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
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

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

Note: Depositors need to form expectations about \( l \)
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

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

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

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

Note that $l^r < l^s$ because bank funding costs higher in risky equilibrium.
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\frac{q^l(l^r) + \frac{\partial q^l(l^r)}{\partial l} l^r}{q^*[(1 - \pi) + \pi \theta^l]} = (1 - \pi)
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Note that $l^r < l^s$ because bank funding costs higher in risky equilibrium
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?

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

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

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- When \( n \in (n^{\text{risky}}, n^{\text{safe}}) \), we can have multiple equilibria
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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?

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

$$d(n^{\text{safe}})$$

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

$$\frac{q^l(l^s)l^s - n^{\text{risky}}}{q^*} = \theta l^s$$

$$d(n^{\text{risky}})$$

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- When $n \in (n^{\text{risky}}, n^{\text{safe}})$, we can have multiple equilibria
**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.

Mechanism reminds Lorenzoni and Werning (2014).
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Mechanism reminds Lorenzoni and Werning (2014)
• 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

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

\[ n + q(d)d \geq q^b b + q^l(l)l \]

• Assume that \( \theta^b = 0 \), so pricing schedule for deposits as before

What is special about gov debt? Lower recovery value and no price elasticity
**Adding government debt**

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What is special about gov debt? **Lower recovery value and no price elasticity**
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

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

- Because \( \theta^l > \theta^b \), bank borrows at low rate and invests at high rates
- So, in the risky equilibrium \( b = \bar{b} \)
Bank holdings of government debt across equilibria

Optimal $l$ same as before

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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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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