# SOVEREIGN RISK AND BANK RISK-TAKING

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Discussion by

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# INTRODUCTION

- Proposes a model to understand certain aspects of European debt crisis

  - Increasing exposure of local banks to domestic sovereign debt

  - Crowding out of loans to private sector

- Mechanism builds on a feedback loop between risk and banks'
  risk-taking incentives

- Lots of material in the paper

  - Two period model to explain mechanism

  - Quantitative dynamic model fit to Portugal. Find that mechanism
    quantitatively important

  - Analysis of ECB interventions

# OVERVIEW OF DISCUSSION

Ambitious project on a very important topic. Mechanism more general than application

This discussion:

1 Simplified two period model to isolate the mechanism

2 Two types of remarks

- Evidence on the mechanism?

- More discipline on quantitative analysis

# A SIMPLIFIED MODEL WITHOUT GOVERNMENT BONDS

- Banks borrow from depositors and lend to firms. The budget constraint is

$$n + q(d)d \geq q^l(l)l$$

- Two states of the world. With probability $\pi$ payouts from loan is $\theta^l < 1$

- Banks choose $(d, l)$ to maximize profits under limited liability,

$$(1 - \pi)[l - d] + \pi \max\{0, \theta^l l - d\}$$

- In case of default, depositors get $\theta^l$ for every dollar lent. Pricing schedule

$$q(d) = \begin{cases} q^* & \text{if} \quad d \geq \theta^l l \\ q^*[(1 - \pi) + \pi \theta^l] & \text{otherwise} \end{cases}$$

Note: Depositors need to form expectations about $l$

# CANDIDATE EQUILIBRIA

Consider two candidate equilibria

- "Safe": bank does not default

- "Risky": bank defaults in the bad state

In the safe equilibrium, the optimal loan of the bank solves

$$\frac{q^l(l^s) + \frac{\partial q^l(l^s)}{\partial l}l^s}{q^*} = [(1 - \pi) + \pi\theta^l]$$

In a risky equilibrium, the optimal loan of the bank solves

$$\frac{q^l(l^r) + \frac{\partial q^l(l^r)}{\partial l}l^r}{q^*[(1 - \pi) + \pi\theta^l]} = (1 - \pi)$$

Note that $l^r < l^s$ because bank funding costs higher in risky equilibrium

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# REGIONS

The equilibrium played depends on net-worth (and possibly expectations)

- If $n \geq n^{\text{safe}}$, the risky equilibrium is not possible. How is $n^{\text{safe}}$ defined?

$$\underbrace{\frac{q^l(l^r)l^r - n^{\text{safe}}}{q^*[(1-\pi) + \pi\theta^l]}}_{d(n^{\text{safe}})} = \theta^l l^r$$

- If $n \leq n^{\text{risky}}$, where $n^{\text{risky}}$ solves

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# MULTIPLE EQUILIBRIA

Why expectations of depositors matter for the equilibrium played?

- If depositors expect a bank default, they charge high interest rates

- Because of that, the bank needs to borrow more to finance its loans

- High borrowing exposes banks to default in the bad state at $t = 2$

- This validates depositors' expectations

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# ADDING GOVERNMENT DEBT

- Introduce government debt. Priced by foreign investors,

$$q^b = q^*[(1 - \pi) + \pi\theta^b]$$

- Bank can buy a government bond, at price $q^b$, up to a cap $\bar{b}$. The bank problem is

$$\max_{d, b \leq \bar{b}, l} (1 - \pi)(b + l - d) + \pi \max\{0, \theta^b b + \theta^l l - b\}$$

$$n + q(d)d \geq q^b b + q^l(l)l$$

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## BANK HOLDINGS OF GOVERNMENT DEBT ACROSS EQUILIBRIA

Optimal $l$ same as before

In the safe equilibrium, optimal $b$ satisfies

$$\frac{q^b}{q^*} \leq (1 - \pi)$$

Because $q^b = (1 - \pi)q^*$, bank is indifferent over $b$

In the risky equilibrium, optimal $b$ solves

$$\frac{q^b}{q^*[(1 - \pi) + \pi\theta^l]} < (1 - \pi)$$

- Because $\theta^l > \theta^b$, bank borrows at low rate and invests at high rates

- So, in the risky equilibrium $b = \bar{b}$

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# GOVERNMENT DEBT AND FINANCIAL FRAGILITY

- Safe equilibrium as before (same net-worth cutoff)

- Risky equilibrium now features

  - Exposure to risky government debt

  - Loan as before

  - More leverage

- Note that economy is now more fragile: $n^{\text{risky}}$ increases, so more net-worth states consistent with risky equilibrium

# EVIDENCE ON THE MECHANISM?

Cool! . . . . . . But more work needed to establish relevance

- Evidence supportive of mechanism
    - Local banks increased exposure during debt crisis
    - More fragile (less capitalized) banks purchased more sovereign debt

- Alternative narrative fitting data is "financial repression"
    - Evidence of moral suasion (De Marco and Macchiavelli, 2016)
    - Moral suasion should be stronger for less capitalized banks

Suggestion: Test mechanism on other financial instruments

- Mechanism works for other assets (E.g. state-owned firms)

- Did we see banks lending more to firms more correlated to government?

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# MORE DISCIPLINE IN QUANTITATIVE ANALYSIS

Need more discipline on the mechanism in quantitative analysis

1. Little discipline on $\theta^l - \theta^b$, which is key for the mechanism

   - Spread between sovereign and banks borrowing rates drives risk-taking incentives

   - Should be a key empirical target in the analysis

   - How should we think about deposit insurance?

2. Model lacks features that should dampen risk-taking incentives

   - No restrictions on bank leverage

   - No price elasticity for government bonds (small open economy)

   - With strategic default, holdings of government debt by banks reduce default risk (Chari, Dovis and Kehoe, 2016)

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# CONCLUSION

- Very nice paper

- Two suggestions

    - More evidence on the mechanism

    - More discipline in quantitative analysis