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)

$$\Pi(x,z) = \overbrace{\underbrace{e}_{Initial\ \ equity} - \underbrace{\gamma(x+z)}_{Capital\ \ investment}}^{d-s\ \ (Dividend\,/\,Capital\ \ Iss.)}$$

$$+ \int_{A_{NotDefault}}^{A_H} \left[\overbrace{\underbrace{(X+Z)}_{Loan\ \ revenue} - \underbrace{(1-\gamma)\cdot(x+z)}_{Deposits}}^{Upside\ \ Payoff} \right] f(A)\, dA$$

Bank's profits rewritten

$$\Pi(x,z) = e + \underbrace{\int_{A_L}^{A_H} \left[\underbrace{(X+Z)}_{Loan\ \ revenue} - \underbrace{(x+z)}_{Loan\ \ investment} \right] f(A)\,dA}_{ECONOMIC\ \ SURPLUS}$$

$$+ \underbrace{\int_{A_L}^{A_{NotDefault}} \left[\overbrace{\underbrace{(1-\gamma)\cdot(x+z)}_{Deposits} - \underbrace{(X+Z)}_{Loan\ \ revenue}}^{Shortfall} \right] f(A)\,dA}_{DEPOSIT\ \ INSURANCE\ \ SUBSIDY}$$

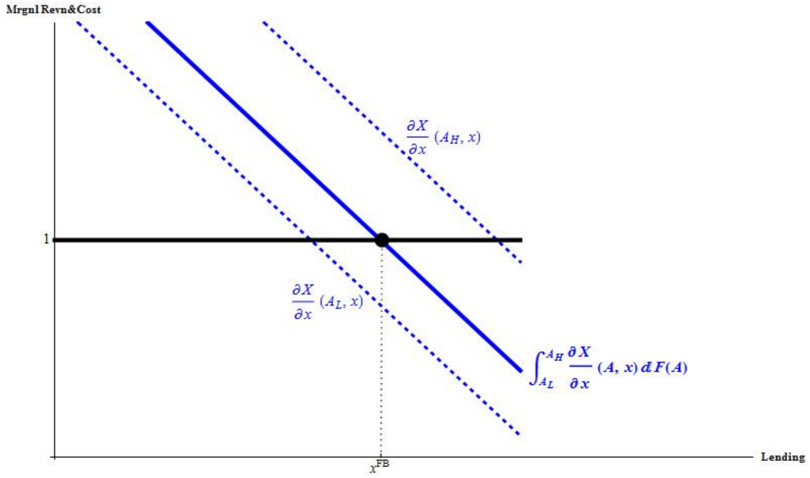
Bank's lending decision

$$
\underbrace{\int_{A_L}^{A_H} \left[\frac{\partial X}{\partial x} (A, x^*) - 1 \right] f(A)\, dA}_{ECONOMIC\ \ SURPLUS\ \ MAXIMIZATION}
+ \underbrace{\int_{A_L}^{A_{NotDefault}(x,Z)} \left[(1-\gamma) - \frac{\partial X}{\partial x} (A, x^*) \right] f(A)\, dA}_{DISTORTION} = 0
$$

First-best

$$\underbrace{\int_{A_L}^{A_H} \frac{\partial X}{\partial x}\left(A, x^{FB}\right) f\left(A\right) dA}_{Expected\ \ loan\ \ revenue} = \underbrace{1}_{Cost\ \ of\ \ funds}$$

First-best



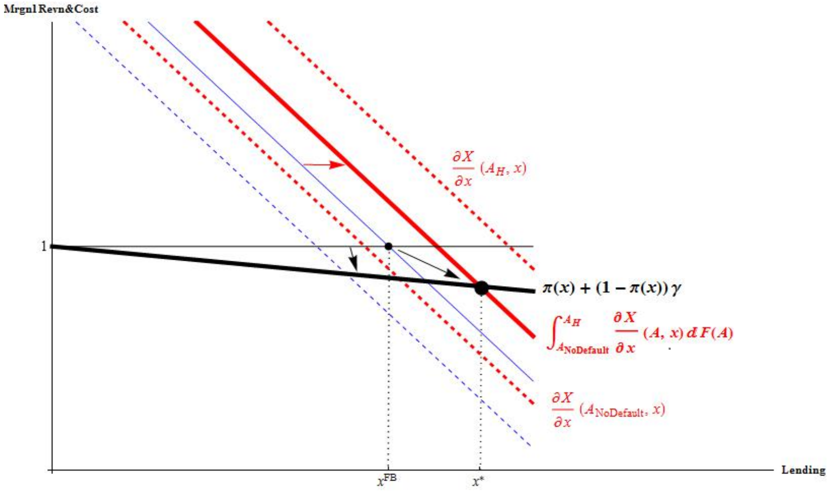
Mrgnl Revn&Cost
$\frac{\partial X}{\partial x}(A_H, x)$
1
$\frac{\partial X}{\partial x}(A_L, x)$
$\int_{A_L}^{A_H} \frac{\partial X}{\partial x}(A, x)\, dF(A)$
x^{FB}
Lending

Role of deposit insurance and limited liability

Effect of deposit insurance and limited liability

$$\underbrace{\int_{\mathbf{A_{NotDefault}}(\mathbf{x})}^{A_H} \frac{\partial X}{\partial x}(A, x^*)\, f(A)\, dA}_{Expected\ \ mrgnl.\ \ loan\ \ revenue} = \underbrace{\overbrace{\boldsymbol{\pi}(\mathbf{x}^*) \cdot 1}^{one\ \ for\ \ one} + \overbrace{(\mathbf{1} - \boldsymbol{\pi}(\mathbf{x}^*)) \cdot \gamma}^{capital\ \ only}}_{Expected\ \ cost\ \ of\ \ funds}$$

Effect of deposit insurance and limited liability



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)l)

Role of legacy assets

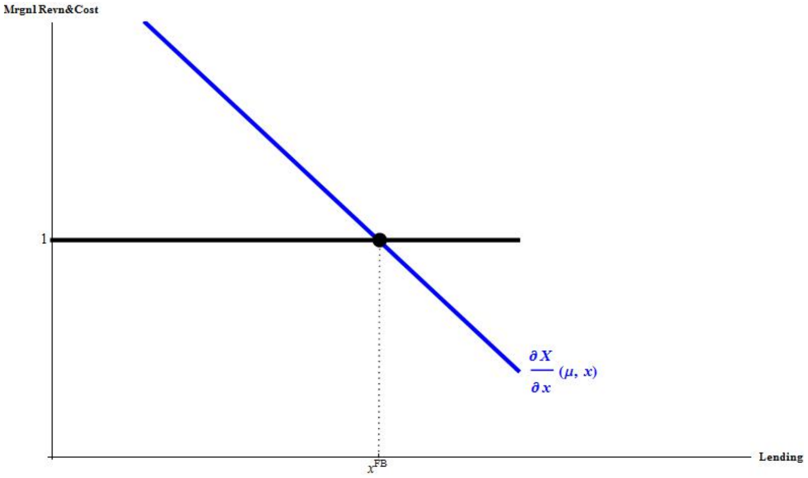
Effect of legacy assets with defaulting states

$$\int_{\mathbf{A}_{\mathbf{NotDefault}}(\mathbf{Z})}^{A_H} \frac{\partial X}{\partial x}\left(\boldsymbol{\mu}, x^*\right) f\left(A\right) dA = \pi\left(Z\right) \cdot 1 + \left(1 - \pi\left(Z\right)\right) \cdot \gamma$$

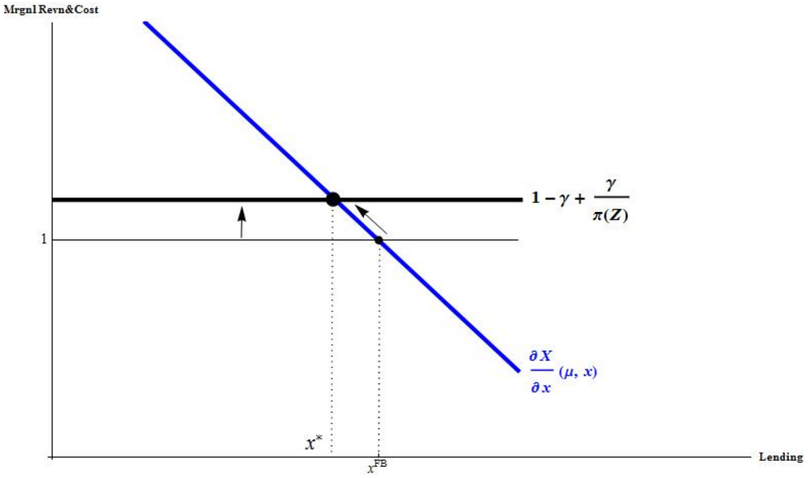
Effect of legacy assets with defaulting states

$$\underbrace{\frac{\partial X}{\partial x}\left(\boldsymbol{\mu}, x^{*}\right) f\left(A\right) dA}_{Mrgnl.new \;\; loan \;\; revenue} = \underbrace{1 + \left(\frac{1}{\pi\left(Z\right)} - 1\right) \cdot \gamma}_{Expected \;\; cost \;\; of \;\; funds}$$

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 overlending
  - Increase lending (**raise more capital)** if underlending (when large amount of **legacy loans** are expected to **misperform**)

The empirics

Role of capital requirements and bank response

- 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

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- 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): $\gamma < 1$

Cutting lending, Which message? Should we worry?

- What is the **social cost of cutting lending** as a response to increasing capital requirements?

Cutting lending, Which message? Should we worry?

- What is the **social cost of cutting lending** as a response to increasing capital requirements?
  - **Cutting lending not a problem**: closer to the efficient outcome!

2. Raising equity instead of cutting lending

Same expected payoff to depositholders and equityholders?

- In the model, the **expected payoff** to **depositors and equityholders** is the **same**: higher payoff to equityholders only to compensate for probability of default

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  - Scarcity rents more likely in bad times: raising capital more costly in bad times
    - 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 requeriments due to the **cost of seasoned equity offering** in bad times

4. Tightening the connection between theory and empirics

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- 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

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 γ: $\pi + (1 - \pi) \cdot \gamma$
- 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)