financing available to firms contracts, reducing corporate bond issuance and raising the cost of corporate bond financing.

I also find that crowding out in the domestic bond market occurs in both advanced and developing countries. Tables 25 and 26 in Appendix F report the baseline regressions separately for the two groups. In both samples, the crisis-period effect of domestic government bond issuance is negative. The evidence therefore suggests that the domestic bond-market crowding-out effect is not confined to one group of countries.

5.2 Shifting to International Bond Markets

I next examine whether firms with access to international debt markets are able to avoid domestic bond-market crowding out by shifting issuance abroad. A firm is classified as having access to international debt markets in a given period if it issues, or has previously issued, in an international debt market. This allows me to study whether established access to international markets gives firms an alternative source of financing when government borrowing crowds them out of the domestic bond market during banking crises.

Table 10 compares firms with access to international debt markets to firms that only issue domestically. Firms with international market access are larger and issue more debt than firms without such access. They also have slightly higher profitability and tangibility, while leverage

32. See Table 31 in Appendix H for the Stock and Yogo (2005) critical values.

33. The corresponding first-stage regression results for the four market specifications are reported in Appendix G.

34. These magnitudes use the IV estimates from Table 9. The baseline value, $y_0 = 3.08$, is the non-crisis mean of domestic firm bond issuance, measured as a percent of previous-year assets. The crisis-only benchmark is calculated as $(1 + y_0) \exp(\beta_{\text{Crisis}}) - 1$, where $\beta_{\text{Crisis}} = 0.380$. This gives $(1 + 3.08) \exp(0.380) - 1 = 4.97$. The magnitude evaluated at average government issuance during banking crises is calculated as $(1 + y_0) \exp(\beta_{\text{Crisis}} + \beta_{\text{Gov,Crisis}} \log(1 + \bar{x})) - 1$, where $\beta_{\text{Gov,Crisis}} = -0.848$ is the total crisis-period effect of domestic government bond issuance and $\bar{x} = 0.603$ is mean domestic government bond issuance during banking crises, measured as a percent of trend GDP. This gives $(1 + 3.08) \exp(0.380 - 0.848 \times \log(1 + 0.603)) - 1 = 3.00$.

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. Firm issuance is winsorized at the 99th percentile.

is similar across the two groups. These differences suggest that international market access is concentrated among larger firms with greater financing needs. The analysis below therefore focuses on whether this group of firms uses international markets as an alternative source of debt financing when domestic bond-market crowding out occurs.

To examine whether firms with international market access shift issuance abroad when domestic bond-market crowding out occurs during banking crises, I estimate the following discrete-choice logit model of market selection:

$$\begin{aligned}
DomesticMarket_{i,k,t} = & \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} + \\
& \beta_3 BankingCrises_{k,t} \times GovIss_{k,t} + \\
& X'_{i,t-1}\eta + \alpha_t + \alpha_i + \epsilon_{i,k,t}
\end{aligned} \tag{2}$$

where $DomesticMarket_{i,k,t}$ is an indicator variable equal to one if firm i in country k in period t issues debt in the domestic market, and zero if it issues debt in the international market. The remaining variables are defined as in equation 1. In these estimations, I include all firm controls, including firm size, since the dependent variable is no longer scaled by assets.

The results are reported in Table 11.³⁵ The model is estimated separately for bonds and syndicated loans. The first two columns examine market choice in the bond market, while the last two examine market choice in the loan market. Within each pair, I examine the effect of domestic government issuance in the first column and international government issuance in the second.

To interpret the coefficients, note that the dependent variable equals one when a firm issues in

35. I also estimate a linear probability model. The results, presented in Table 32 in Appendix I, are very similar to the logit estimates.

Table 11: Market Choice during Banking Crises

	Bond Market Choice		Loan Market Choice	
	(1)	(2)	(3)	(4)
Banking Crises	0.55 (1.21)	0.39 (0.87)	0.73*** (2.58)	0.46* (1.74)
Dom. Gov. Bond Issuance	0.28 (1.23)			
Banking Crises $\times$ Dom. Gov. Bond Issuance	-0.81** (-2.42)			
Int. Gov. Bond Issuance		-1.18* (-1.82)		
Banking Crises $\times$ Int. Gov. Bond Issuance		-0.36 (-0.62)		
Dom. Gov. Loan Issuance			4.13*** (4.15)	
Banking Crises $\times$ Dom. Gov. Loan Issuance			-5.01 (-0.77)	
Int. Gov. Loan Issuance				-2.63*** (-3.34)
Banking Crises $\times$ Int. Gov. Loan Issuance				1.69 (0.70)
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 for firms with access to international debt markets. 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 zero if it issues an international bond. In the last two columns, the dependent variable follows the same definition but applies to loans. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Government loan issuance is winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed 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 cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

the domestic market and zero when it issues internationally. A positive coefficient therefore indicates that government issuance is associated with a greater likelihood of firms issuing domestically, while a negative coefficient implies a shift toward international markets.

Table 11 shows that firms with international market access shift away from domestic bond markets when domestic government bond issuance rises during banking crises. In column 1, the interaction between banking crises and domestic government bond issuance is negative and statistically significant. This implies that higher domestic government bond issuance during banking crises reduces the likelihood that firms issue bonds domestically and increases the likelihood that they issue bonds internationally. This is consistent with firms using international bond markets as an alternative source of financing when they are crowded out of the domestic bond market.

The remaining columns show that this switching behavior is specific to the domestic bond market. In the international bond specification, the interaction between banking crises and international government bond issuance is not statistically significant. Similarly, in the loan-market specifications, the interactions between banking crises and government loan issuance are not statistically significant. Thus, firms with international market access do not appear to shift abroad in response to government issuance in all debt markets. Instead, the shift toward international markets occurs precisely when domestic government bond issuance rises during banking crises, consistent with firms responding to crowding out in the domestic bond market.

International market access therefore gives firms an alternative source of financing when domestic bond-market financing becomes constrained. When government borrowing crowds firms out of the domestic bond market, firms with established international market access respond by shifting issuance abroad. This does not imply that international markets fully eliminate the costs of domestic crowding out, since only a subset of firms has access to these markets. However, it shows that market access affects how firms adjust to crowding out during banking crises.

5.3 Developing Domestic Bond Markets

The previous section shows that firms with international market access can shift issuance abroad when they are crowded out of the domestic bond market. However, many firms do not have access to international debt markets. I therefore examine whether the depth of the domestic bond market mitigates crowding out. The idea is that more developed domestic bond markets may have a larger investor base and greater capacity to absorb both government and firm issuance, reducing the effect of government borrowing on firm issuance. To test this, I augment the baseline specification by interacting banking crises and government issuance with an indicator for whether a country has a developed domestic bond market:

$$\begin{aligned}
I_{i,k,t} = & \beta_1 \text{BankingCrises}_{k,t} + \beta_2 \text{GovIss}_{k,t} + \beta_3 \text{DevDomBondMarket}_{k,t} + \\
& \beta_4 \text{BankingCrises}_{k,t} \times \text{GovIss}_{k,t} + \\
& \beta_5 \text{BankingCrises}_{k,t} \times \text{DevDomBondMarket}_{k,t} + \\
& \beta_6 \text{DevDomBondMarket}_{k,t} \times \text{GovIss}_{k,t} + \\
& \beta_7 \text{BankingCrises}_{k,t} \times \text{DevDomBondMarket}_{k,t} \times \text{GovIss}_{k,t} + \\
& X'_{i,t-1} \eta + \alpha_t + \alpha_i + \epsilon_{i,k,t}
\end{aligned} \tag{3}$$

where $\text{DevDomBondMarket}_{k,t}$ is an indicator equal to one if country k has a developed domestic bond market in period t , and zero otherwise. The coefficient of interest is β_7 , which captures whether domestic bond market development changes the effect of government issuance during banking crises. A positive value of β_7 would indicate that developed domestic bond markets mitigate crowding out, while a negative value would indicate that crowding out is stronger in countries with developed domestic bond markets.

I construct $\text{DevDomBondMarket}_{k,t}$ using data from the Financial Development Structure Database (FDSD).³⁶ The database reports annual outstanding domestic bond debt issued by firms and governments, both measured as a percentage of GDP. I sum firm and government domestic bond debt to obtain total domestic bond debt as a percentage of GDP, which I use to construct the developed domestic bond market indicator in equation 3.³⁷ Although I use issuance throughout the rest of the paper, issuance is not appropriate for measuring domestic bond market development because it is a flow variable and is highly volatile, even at the annual frequency. Outstanding bond debt, by contrast, is an accumulated stock of past issuance and generally smoother than annual issuance. It is therefore better suited to capturing the size and depth of the domestic bond market at a given point in time. Once normalized by GDP, it also allows me to compare domestic bond market development across countries. The indicator $\text{DevDomBondMarket}_{k,t}$ equals one when total domestic bond debt is above the sample median, equal to 51.66% of GDP, and zero otherwise.

Table 12 presents summary statistics for domestic bond debt by region and decade. The table shows substantial variation across both regions and time. Over the full sample period, average total domestic bond debt ranges from 21.4% of GDP in Eastern Europe and Central Asia to 99.8% of GDP in North America and the Pacific. The variation is not limited to differences between advanced and developing economies. There is also substantial variation within developing regions: average total domestic bond debt is 67.7% of GDP in East Asia, compared to 28.5% in Latin

36. The Financial Development Structure Database does not cover all countries in 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.

37. Since the database is annual, I assign each annual value to all quarters in that year.

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.

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.	0.006 (0.04)	-0.320** (-2.32)	-0.510** (-2.46)	0.036 (0.33)
Banking Crisis × Dev. Dom. Bond Mar.	0.508*** (3.44)	0.421* (1.72)	-0.584 (-1.30)	-0.175 (-0.81)
Banking Crisis × Dom. Gov. Bond Issuance	-2.220*** (-3.79)			
Banking Crisis × Dev. Dom. Bond Mar. × Dom. Gov. Bond Issuance	1.545** (2.60)			
Banking Crisis × Int. Gov. Bond Issuance		0.543 (1.67)		
Banking Crisis × Dev. Dom. Bond Mar. × Int. Gov. Bond Issuance		-0.559 (-1.60)		
Banking Crisis × Dom. Gov. Loan Issuance			-3.351** (-2.32)	
Banking Crisis × Dev. Dom. Bond Mar. × Dom. Gov. Loan Issuance			-10.730*** (-4.05)	
Banking Crisis × Int. Gov. Loan Issuance				11.055** (2.25)
Banking Crisis × Dev. Dom. Bond Mar. × Int. Gov. Loan Issuance				-10.637** (-2.14)
N	9,591	3,094	11,460	2,891
R-squared	0.66	0.58	0.74	0.64
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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. Standard errors are heteroskedasticity-robust and clustered by country. This table presents the abridged regression results. Table 33 in Appendix J presents the full results.

America. Domestic bond markets also deepen over time, but the pace of development differs substantially across regions. East Asia experienced especially rapid growth, with total domestic bond debt rising from 44.8% of GDP in the 1990s to 93.3% in the 2010s. By contrast, domestic bond debt rose only from 13.0% to 39.8% of GDP in Latin America and from 11.6% to 30.2% of GDP in Eastern Europe and Central Asia over the same period. This variation allows me to test whether countries with deeper domestic bond markets experience less crowding out during banking crises.

Table 13 presents the estimates of equation 3. The results first show that firms in countries with developed domestic bond markets make greater use of these markets during banking crises. In column 1, the interaction between banking crises and the developed domestic bond market indicator is positive and statistically significant. This is consistent with the idea that deeper domestic bond markets allow firms to substitute toward bond financing when bank credit contracts.

The main result is that developed domestic bond markets are associated with less crowding out. The crowding-out pattern remains present in the restricted sample: in countries without developed domestic bond markets, domestic government bond issuance crowds out firm issuance during banking crises. In column 1, the interaction between banking crises and domestic government bond issuance is negative and statistically significant, with a coefficient of -2.220 .³⁸ The triple interaction with developed domestic bond markets is positive and statistically significant, with a coefficient of 1.545. This indicates that the crowding-out effect is substantially smaller in countries with developed domestic bond markets. The implied crisis-period interaction in developed domestic bond markets is -0.675 , equal to $-2.220 + 1.545$, so the point estimate remains negative. Developed domestic bond markets therefore mitigate crowding out, but do not fully eliminate it. This is consistent with the market-specific funding mechanism: deeper domestic bond markets are supported by a broader domestic bond investor base and have greater capacity to absorb issuance by both firms and governments, but they do not eliminate competition between them during banking crises.

This result highlights an additional benefit of domestic bond market development. Prior work emphasizes that local currency bond markets can reduce reliance on foreign-currency borrowing and make economies less vulnerable to sudden shifts in international capital flows. The results in this section suggest another benefit: deeper domestic bond markets can also reduce the extent to which government borrowing crowds out firm issuance during banking crises. Policies that support domestic bond market development may therefore help preserve firms' access to debt financing during periods of banking-sector stress.

38. This coefficient differs from the baseline estimate in Table 8 because the domestic bond market development regressions are estimated on the subset of countries covered by the Financial Development Structure Database and include additional interactions with the developed domestic bond market indicator.

6 Conclusion

This paper studies whether government issuance crowds out firm issuance during banking crises. Using transaction-level bond and loan data for 66 countries over the 1991–2017 period, I examine firm and government issuance across four debt markets: the domestic bond market, the domestic loan market, the international bond market, and the international loan market. Separating debt issuance by market is central to the analysis. In non-crisis periods, firms rely mainly on loans while governments rely mainly on bonds. During banking crises, however, firms shift away from loans and toward bonds, bringing them into the same market in which governments are large issuers.

To identify crowding out, I use two complementary strategies. First, I restrict the analysis to firm-quarters in which firms issue debt in at least one market. Issuing in at least one market reveals that the firm has positive demand for external debt in that quarter. Therefore, changes in how much the firm issues and in which market it issues are more informative about the supply of credit available to the firm, rather than simply reflecting a lack of demand for debt. Second, I instrument government issuance using maturing government debt, which captures predetermined refinancing needs rather than contemporaneous economic conditions.

The results show that crowding out is concentrated in the domestic bond market during banking crises. During non-crisis periods, government issuance does not reduce firm issuance. During banking crises, however, firms substitute away from domestic loans and toward domestic bonds. At the same time, governments continue to issue heavily in domestic bond markets. When domestic government bond issuance rises in these periods, firm domestic bond issuance falls. This crowding out occurs in both advanced and developing countries.

The paper also shows that market access and market development shape how firms adjust to crowding out. Firms with access to international debt markets shift issuance abroad when domestic bond-market crowding out occurs. In addition, deeper domestic bond markets mitigate the crowding-out effect, although they do not eliminate it. These findings suggest that domestic bond market development can help preserve firms' access to financing during periods of financial stress.

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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. Countries are classified as advanced or developing using the World Bank's 2019 income classification. Advanced countries are those with GNI per capita of \$12,376 or more. There are 31 advanced countries and 35 developing countries.

B Controls

Table 15: Firm Level Variable Description

Variable	Definition
Size	$\ln(\text{Assets})$, 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 full sample period. Issuance is expressed as a percentage of firms' assets and is winsorized at the 99th percentile.

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 full sample period. Issuance is expressed as a percentage of firms' assets and is winsorized at the 99th percentile.

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 non-crisis periods and banking crises. Government Issuance is reported as a percentage of trend GDP. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. Government loan issuance is winsorized at the 99th percentile.

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 non-crisis periods and banking crises. Government Issuance is reported as a percentage of trend GDP. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. Government loan issuance is winsorized at the 99th percentile.

E Crowding Out during Other Crisis Episodes

Table 20: Crowding Out during Bad Times

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Bad Times	-0.010 (-0.35)	-0.048 (-1.17)	-0.083 (-1.45)	0.025 (0.77)
Dom. Gov. Bond Issuance	-0.087* (-1.89)			
Bad Times $\times$ Dom. Gov. Bond Issuance	0.020 (0.55)			
Int. Gov. Bond Issuance		-0.115* (-1.87)		
Bad Times $\times$ Int. Gov. Bond Issuance		0.045 (1.26)		
Dom. Gov. Loan Issuance			0.665** (2.55)	
Bad Times $\times$ Dom. Gov. Loan Issuance			-0.051 (-0.16)	
Int. Gov. Loan Issuance				0.008 (0.03)
Bad Times $\times$ Int. Gov. Loan Issuance				-0.211 (-0.64)
N	16,003	5,093	16,232	4,996
R-squared	0.64	0.54	0.74	0.61
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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Bad Times is an indicator variable equal to one if a firm's country is experiencing bad times in the current year and zero otherwise. Government issuance is transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with bad times defined as country-years in which annual GDP growth falls below the country-specific median growth rate over the sample, while the non-crisis periods cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Table 21: Crowding Out during Currency Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Currency Crisis	-0.041 (-0.59)	-0.042 (-0.38)	0.222** (2.63)	0.061 (0.68)
Dom. Gov. Bond Issuance	-0.056 (-1.45)			
Currency Crisis $\times$ Dom. Gov. Bond Issuance	0.005 (0.05)			
Int. Gov. Bond Issuance		-0.112* (-1.76)		
Currency Crisis $\times$ Int. Gov. Bond Issuance		0.239** (2.40)		
Dom. Gov. Loan Issuance			1.103*** (4.11)	
Currency Crisis $\times$ Dom. Gov. Loan Issuance			-0.371 (-0.62)	
Int. Gov. Loan Issuance				-0.068 (-0.26)
Currency Crisis $\times$ Int. Gov. Loan Issuance				-1.753 (-1.54)
N	11,893	3,763	12,653	3,616
R-squared	0.66	0.57	0.75	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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Currency Crisis is an indicator variable equal to one if a firm's country is experiencing a currency crisis in the current year and zero otherwise. Government issuance is transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with currency crises reported in the Reinhart and Rogoff crises database, while the non-crisis periods cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Table 22: Crowding Out during Inflation Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Inflation Crisis	-1.178*** (-3.63)	3.029*** (10.25)	2.155*** (7.23)	2.095*** (3.00)
Dom. Gov. Bond Issuance	-0.054 (-1.39)			
Inflation Crisis × Dom. Gov. Bond Issuance	0.000 (.)			
Int. Gov. Bond Issuance		-0.066 (-1.05)		
Inflation Crisis × Int. Gov. Bond Issuance		-3.393*** (-13.02)		
Dom. Gov. Loan Issuance			0.996*** (3.51)	
Inflation Crisis × Dom. Gov. Loan Issuance			0.000 (.)	
Int. Gov. Loan Issuance				-0.147 (-0.54)
Inflation Crisis × Int. Gov. Loan Issuance				-26.640*** (-3.13)
N	11,865	3,743	12,640	3,587
R-squared	0.66	0.57	0.75	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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Inflation Crisis is an indicator variable equal to one if a firm's country is experiencing an inflation crisis in the current year and zero otherwise. Government issuance is transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with inflation crises reported in the Reinhart and Rogoff crises database, while the non-crisis periods cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Table 23: Crowding Out during Domestic Debt Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Domestic Debt Crisis	0.587*** (8.94)	-1.765*** (-5.54)	-0.330*** (-2.96)	-0.074 (-0.07)
Dom. Gov. Bond Issuance	-0.062 (-1.49)			
Domestic Debt Crisis $\times$ Dom. Gov. Bond Issuance	0.000 (.)			
Int. Gov. Bond Issuance		-0.098 (-1.45)		
Domestic Debt Crisis $\times$ Int. Gov. Bond Issuance		-3.075*** (-3.05)		
Dom. Gov. Loan Issuance			1.130*** (3.67)	
Domestic Debt Crisis $\times$ Dom. Gov. Loan Issuance			0.000 (.)	
Int. Gov. Loan Issuance				-0.192 (-0.78)
Domestic Debt Crisis $\times$ Int. Gov. Loan Issuance				0.000 (.)
N	10,975	3,470	11,766	3,301
R-squared	0.66	0.57	0.75	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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Domestic Debt Crisis is an indicator variable equal to one if a firm's country is experiencing a domestic debt crisis in the current year and zero otherwise. Government issuance is transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with domestic debt crises reported in the Reinhart and Rogoff crises database, while the non-crisis periods cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Table 24: Crowding Out during Foreign Debt Crises

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Foreign Debt Crisis	-0.542* (-1.80)	-0.057 (-0.16)	0.956** (2.56)	-0.205 (-0.52)
Dom. Gov. Bond Issuance	-0.059 (-1.50)			
Foreign Debt Crisis × Dom. Gov. Bond Issuance	4.021*** (12.71)			
Int. Gov. Bond Issuance		-0.084 (-1.31)		
Foreign Debt Crisis × Int. Gov. Bond Issuance		0.463 (1.01)		
Dom. Gov. Loan Issuance			0.995*** (3.35)	
Foreign Debt Crisis × Dom. Gov. Loan Issuance			-1.990*** (-3.08)	
Int. Gov. Loan Issuance				-0.169 (-0.66)
Foreign Debt Crisis × Int. Gov. Loan Issuance				0.000 (.)
N	11,768	3,636	12,576	3,471
R-squared	0.66	0.57	0.75	0.64
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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Foreign Debt Crisis is an indicator variable equal to one if a firm's country is experiencing a foreign debt crisis in the current year and zero otherwise. Government issuance is transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. The estimations cover the 1991–2017 period. The crisis periods cover the quarters with foreign debt crises reported in the Reinhart and Rogoff crises database, while the non-crisis periods cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

F Crowding Out during Banking Crises: Advanced and Developing Countries

Table 25: Crowding Out during Banking Crises (Advanced Countries)

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crisis	0.285*** (3.69)	-0.150 (-1.65)	-0.427*** (-4.03)	0.171* (1.84)
Dom. Gov. Bond Issuance	-0.005 (-0.19)			
Banking Crisis × Dom. Gov. Bond Issuance	-0.325** (-2.34)			
Int. Gov. Bond Issuance		-0.018 (-0.29)		
Banking Crisis × Int. Gov. Bond Issuance		0.061 (0.51)		
Dom. Gov. Loan Issuance			0.587** (2.39)	
Banking Crisis × Dom. Gov. Loan Issuance			0.390 (0.10)	
Int. Gov. Loan Issuance				-0.207 (-0.75)
Banking Crisis × Int. Gov. Loan Issuance				0.886 (0.72)
N	10,475	3,601	11,896	3,453
R-squared	0.60	0.56	0.75	0.62
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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed 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 cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

Table 26: Crowding Out during Banking Crises (Developing Countries)

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crisis	0.281 (1.54)	-0.619* (-1.89)	-1.083 (-1.68)	0.694 (1.40)
Dom. Gov. Bond Issuance	-0.096 (-0.80)			
Banking Crisis $\times$ Dom. Gov. Bond Issuance	-1.507** (-2.58)			
Int. Gov. Bond Issuance		0.013 (0.09)		
Banking Crisis $\times$ Int. Gov. Bond Issuance		-0.536 (-1.26)		
Dom. Gov. Loan Issuance			4.896*** (4.41)	
Banking Crisis $\times$ Dom. Gov. Loan Issuance			-4.129 (-1.74)	
Int. Gov. Loan Issuance				-0.871 (-1.70)
Banking Crisis $\times$ Int. Gov. Loan Issuance				0.000 (.)
N	1,805	520	606	528
R-squared	0.65	0.68	0.69	0.75
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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed 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 cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

G First Stage Results

Table 27: First stage: Bonds, Domestic Market, Banking Crises

	(1) Gov. Issuance	(2) Gov. Issuance $\times$ Crisis
Dom. Maturing Gov. Bond Debt	0.285*** (4.66)	-0.022 (-1.61)
Banking Crisis $\times$ Dom. Maturing Gov. Bond Debt	0.247 (1.16)	0.709* (1.89)
N	12,280	12,280
Firm Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Firm-Level Controls	Yes	Yes

t statistics in parentheses

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

Note: This table reports the two first-stage regressions corresponding to the domestic bond-market IV specification in Table 9. Column (1) uses domestic government bond issuance as the dependent variable. Column (2) uses domestic government bond issuance interacted with Banking Crisis as the dependent variable. The excluded instruments are maturing government bond debt and its interaction with Banking Crisis. Only the excluded instruments are reported in the table; the crisis indicator, firm controls, and fixed effects are included in the first-stage regressions but omitted from display. Standard errors are heteroskedasticity-robust and clustered by country.

Table 28: First stage: Bonds, International Market, Banking Crises

	(1) Gov. Issuance	(2) Gov. Issuance $\times$ Crisis
Int. Maturing Gov. Bond Debt	0.022 (0.46)	-0.038** (-2.15)
Banking Crisis $\times$ Int. Maturing Gov. Bond Debt	-0.247*** (-2.81)	0.157 (1.01)
N	4,125	4,125
Firm Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Firm-Level Controls	Yes	Yes

t statistics in parentheses

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

Note: This table reports the two first-stage regressions corresponding to the international bond-market IV specification in Table 9. Column (1) uses international government bond issuance as the dependent variable. Column (2) uses international government bond issuance interacted with Banking Crisis as the dependent variable. The excluded instruments are maturing government bond debt and its interaction with Banking Crisis. Only the excluded instruments are reported in the table; the crisis indicator, firm controls, and fixed effects are included in the first-stage regressions but omitted from display. Standard errors are heteroskedasticity-robust and clustered by country.

Table 29: First stage: Loans, Domestic Market, Banking Crises

	(1) Gov. Issuance	(2) Gov. Issuance $\times$ Crisis
Dom. Maturing Gov. Loan Debt	0.448*** (4.76)	0.002 (1.14)
Banking Crisis $\times$ Dom. Maturing Gov. Loan Debt	-0.808*** (-6.59)	0.139*** (15.04)
N	12,504	12,504
Firm Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Firm-Level Controls	Yes	Yes

t statistics in parentheses

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

Note: This table reports the two first-stage regressions corresponding to the domestic loan-market IV specification in Table 9. Column (1) uses domestic government loan issuance as the dependent variable. Column (2) uses domestic government loan issuance interacted with Banking Crisis as the dependent variable. The excluded instruments are maturing government loan debt and its interaction with Banking Crisis. Only the excluded instruments are reported in the table; the crisis indicator, firm controls, and fixed effects are included in the first-stage regressions but omitted from display. Standard errors are heteroskedasticity-robust and clustered by country.

Table 30: First stage: Loans, International Market, Banking Crises

	(1) Gov. Issuance	(2) Gov. Issuance $\times$ Crisis
Int. Maturing Gov. Loan Debt	0.225** (2.31)	-0.009 (-0.89)
Banking Crisis $\times$ Int. Maturing Gov. Loan Debt	-0.367*** (-3.52)	-0.084* (-1.78)
N	3,983	3,983
Firm Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Firm-Level Controls	Yes	Yes

t statistics in parentheses

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

Note: This table reports the two first-stage regressions corresponding to the international loan-market IV specification in Table 9. Column (1) uses international government loan issuance as the dependent variable. Column (2) uses international government loan issuance interacted with Banking Crisis as the dependent variable. The excluded instruments are maturing government loan debt and its interaction with Banking Crisis. Only the excluded instruments are reported in the table; the crisis indicator, firm controls, and fixed effects are included in the first-stage regressions but omitted from display. Standard errors are heteroskedasticity-robust and clustered by country.

H Weak Instrument Critical Values

Table 31: 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).

I Linear Probability Model: Market Switching

Table 32: Market Choice during Banking Crises

	Bond Market Choice		Loan Market Choice	
	(1)	(2)	(3)	(4)
Banking Crisis	0.06*	0.05*	0.09**	0.04
	(1.71)	(1.80)	(2.27)	(1.55)
Dom. Gov. Bond Issuance	0.02			
	(0.87)			
Banking Crisis × Dom. Gov. Bond Issuance	-0.10**			
	(-2.70)			
Int. Gov. Bond Issuance		-0.13*		
		(-1.96)		
Banking Crisis × Int. Gov. Bond Issuance		-0.02		
		(-0.34)		
Dom. Gov. Loan Issuance			0.42***	
			(3.16)	
Banking Crisis × Dom. Gov. Loan Issuance			-0.47	
			(-1.16)	
Int. Gov. Loan Issuance				-0.34***
				(-4.16)
Banking Crisis × Int. Gov. Loan Issuance				0.22
				(1.04)
N	9,133	9,133	11,789	11,789
R-squared	0.69	0.70	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 zero if it issues an international bond. In the last two columns, the dependent variable follows the same definition but applies to loans. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Government loan issuance is winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed 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 cover all other quarters. Standard errors are heteroskedasticity-robust and clustered by country.

J Full Regression: Developed Domestic Bond Markets

Table 33: Mitigating Effects of Developed Domestic Bond Markets

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Banking Crisis	0.090 (0.67)	-0.471** (-2.17)	0.003 (0.01)	0.281 (1.50)
Dev. Dom. Bond Mar.	0.006 (0.04)	-0.320** (-2.32)	-0.510** (-2.46)	0.036 (0.33)
Banking Crisis × Dev. Dom. Bond Mar.	0.508*** (3.44)	0.421* (1.72)	-0.584 (-1.30)	-0.175 (-0.81)
Dom. Gov. Bond Issuance	0.037 (0.46)			
Banking Crisis × Dom. Gov. Bond Issuance	-2.220*** (-3.79)			
Dev. Dom. Bond Mar. × Dom. Gov. Bond Issuance	0.088 (0.81)			
Banking Crisis × Dev. Dom. Bond Mar. × Dom. Gov. Bond Issuance	1.545** (2.60)			
Int. Gov. Bond Issuance		-0.294*** (-2.83)		
Banking Crisis × Int. Gov. Bond Issuance		0.543 (1.67)		
Dev. Dom. Bond Mar. × Int. Gov. Bond Issuance		0.343*** (2.75)		
Banking Crisis × Dev. Dom. Bond Mar. × Int. Gov. Bond Issuance		-0.559 (-1.60)		
Dom. Gov. Loan Issuance			3.274** (2.51)	
Banking Crisis × Dom. Gov. Loan Issuance			-3.351** (-2.32)	

Continued on next page

	Bonds		Loans	
	(1) Domestic Market	(2) International Market	(3) Domestic Market	(4) International Market
Dev. Dom. Bond Mar. $\times$ Dom. Gov. Loan Issuance			-2.834** (-2.06)	
Banking Crisis $\times$ Dev. Dom. Bond Mar. $\times$ Dom. Gov. Loan Issuance			-10.730*** (-4.05)	
Int. Gov. Loan Issuance				0.642 (1.30)
Banking Crisis $\times$ Int. Gov. Loan Issuance				11.055** (2.25)
Dev. Dom. Bond Mar. $\times$ Int. Gov. Loan Issuance				-0.871 (-1.41)
Banking Crisis $\times$ Dev. Dom. Bond Mar. $\times$ Int. Gov. Loan Issuance				-10.637** (-2.14)
N	9,591	3,094	11,460	2,891
R-squared	0.66	0.58	0.74	0.64
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), both transformed using the log of one plus issuance, with issuance measured as a percentage of firms' previous year's assets. Banking Crisis 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 transformed using the log of one plus annualized government issuance as a percentage of trend GDP. Firm issuance and government loan issuance are winsorized at the 99th percentile. Government bond issuance is winsorized at the 95th percentile to limit the influence of extreme observations in its highly right-skewed distribution. Standard errors are heteroskedasticity-robust and clustered by country. This table presents the full regression results for Table 13.