Discussion of "A positive analysis of bank behaviour under capital requirements"

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THE PAPER
Research Question
Question

- **Theory**: Propose a positive analysis of a bank’s response to capital requirements accounting for risk-shifting and debt-overhang

- **Empirics**: Banks’ response to higher capital requirements: *cut* lending when prospects are low, *raise equity* when prospects are high
The mechanism
Bank’s profits (initial shareholders)

\[ \Pi(x, z) = \left( d - s \frac{(\text{Dividend} / \text{Capital Iss.})}{(e - \gamma(x + z))} \right) \]

Initial equity
Capital investment

\[ + \int_{A_{\text{NotDefault}}}^{A_H} \left[ \text{Upside Payoff} \right] f(A) \, dA \]

Loan revenue
Deposits
Bank’s profits rewritten

\[ \Pi(x, z) = e + \int_{A_L}^{A_H} \left[ (X + Z) - (x + z) \right] f(A) \, dA \]

\(\text{ECONOMIC SURPLUS}\)

\[ + \int_{A_L}^{A_{\text{NotDefault}}} \left[ (1 - \gamma) \cdot (x + z) - (X + Z) \right] f(A) \, dA \]

\(\text{DEPOSIT INSURANCE SUBSIDY}\)
Bank’s lending decision

\[
\int_{A_L}^{A_H} \left[ \frac{\partial X}{\partial x} (A, x^*) - 1 \right] f(A) \, dA
\]

\[\text{ECONOMIC SURPLUS MAXIMIZATION}\]

\[= 0\]

\[+ \int_{A_L}^{A_{\text{NotDefault}}(x,Z)} \left[ (1 - \gamma) - \frac{\partial X}{\partial x} (A, x^*) \right] f(A) \, dA\]

\[\text{DISTORTION}\]
First-best

\[
\int_{A_L}^{A_H} \frac{\partial X}{\partial x} \left( A, x^{FB} \right) f(A) \, dA = \frac{1}{\text{Cost of funds}}
\]

Expected loan revenue
First-best
Role of deposit insurance and limited liability
Effect of deposit insurance and limited liability

\[
\int_{A_{\text{NotDefault}}(x)}^{A_H} \frac{\partial X}{\partial x} (A, x^*) f(A) \, dA = \begin{cases} 
\text{one for one} & \pi(x^*) \cdot 1 + (1 - \pi(x^*)) \cdot \gamma \\
\text{capital only} & \text{Expected cost of funds}
\end{cases}
\]

\textit{Expected mrgnl. loan revenue}
Effect of deposit insurance and limited liability

\[
\pi(x) + (1 - \pi(x)) \gamma \\
\int_{A_{\text{NoDefault}}}^{A_H} \frac{\partial X}{\partial x} (A, x) \, dF(A) \\
\frac{\partial X}{\partial x} (A_{\text{NoDefault}}, x)
\]
Role of limited liability and deposit insurance

- **Bank’s limited liability** (no internalization of losses) and **deposit insurance** (bank’s risk not priced): bank’s funds are subsidized

  - Negative NPV loans funded: bank does **not internalize all the downside** (risk-taking–overlending in the model)
Role of legacy assets
Effect of legacy assets with defaulting states

\[ \int_{A_{\text{NotDefault}(Z)}}^{A_H} \frac{\partial X}{\partial x} (\mu, x^*) f(A) \, dA = \pi(Z) \cdot 1 + (1 - \pi(Z)) \cdot \gamma \]
Effect of legacy assets with defaulting states

\[
\frac{\partial X}{\partial x} \left( \mu, x^* \right) f (A) dA = 1 + \left( \frac{1}{\pi(Z)} - 1 \right) \cdot \gamma
\]

Marginal new loan revenue

Expected cost of funds
No legacy assets and safe new loans
Effect of legacy assets with defaulting states
Role for legacy loans with defaulting states

- **Non-performing legacy loans** (debt-overhang): loan revenues towards paying "inherited" deposits shortfall

  - Positive NPV loans funded: bank does not *internalize all the upside* (underlending in the model)
All effects together

- Non-separabilities make it hard to tell!
Role of capital requirements and bank response

- Substitute deposits for capital: **lessen the wedge** between bank’s profits and economic surplus

- Increase capital requirements leads to...
  - **Curtail lending**, if over-lending
  - Increase lending (**raise more capital**) if under-lending (when large amount of **legacy loans** are expected to **misperform**)
The empirics
Bank response to capital requirements elevation leads to...

- **Cutting lending** if economic prospects (low confidence) are bad
- **Raise capital** if economic prospects are good
COMMENTS
1. From a positive analysis to a normative theory
Optimal capital requirement?

- Paper proposes a **positive analysis** of bank’s behavior under capital requirements

What would it be the optimal capital requirement in this model?

Lack of appropriate social welfare function, but suggestive of economic surplus maximization.

In this case, \( \gamma = 1 \): full internalization (no deposit insurance subsidy, no legacy liabilities paid to depositors).

If capital is socially costly (substituting valuable deposits for capital): \( \gamma < 1 \).
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Cutting lending, Which message? Should we worry?

- What is the social cost of cutting lending as a response to increasing capital requirements?
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- **Cutting lending not a problem**: closer to the efficient outcome!
2. Raising equity instead of cutting lending
In the model, the **expected payoff** to **depositors and equityholders** is the **same**: higher payoff to equityholders only to compensate for probability of default.
Same expected payoff to deposit holders and equity holders?

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  - Scarcity rents more likely in bad times: raising capital more costly in bad times.
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    - Cutting (**positive NPV**)! lending in bad times even in the presence of underlending (exacerbate the problem!)
Empirical implications of costly capital in bad times

- Cutting lending in bad times may have been a response to increased capital requirements due to the cost of seasoned equity offering in bad times.
4. Tightening the connection between theory and empirics
Testing empirical implication of the model

- Empirical implication of the model:

  Raising capital requirements would lead to raising equity and to cut lending in the presence of troubled legacy-assets.

  Empirical test (bank-level):
  - Banks with a higher share of troubled legacy-assets relatively cut lending less and raise more equity.

  May want to look into (ex-post) proportion of loans written-off to appraise troubled legacy-assets.
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5. Alternative explanations of empirical findings
Better prospects may make raising equity more profitable than cutting lending

- All loans perfectly correlated, fail with probability $1 - \pi$
  - Expected cost of funds with a capital requirement $\gamma$:
    $\pi + (1 - \pi) \cdot \gamma$

- Project expected return if not fail: $H$ (high) or $L$ (low), with probabilities $p$ and $1 - p$
  - Expected return $[pH + (1 - p)L] \cdot \pi$

- If $H$ high enough and $L$ low enough, raise equity if $p$ high (good prospects?) and cut lending if $p$ low (bad prospects?)
Better economic conditions may ease raising capital

- In good times, **equity may be cheaper** to raise (scarce equity argument)

- In good times, banks may find it **easier to retain earnings** to increase capital
  - Data about earnings and dividends?
Controlling for demand

- **Control for** firm fundamentals (*demand*)
  - Identification through multiple borrowing from the *same firm* at the *same time* (credit registry data!)
CONCLUDING REMARKS
Overall impression about the paper

- Theory **challenges** common wisdom that **raising capital leads to cut lending**
  - First time to see nice integration of **deposit insurance** (risk-shifting) and **legacy assets** (debt overhang)
  - Pathway to a normative theory of optimal capital requirements and deposit insurance?
- Empirical analysis documenting different **response of banks** to raising capital requirements: **cut lending only when economic prospects are bad**
- Policy implications:
  - **Legacy asset important** issue when thinking of capital requirements (lesson from theory)
  - **Economic prospects important** issue when thinking of capital requirements (lesson from empirics)