How does financial regulation change bank credit supply?

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1. Basic environment

2. Baseline findings

3. Regulatory Implications

How to think about financial regulation?

1. Need to decide the economic function of bank and the financial system ➜

2. Which Modigliani and Miller assumptions to discard?

3. Tradeoff between simplicity and generality
    –   Today is a first step but I hope is the natural one

Modified Diamond-Dybvig Environment

General equilibrium

- Incomplete Asset Markets

- One good

- Three periods

- Three agents

- Financial system helps with
- Risk sharing
- Credit constraints

Externalities from the financial system:

- Possible ruinous bank run, default amplification

(Lots of other things to add, that I will discus at the end)

The Agents

- A poor entrepreneur (P) that owns the rights to a project but must borrow to implement it

- A rich saver (R) who can invest in a riskless asset, can lend directly to P, or save via a bank

- A banker (B) with some own funds who can raise funds from R and invest in P.

Timing

T=0	T=1	T=2
R chooses: -How much to invest with P, B or in the riskless asset -Whether to fund B with deposits or equity - How much to consume this period	R learns whether he is impatientt: -If he is impatient, he withdraws his deposit and consumes - If patient, he might run based on B's riskiness and consume whatever he can	If a run has not occurred, then there are 3 outcomes for P's project (High, Med, Low) P repays all loans to R & B (or defaults) B repays deposits first (or defaults) and then pays pro-rata dividends on equity
B chooses: -Whether to make deposits or to buy bank equity -Whether to invest in the riskless asset -Scale of the loan to P -How much to consume this period	B chooses: - How to service withdrawals, selling the riskless asset or liquidating loans	All agents who did not consume already, consume now
P chooses: - The scale of the risky investment - How much to consume this period	P learns: If her loan is called by B	

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Contract restrictions

- No short sales (against either P or B)
- **Limited liability for B and P**
- P cannot/will not issue equity
- B operates on two dimensions: one side of her brain manages the assets of the bank, the other side decides what to do with her wealth

- Market incompleteness means we cannot decentralize a planner's problem.

What is the Role of the Bank?

- Creating both debt and equity claims potentially improves the investment opportunities for R and thus improves risk-sharing.

- Provides liquidity insurance for impatient consumers but creates the risk of a run in doing so.

- **Creates the potential for risk shifting by B due to limited liability – B fails to recognize that taking more risk will raise its cost of funding and does not internalize that more risk taking raises the odds of run**

Why does allowing for runs matter?

- Patient savers can decide to withdraw early if they fear that the bank has taken too much risk
    - In this case B must liquidate loans
- Assume no sunspot-based runs, instead assume the probability of a run is increasing in the level of leverage and decreasing in the level of liquid assets
    - Savers and the bank take this probability as given
    - **A planner would recognize it is endogenous**

Micro- versus Macroprudential considerations

- Limited liability for B and P create an incentive to excessively gamble – overinvest!

- Run risk leads to caution in lending to avoid unnecessary early liquidation – underinvest

- Fundamental asymmetry between over- and under-investing
  - Agents that want to over-invest by gambling never will voluntarily give up this option.

Generic properties of the competitive equilibrium

- B never chooses to buy equity in the bank
  - Since B cannot make equity investments in P, the upside from lending is limited
- We calibrate so that P defaults all but the high state, and B defaults on deposits in the low state
- Over-investment or under-investment (relative to a planner) are both possible depending on endowments and levels of risk aversion.

Why would a planner reduce investment and risk?

- Forcing a bank to use more equity finance and rely less on (unproductive) liquid assets can reduce run risk.

- If a run is sufficiently destructive, greatly reducing this risk can leave everyone better off.

Why would a planner raise investment?

- If the run risk is sufficiently high, the bank will voluntarily hold excess liquidity and ration credit – safe banks with too little investment.

- Switching to more equity finance can maintain safety while freeing up lending capacity.

Extreme Regulatory Alternative: Unlimited liability

- Bounds lending to P to be below her endowment
- Bounds deposits to be less than P's repayment and B's endowment
- Greatly reduces risk-taking, shrinking lending to P, leaving her worse off.
- Taking away the default option can make B worse off -- he gains from the eliminating the run
- R gets safer savings, but they earn a much lower return. In our calibration, he is worse off too.

Capital regulation

- Take FOCs as given, solve for optimal choices.
- Mandating that R supplies more capital leads R to cut back on deposits
- This greatly reduces the risk of a run, but in this case it is optimal for the bank to raise investment
  - Bank mostly loses the benefits of limited liability, so must share more of the upside from higher lending
- Would like a second regulatory tool

Other regulatory options

- Planner favors equity over deposit financing. Raising **liquidity requirements** enables more deposit financing. Goes the wrong way!

- Financial repression, i.e. interest rate caps on deposits, can make P and B much better off but at R's expense. Depends on Pareto weights used by the planner.

Conclusions

- Helpful to recognize whether the competitive allocations yield over or under investment.
  - Regulation challenges are very different

- Diamond-Dybvig style set up can lead to either outcome

- Single regulatory tool such as capital regulation will not solve multiple distortions