Crowding Out and Banking Crises

Pablo Hernando-Kaminsky

International Finance Corporation

October 11, 2024

The findings and conclusions expressed do not necessarily reflect the views of the World Bank.

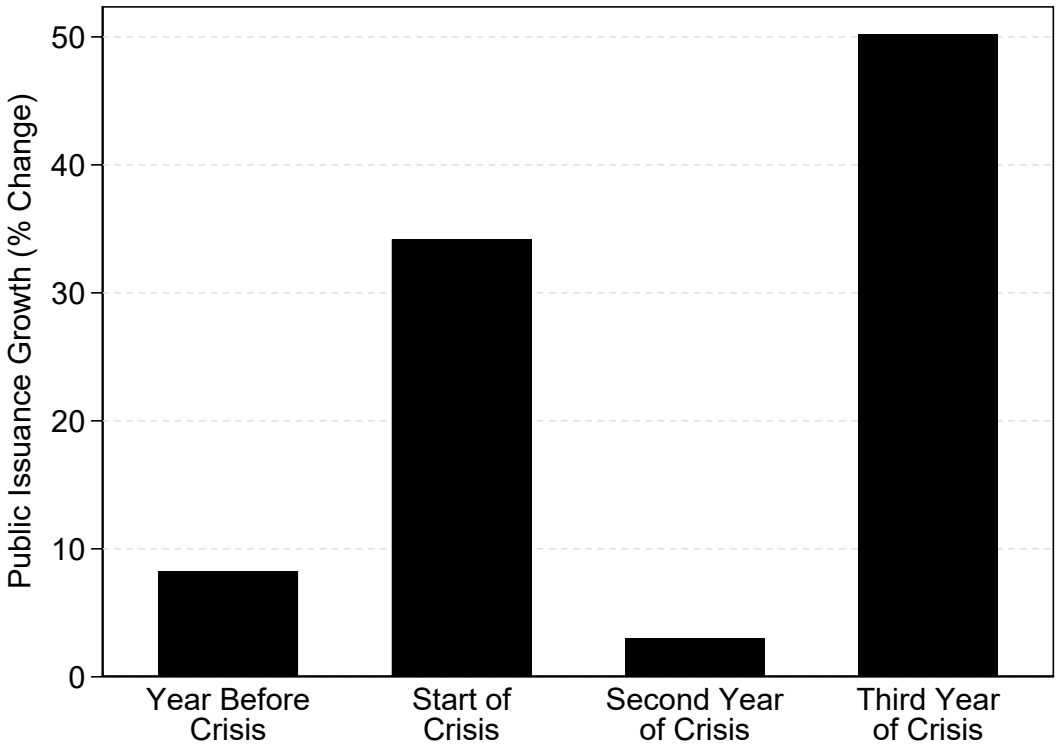
Motivation

- With the onset of the GFC, the world entered a period of increased government borrowing.
- The buildup of government debt has brought with it a fear of government debt *crowding out* firm debt.
  → *Crowding out* = the decline in firm borrowing due to an increase in government borrowing.

Motivation cont.

- Government borrowing increases during banking crises.

Government Debt Issuance Growth during Banking Crises



Note: The sample covers 66 advanced and developing countries for the 1991-2017 period.

Why is studying crowding out important?

- If government issuance is crowding out firm issuance, this will lead to less firm investment and can hinder economic growth.

- During crises, firms need to borrow to keep operating. If they can't, many may go under.

Definition of Crowding Out

- Textbook definition: Net issuance (Gross Issuance - Repayment)
  → Becker and Ivashina (2018), Popov and Van Horen (2015), Ongena et al. (2019), and Pinardon-Touati (2021)

- My definition: Gross issuance (includes maturing debt that is being rolled over)
  → The ability to rollover financing is often critical even though it does not register as additional financing

- Both matter!
  - Net capital flows (new borrowing) affect firm borrowing through a rise in interest rates.
  - Gross capital flows (market access) affect firm borrowing through lack of liquidity.

Contribution

1. I build a new dataset of firm issuance with firm characteristics in advanced and developing countries.
   → Study four distinct credit markets.

2. Use a novel instrument to identify crowding out.
   → Amount of maturing debt.

Main Results

1. Crowding out does not occur in non-crisis periods.

2. Crowding out occurs in the domestic bond market during banking crises.

3. Firms with the ability to issue in foreign markets are more likely to use these markets when there is crowding out in the domestic market.

4. Developed local bond markets mitigate the amount of crowding out that occurs.

Sample

- Issuance: SDC Platinum (Bonds) and Dealscan (Loans)
  - Provide detailed historical issuance data
- Firm Characteristics: Worldscope Database
  - Provides financial statement data
- Banking Crises: Laeven and Valencia (2018)
- Period: 1991 - 2017
- 31 advanced countries and 35 developing countries
- Divide by market of issuance (Domestic and Foreign)
  - Bonds: Compare the location of the issuance with the residence of the issuing firm.
  - Loans: Compare the residence of the lead banks that arrange the deal with the issuing firm's residence.

Summary Statistics

- Firms issue more loans
- Governments issue more bonds

Summary Statistics: **Firm** Issuance (% of Assets)

	Domestic Market		Foreign Market	
	Mean	SD	Mean	SD
Whole Sample				
Private Bond Issuance	**3.13**	4.48	**5.45**	6.52
Private Loan Issuance	**9.91**	16.43	**13.23**	20.71

Summary Statistics: **Government** Issuance (% of GDP)

	Domestic Market		Foreign Market	
	Mean	SD	Mean	SD
Whole Sample				
Gov. Bond Issuance	**0.639**	1.532	**0.731**	1.486
Gov. Loan Issuance	**0.001**	0.004	**0.001**	0.005

Research Design

$$
\begin{aligned}
I_{i,k,t} = \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} + \\
\beta_3 BankingCrises_{k,t} \times GovIss_{k,t} + \\
X'_{i,t-4}\eta + \alpha_t + \alpha_i + \epsilon_{i,t}
\end{aligned} \tag{1}
$$

- $I_{i,k,t}$: issuance (as a % of previous years assets) of firm i, country k, and quarter-year t
- $BankingCrises_{k,t}$: indicator variable equal to 1 during banking crises, 0 otherwise
- $GovIss_{k,t}$: government issuance (as a % of trend GDP) in country k and year-quarter t
- $X_{i,t-4}$: firm controls (tangibility, profitability, leverage)
- α_t: quarter-year fixed effects
- α_i: firm fixed effects

Identification

1. Need to show that a contraction in issuance is driven by a reduction in credit supplied and not by a reduction of credit demanded.

2. Endogeneity problem: Government issuance is correlated with current economic conditions.

Identification

1. Need to show that a contraction in issuance is driven not by a reduction of credit demanded, but instead by a reduction in credit supplied.
   → Periods may be characterized with both an increase of government issuance and a decrease in private issuance, and simply observing this is not sufficient evidence of crowding out.
   1.1 To isolate the behavior of private credit supply, I only include quarters in which firms issue debt.
   → Idea: if a firm issues debt, it has a positive demand for debt, and thus, changes in its amount of issuance are informative about the supply of credit.
   1.2 Include firm characteristics to address changes in firm credit unrelated to banking crises (firm demand for credit).
   → Houston and James (1996), Denis and Mihov (2003), and Adrian et al. (2013)

Instrumental Variable

2. Endogeneity problem: Government issuance is correlated with current economic conditions.
   → Governments may issue more during crises to stabilize financial system.

   IV: the **amount of maturing government debt**.

   2.1 This variable is the outcome of choices made years ago by previous governments and are exogenous to current economic conditions.

   2.2 Amount of maturing debt is a large determinant of new debt issuance.

Instrumental Variable (Bonds)

2.1 Amount of maturing debt is exogenous to current economic conditions.

Correlation: Maturing Government Bond Debt and Cyclical GDP

	Cyclical GDP	Cyclical GDP
Domestic **Maturing** Government **Bond** Debt	-0.0173	
Foreign **Maturing** Government **Bond** Debt		0.00238

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

2.2 Amount of maturing debt is a large determinant of new debt issuance.

Correlation: Maturing Government Bond Debt with Government Bond Issuance

	Domestic Government Bond Issuance	Foreign Government Bond Issuance
Domestic **Maturing** Government **Bond** Debt	0.416^{***}	
Foreign **Maturing** Government **Bond** Debt		0.258^{***}

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

Instrumental Variable (Loans)

2.1 Amount of maturing debt is exogenous to current economic conditions.

Correlation: Maturing Government Loan Debt and Cyclical GDP

	Cyclical GDP	Cyclical GDP
Domestic **Maturing** Government **Loan** Debt	-0.00126	
Foreign **Maturing** Government **Loan** Debt		-0.00798

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

2.2 Amount of maturing debt is a large determinant of new debt issuance.

Correlation: Maturing Government Loan Debt with Government Loan Issuance

	Domestic Government Loan Issuance	Foreign Government Loan Issuance
Domestic **Maturing** Government **Loan** Debt	0.171***	
Foreign **Maturing** Government **Loan** Debt		0.321***

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

OLS Estimates

Crowding Out during Banking Crises

	Bonds		Loans	
	(1) Domestic Firm Issuance	(2) Foreign Firm Issuance	(3) Domestic Firm Issuance	(4) Foreign Firm Issuance
Banking Crises	1.019**	-0.929**	-3.020**	0.896
	(2.42)	(-2.44)	(-2.44)	(0.74)
Dom. Gov. Bond Issuance	**0.164***			
	(2.00)			
Banking Crises × Dom. Gov. Bond Issuance	-0.774***			
	(-2.80)			
For. Gov. Bond Issuance		-0.220		
		(-1.35)		
Banking Crises × For. Gov. Bond Issuance		0.271		
		(1.04)		
Dom. Gov. Loan Issuance			**7.680****	
			(2.16)	
Banking Crises × Dom. Gov. Loan Issuance			9.440	
			(0.59)	
For. Gov. Loan Issuance				-9.410*
				(-1.86)
Banking Crises × For. Gov. Loan Issuance				41.693**
				(2.26)
N	12,280	4,125	12,504	3,980
R-squared	0.65	0.56	0.73	0.64
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes

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OLS Estimates

- A one SD increase in government bond issuance decreases private issuance by 1.18pp (1.53×-0.774)

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IV Estimates

IV: Crowding Out during Banking Crises

	Bonds		Loans	
	(1) Domestic Firm Issuance	(2) Foreign Firm Issuance	(3) Domestic Firm Issuance	(4) Foreign Firm Issuance
Banking Crises	2.556**	-2.519	-2.981**	4.225*
	(2.68)	(-0.47)	(-2.39)	(1.93)
Dom. Gov. Bond Issuance	**1.205***			
	(1.79)			
Banking Crises × Dom. Gov. Bond Issuance	-2.242***			
	(-3.45)			
For Gov. Bond Issuance		-0.649		
		(-0.22)		
Banking Crises × For Gov. Bond Issuance		2.328		
		(0.42)		
Dom. Gov. Loan Issuance			**9.860****	
			(2.04)	
Banking Crises × Dom. Gov. Loan Issuance			110.804***	
			(4.42)	
For. Gov. Loan Issuance				-1.412
				(-0.17)
Banking Crises × For. Gov. Loan Issuance				-222.348***
				(-3.24)
N	12,280	4,125	12,504	3,980
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes
F-stat Weak Instrument	15.39	0.34	51.03	36.66

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Can firms avoid being crowded out?

- Next, I explore whether firms that have access to foreign markets, use these markets when they are crowded out in the domestic bond market.
- I estimate a discrete choice model of firms' market issuance decisions.
- I examine the effect of domestic and foreign government issuance on firm market choice for bonds and loans.

Research Design

$$\begin{aligned} DomesticMarket_{i,k,t} = \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} + \\ \beta_3 BankingCrises_{k,t} \times GovIss_{k,t} + \\ X'_{i,t-4}\eta + \alpha_t + \alpha_i + \epsilon_{i,t} \end{aligned} \tag{2}$$

- $DomesticMarket_{i,k,t}$: market choice indicator that equals 1 if firm i in country k issued in the domestic market in quarter-year t, and 0 otherwise
- $BankingCrises_{k,t}$: indicator variable equal to 1 during banking crises, 0 otherwise
- $GovIss_{k,t}$: government issuance (as a % of trend GDP) in country k and year-quarter t
- $X_{i,t-4}$: firm controls (size, tangibility, profitability, leverage)
- α_t: quarter-year fixed effects
- α_i: firm fixed effects

Logit Estimates

Market Choice and Crowding Out during Banking Crises

	$DomesticMarket_{i,k,t}$ = 1 if a firm issues in the domestic market, 0 if in foreign market			
	Bonds		Loans	
	(1)	(2)	(3)	(4)
Banking Crises	0.51	0.36	0.71**	0.40
	(1.23)	(0.80)	(2.49)	(0.70)
Domestic Gov. Bond Issuance	**1.03*** **			
	(3.13)			
Banking Crises ×	-1.17**			
Domestic Gov. Bond Issuance	(-2.36)			
Foreign Gov. Bond Issuance		-0.03		
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Banking Crises ×		-1.23		
Foreign Gov. Bond Issuance		(-1.30)		
Domestic Gov. Loan Issuance			**17.47*** **	
			(3.28)	
Banking Crises ×			-47.67	
Domestic Gov. Loan Issuance			(-1.10)	
Foreign Gov. Loan Issuance				-51.29
				(0.98)
Banking Crises ×				41.31
Foreign Gov. Loan Issuance				(1.04)
N	3,814	3,814	6,270	6,270
R-squared	0.106	0.101	0.047	0.047
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes

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Why does the development of local debt markets matter?

- Borrowing in foreign currencies in international markets can leave countries exposed to volatile exchange-rate movements.
- Local debt markets can also make an economy more resilient to sudden movements in foreign capital flows.
- When they are developed, these markets become more stable and less risky sources of funding.
- **Can they mitigate crowding out?**

Domestic Bond Markets

- Use stock of domestic bond debt (as a % of GDP) from the Financial Development Structure Database.
  → Much less volatile than bond issuance and gives an accurate sense of how large domestic bond markets are at any particular moment.

- Median across countries and time as threshold (51.66%).

Research Design

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\begin{aligned}
I_{i,k,t} = {} & \beta_1 BankingCrises_{k,t} + \beta_2 GovIss_{k,t} + \beta_3 DevDomBondMarket_{k,t} + \\
& \beta_4 BankingCrises_{k,t} \times GovIss_{k,t} + \\
& \beta_5 BankingCrises_{k,t} \times DevDomBondMarket_{k,t} + \\
& \beta_6 DevDomBondMarket_{k,t} \times GovIss_{k,t} + \\
& \beta_7 BankingCrises_{k,t} \times DevDomBondMarket_{k,t} \times GovIss_{k,t} + \\
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- α_t: quarter-year fixed effects
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Developed Domestic Bond Markets

Developed Domestic Bond Markets

	Bonds		Loans	
	(1) Domestic Firm Issuance	(2) Foreign Firm Issuance	(3) Domestic Firm Issuance	(4) Foreign Firm Issuance
Dev. Dom. Bond Market	-1.124	**-1.323****	**-6.850****	**-1.982****
	(-1.04)	(-2.08)	(-2.68)	(-2.15)
Banking Crises × Dev. Dom. Bond Market	1.640**	1.686	-2.703	-3.356
	(2.41)	(1.61)	(-0.47)	(-1.41)
Banking Crises × Dom. Gov. Bond Issuance	-38.619***			
	(-3.46)			
Dev. Dom. Bond Market × Dom. Gov. Bond Issuance	1.486			
	(1.18)			
Banking Crises × Dev. Dom. Bond Market × Dom. Gov. Bond Issuance	33.843***			
	(3.05)			
		⋮		
		⋮		
N	9,591	3,094	11,460	2,889
R-squared	0.66	0.58	0.74	0.66
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes

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Conclusion

- I establish existence of crowding out in the domestic bond market during banking crises using a new instrument based on the amount of maturing debt.
- Firms with access to foreign markets switch to foreign borrowing when they are crowded out of the domestic bond market.
- Countries with more developed domestic bond markets are able to mitigate, but not completely eliminate, crowding out.

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Crowding Out during Banking Crises (Advanced Countries)

	Bonds		Loans	
	(1) Domestic Market	(2) Foreign Market	(3) Domestic Market	(4) Foreign Market
Banking Crises	0.682*	-0.770*	-3.249**	0.954
	(1.93)	(-2.01)	(-2.45)	(0.74)
Gov. Bond Issuance	0.013	-0.071		
	(0.29)	(-0.43)		
Banking Crises × Gov. Bond Issuance	**-0.627****	0.205		
	(-2.18)	(0.72)		
Gov. Loan Issuance			5.766*	-9.342
			(1.86)	(-1.38)
Banking Crises × Gov. Loan Issuance			101.391*	39.816*
			(1.82)	(1.97)
N	10,475	3,601	11,896	3,450
R-squared	0.57	0.56	0.73	0.63
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes

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

▸ Main Results

Crowding Out during Banking Crises (Developing Countries)

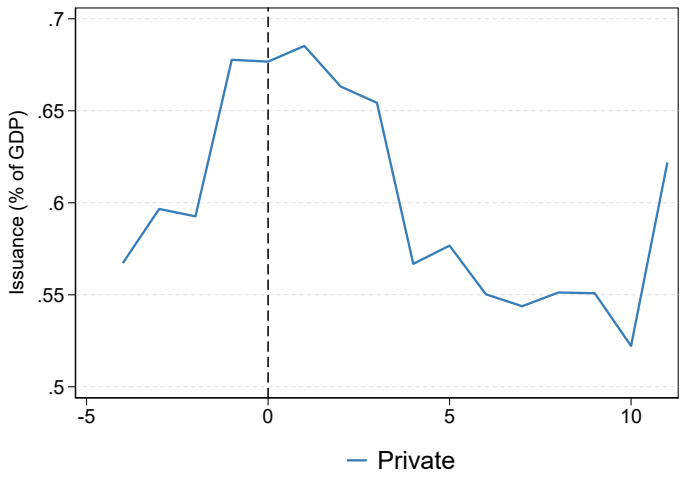
	Bonds		Loans	
	(1) Domestic Market	(2) Foreign Market	(3) Domestic Market	(4) Foreign Market
Banking Crises	1.344	-2.922*	-2.276	10.472**
	(1.71)	(-1.82)	(-0.34)	(2.68)
Gov. Bond Issuance	-0.379	-0.122		
	(-0.91)	(-0.27)		
Banking Crises × Gov. Bond Issuance	**-5.500****	-0.125		
	(-2.22)	(-0.12)		
Gov. Loan Issuance			75.712**	-22.066**
			(2.34)	(-2.75)
Banking Crises × Gov. Loan Issuance			-80.568**	0.000
			(-2.25)	(.)
N	1,805	520	606	528
R-squared	0.64	0.68	0.73	0.78
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes

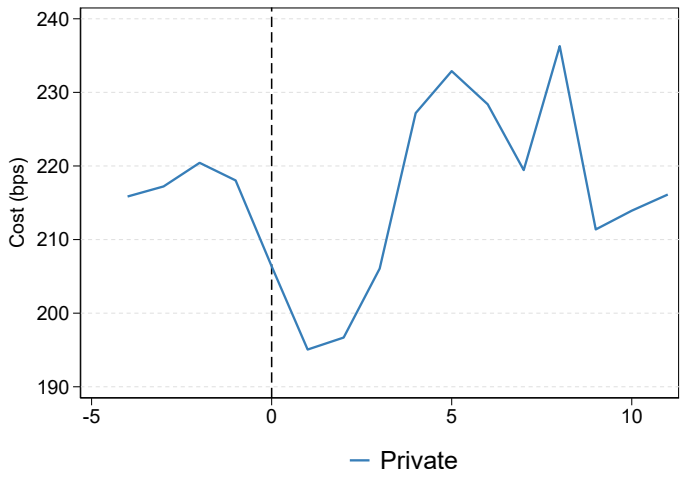
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

▸ Main Results

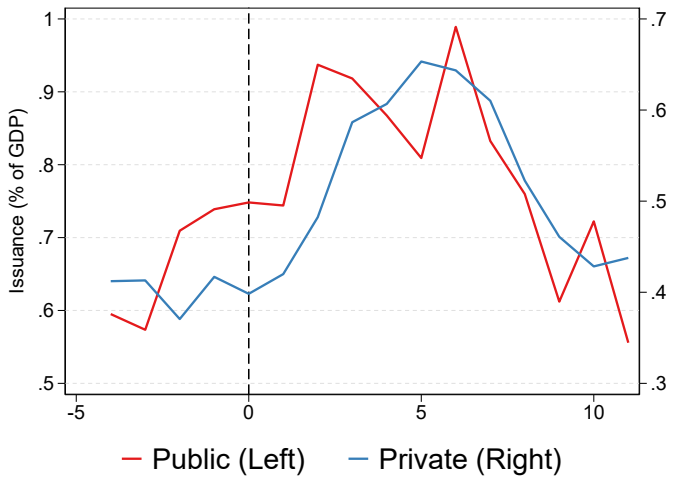
Domestic Market during Banking Crises (Cross-country averages)

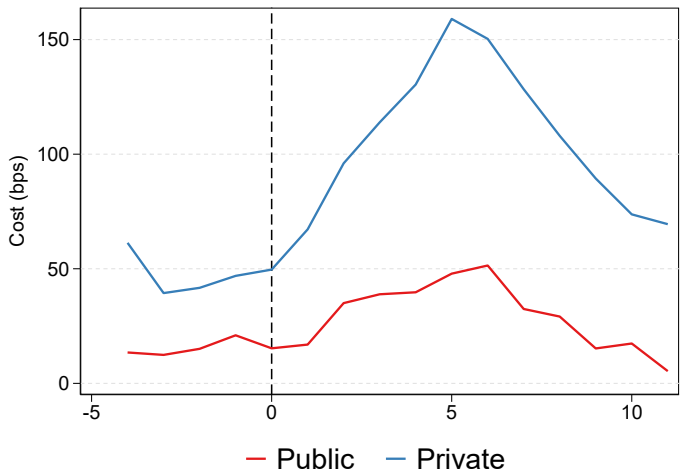
(a) Loan Issuance





(b) Bond Issuance





▸ Main Results