

Default, Commitment, and Bank Holdings of Domestic Sovereign Debt

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Overview

Research questions:

- ▶ What explains output losses associated with sovereign default?
- ▶ Why banks hold sovereign debt, and why does it matter

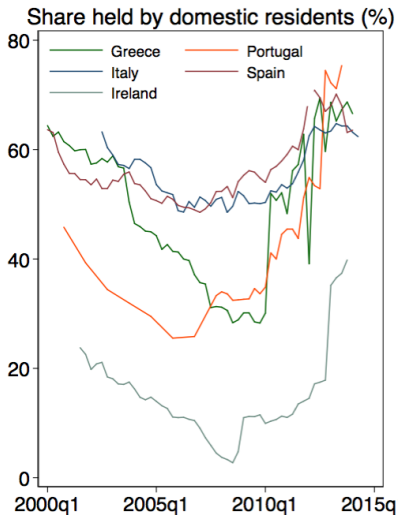
For today:

- ▶ A model of banks and sovereign default
- ▶ Domestic banks lend to the sovereign, financial frictions

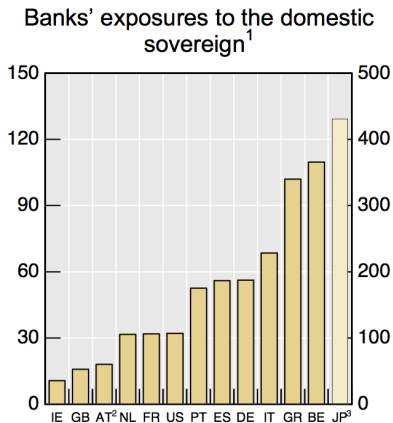
Results:

- ▶ Domestic bondholdings are a commitment device
- ▶ Implications for bank behavior, default incentives, policy

Empirical evidence

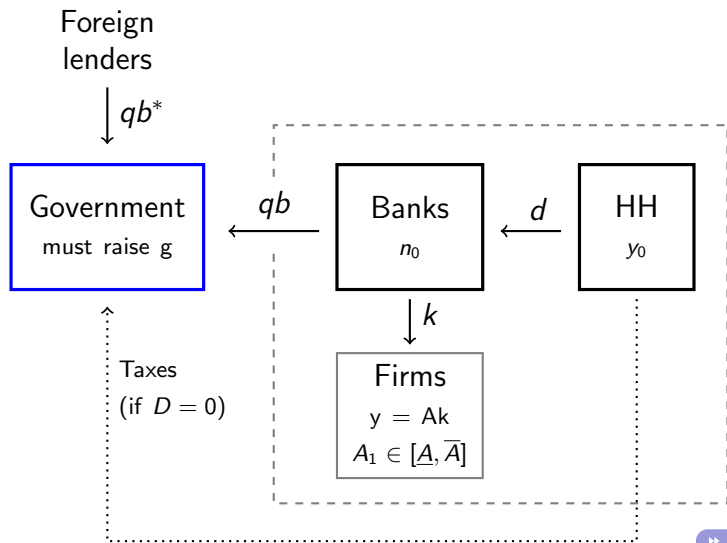


Source: Eurostat, Bruegel, World Bank.



Source: BIS, 2011.

Model: $t = 0, 1, 2$



Households

Receive endowment y_0 and choose consumption, savings to maximize

$$c_0 + E_0 [c_1 + c_2]$$

subject to:

$$c_0 + d_0 = y_0$$

$$c_1 + d_1 = R_1 d_0 - \underbrace{b^{tot} \cdot \mathbb{I}_{\{D=0\}}}_{\text{Taxes}}$$

$$c_2 = R_2 d_1 + \underbrace{n_2}_{\text{Bank profits}}$$

Government and foreign lenders

Government's optimal program satisfies:

$$V_0 = \max_{b^{tot}} c_0 + \mathbb{E} \left[\max_{D \in \{0,1\}} \{c_1 + c_2, c_1^d + c_2^d\} \right] \quad (1)$$

where $b^{tot} = b + b^*$, and fiscal need $g = q(b + b^*)$.

Default set:

$$\Delta(b, b^*) = \{A_1 \in [\underline{A}, \bar{A}] : c_1 + c_2 < c_1^d + c_2^d\}$$

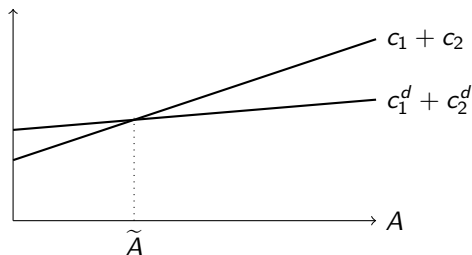
Foreign lenders are risk neutral, profit maximizing with outside option R :

$$q = \frac{1 - p(b, b^*)}{R}$$

Default threshold and incentives

Lemma

There exists \tilde{A} such that default is optimal for all $A < \tilde{A}$.

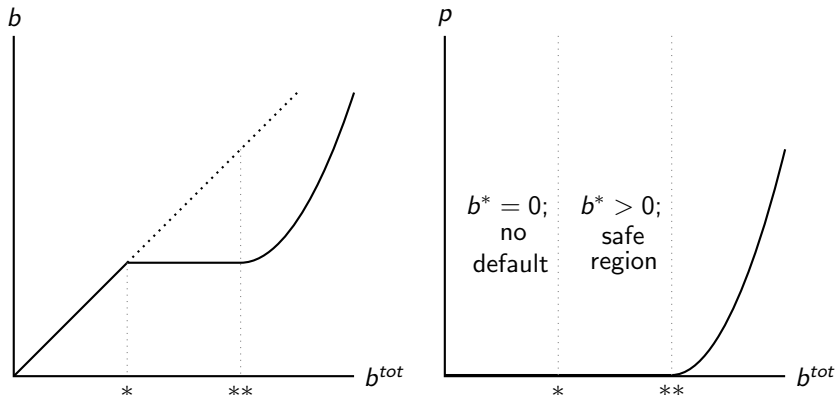


Proposition (Default incentives)

For $b < b'$: $\Delta(b, b^*) \supseteq \Delta(b', b^*)$

For $b^* < b^{*'} :$ $\Delta(b, b^*) \subseteq \Delta(b, b^{*'})$

Debt issuance and ownership



- ▶ Banks optimally choose enough government debt to intermediate
- ▶ When debt is risky, more is required to be used as collateral
- ▶ High p leads to high domestic share (e.g. Southern Europe)

Default incentives and bank health

1. Financial frictions arise when bank equity falls below a threshold

Assets	Liabilities
Loans k	Deposits d
Bonds qb	Equity n : if $< \frac{\theta}{1-\theta} R_1 d_0$, then FF

∴ Well capitalized banks (i.e. higher n_0) are less costly to default on

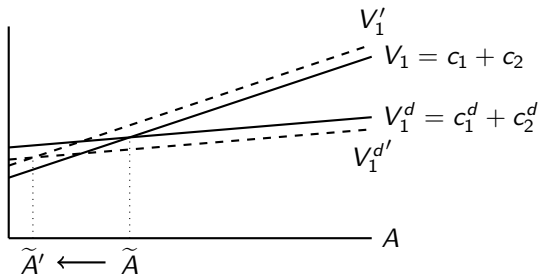
2. Disruptions to deposits drive the extent of losses in $t = 2$

$$d_1 \leq \frac{(1-\theta)A_2}{R_2 - (1-\theta)} n_1$$

∴ Default risk decreases in deposits, i.e. $\Delta(b, b^*)$ decreases in d_0
But, deposit flight in $t = 0$ makes default more likely.

Scope for policy

$$\text{New government problem: } V_0 = \max_{b^{\text{tot}}, b} \mathbb{E} \left[\max_{D \in \{0,1\}} \{c_1 + c_2, c_1^d + c_2^d\} \right].$$



Proposition (Financial repression)

When debt is risky, financial repression crowds out private investment,

but can improve welfare. Necessary condition: $\frac{dV_1}{db} \Big|_{b = \frac{(1-\omega)(n_0+d_0)}{\lambda q}} > 0$

Conclusion

1. Default can cause endogenous output losses via banking system
2. Interactions between banks and sovereign incentives has implications for the share of domestic debt and for default incentives
3. Financial repression may reduce default risk, subject to tradeoffs

Thank you!

Appendix

Related literature

Sovereign default comes at some cost to output; typically exogenous

- ▶ Exclusion costs alone cannot sustain large levels of borrowing (Eaton and Gersovitz, 1981; Arellano, 2008)

Existing literature on:

- ▶ Endogenous output costs
 - ▶ Mendoza and Yue (2012), Gennaioli et al. (2014), Bocola (2014), Perez (2014), Sosa Padilla (2015)
- ▶ Credit disruptions and the real economy
- ▶ Banks' holdings of sovereign debt
 - ▶ Gorton and Ordonez (2013), Bolton and Jeanne (2011), Woodford (1990), Broner, Martin and Ventura (2010)

My paper endogenizes output costs, and explains bank-gov't interactions

Setup

- ▶ In $t = 0$
 - ▶ Gov't borrows g from foreigners & domestic banks
 - ▶ HHs consumes and saves
 - ▶ Banks receive deposits and lend to gov't, other banks, and firms
 - ▶ A_1 is uncertain $\in [\underline{A}, \bar{A}]$
- ▶ In $t = 1$
 - ▶ A_1 is realized, production
 - ▶ Gov't decides to default or repay, taxing HHs accordingly
 - ▶ If default, financial frictions
 - ▶ HHs consume and save, banks lend to firms
- ▶ In $t = 2$
 - ▶ Firms produce
 - ▶ Banks shut down and return net worth to HHs, who consume

◀ Go Back

Equilibrium

All agents optimize, all markets clear.

Set of policy functions for consumption $\{c_0, c_1, c_2\}$, deposits $\{d_0, d_1\}$, lending $\{k_1, k_2\}$, government asset holdings b and b^* , default sets $D(b, b^*)$ and bond prices $q(b, b^*)$ such that:

1. HHs choose $\{c_0, c_1, c_2\}$ to max utility
2. Banks choose $\{d_0, d_1, k_1, k_2, b\}$ to max. $E[n_2]$, s.t. constraints
3. Deposit, interbank and sovereign debt markets clear
4. Taking q as given, b^* , default sets satisfy gov't optimization
5. Bond prices $q(b, b^*)$ reflect default probabilities, and are consistent with foreign lenders' expected zero profits