Banking Regulation

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1 Introduction

- Banking Regulation now exists in every country with well-developed banking system.

- The general theory of regulation relates to market failures:
  - the presence of monopoly power (imperfect competition)
  - Externalities and public goods;
  - Asymmetric information.

- Is banking just a special case of this, or is there something special and characteristic of banking that requires its reguation?

- Historically, *unregulated* banking was prone to:
  - Bank-runs: this occurs when depositors take out their money from the bank leading to insufficent liquidity. This affects individual banks.
  - Bank panics: there is contagion and bank-runs spread across large sectors of banking system. This affects the whole system.
  - Fraud: a bank is a licence to print money!
- Fundamental problem: there is an imbalance betweent the structure of the banks assets and its liabilities. Depositors need to know they can get their money when they want it.
- Banking Crises can be very costly: the asian crisis 1997-2000: the banking

systems in Malaysia, Indonesia, Thailand and South Korea all collapsed - very costly for the government to sort out.

- Bank runs and crises are not uncommon, and occur in all economies including US, UK, Japan....

2 Lender of last resort (LLR).

- Walter Bagehot (1873): Classical Theory.
  - CB lends to illiquid but solvent financial institutions

  - Lends at penalty rate.
  - Lends on the basis of collateral
  - The CB makes its policy public (credibility).

- This is based on the disinction between illiquidity and insolvency: illiquidity is a cash-flow concept; insolvency refers to the underlying unprofitability of the bank.

- Transparent rule: disliked by central banks, which like to use discretion (LLR is not a right of banks).

2.1 US: Federal Reserve Banking system

- set up in 1913. Very late (nearly 300 years after UK!). Can compare before and after!
  - Before: 1870-1907, 21 financial crises. In 1907 Panic 2 out 3 banks had to close their doors.
  - After: 1915-28: None.
  - 1929-33: Great Crash. Friedman amd Schwartz: the FRB did not provide the liquidity required to keep the finacial system afloat.

- UK: Had a Central Bank, but only introduced formal LLR in 1866. Potential crises in 1878, 1890 and 1914 prevented. The UK had no banking crisis in period 1870-1913.

- Switzerland: the exception - free banking without runs for a long period, and LLR operates very infrquently. But, Swiss banks are an exception?

3 Bank Runs: Diamond-Dybvig.

- Back to old model.

- Three periods:

  - Period 0: Each farmer has one unit endowment. Has to decide how much to invest I.

  - Period 1: the farmer may consume the quantity not invested.
  - Period 2: the farmer consumes the output resulting from then investment.

- Technolgy: $Y_2 = (1 + R) .I : R > 0$.

- Preferences: "liquidity shock".
  - probability π farmer only get utility from period 2 consumption and obtains utility $u(C_1)$ where $C_1 = 1 - I$
  - Probability $(1 - \pi)$ the the farmer only gets utility in period 3 and gets utility $u\left(C_2\right) = (1 + R) I$.

– In period 0, ex ante lifetime utility is

$$U = \pi u\left(C_1\right) + \left(1 - \pi\right) \rho u\left(C_2\right)$$

where $\rho < 1$ and we assume that the technology is "productive" so that $\rho\left(1 + R\right) > 1$.

3.1 Autarky.

- Suppose there is only one farmer: Robinson Crusoe on his Island before man friday arrived!

- In period 0 the farmer solves the following max

$$\max_{I} \pi u(1 - I) + \left(1 - \pi\right) \rho u\left(I\left(1 + R\right)\right)$$

- FOC:

$$\begin{aligned} -\pi u_1' + (1-\pi)\,\rho u_2'(1+R) &= 0 \\ \frac{\pi u_1'}{(1-\pi)\,\rho u_2'} &= (1+R) \end{aligned}$$

- Where $\frac{-\pi u_1'}{(1-\pi)\rho u_2'} = MRS$ since

$$\begin{aligned} du &= \pi u_1' dC_1 + (1-\pi)\,\rho u_2' dC_2 \\ MRS &= -\left.\frac{dC_2}{dC_1}\right|_u \\ &= \frac{\pi u_1'}{(1-\pi)\,\rho u_2'} \end{aligned}$$

- This is a tangency condition: the farmer faces a technological trade-off

between consuming now and later.

- $$\begin{aligned} C_1^A &= 1 - I \\ C_2^A &= I\,(1 + R) \end{aligned} \tag{1}$$

3.2 Banks 1: provide insurance (pool of piquidity).

- There are lots of farmers. The farmers deposit all their endowment in the bank in period 0.

- The Bank makes loans of size 1 to a proportion $1 - \pi$ of farmers (or just gives the whole lot to one farmer, since constan returns to scale). The loan requires $1 + R_L$ is payed back.

- Bank offers following deposit account:
  - If you withdraw at period 1 you get no interest in period 2.
  - If you leave your money in, you get interest of R_D.

- Profits of Bank:
  - period 1: π will withdraw cash in period 1 The bank has suffient reserves to pay them. No profit.

- Period 2: $(1-\pi)$ withdraw cash in period 2 and the bank pays receives its loan interest and pays out the cash plus interest to depositors. profit is equal to

$$(1-\pi)(R_L - R_D)$$

- Zero profits? Assume $R = R_D = R_L$

- What is the consumption of each farmer?

  - Period 1: $C_1^B = 1$. Put endowment of money in and take it all out in period 1 .

  - Period 2: $C_2^B = (1+R)$. Take it all out plus interest in period 2.

– Utility: much much better! Without Bank each farmer's investment was "wasted" if they had to consume in period 1. If he had to consume in period 2, the portion not invested was "wasted". Inefficient.

$$\begin{aligned} C_1^B - C_1^A &= I \\ C_2^B - C_2^A &= (1 - I)(1 + R) \end{aligned}$$

- Compare Autarky with Bank.

- Farmers much better off! In fact the bank can make a profit and charge different loan and deposit rates. Suppose the bank pays zero on deposits $R_D = 0$ and $R_L = R$.

- Banks profits in period 2 are now

$$(1 - \pi) R$$

- $C_2 = I : C_1 = 1$. Farmer can still be better of, since in period 1 can liquidate investment! This may compensate for lower consumption in period 2. From social welfare, the outcome is efficient, since banks shareholders benefit (investment and output the same).

- Banks provide pools of liquidity and "insure" against idiosyncratic shocks. Can model these differently (income or productivity shocks). In book allows for storage (can store good).

3.3 Bank Runs.

- Now, consider if there is a simple storage technology: households can store the money costlessly (but with no return).

- The "patient" households leave their money in the bank and then receive return. This is an equilibrium. However, it relies on the trust of the patient households. This is the efficient allocation.

- But, alson an inefficient allocation: the patient depsoitors do not trust the bank and withdraw their deposits in period 1. The investment is liquidated.

- The banks liquidity constraint relies on the law of large numbers and certainty of π. Suppose that there are two possible values of π: $1 > \pi_h > \pi_l > 0$. Suppose that this becomes known only after the investment has been made. The probability of the high proportion is P.

- The bank can react to this uncertainty in different ways:

- Assume the worst: only invest the smaller value $1 - \pi_h$.
- That means that if $\pi = \pi_h$ the outcome is efficient (ex post).
- If $\pi = \pi_l$, the outcome is inefficient. There was reduced investment in the first period, so the total second period payment to each depositor is only

$$1 + R\left(1 - (\pi_h - \pi_l)\right)$$

- The bank invests more than $1 - \pi_h$: there is a probability of P that it will have insufficient funds to meet depositors who wish to withdraw money in period 1. This will cause a bank-run.

4 Regulators response.

- Insurance.
  - A third institution provides deposit insurance (or the banks get together).
  - If many banks and P same for all: in population
$$\pi = P\pi_h + (1 - P)\,\pi_l$$
  - insurance just like a meta-bank.
  - Does not work if there is *systemic risk*.
- Fractional reserves: require the bank to hold reserves: in previous example, to invest only $(1 - \pi_L)$. But, this leads to inefficiency.

- "Narrow Banking". Restrict the lending of banks so that they have liquidity.

- Suspend convertability in case of bank run. Banks are allowed to "shut the doors". This is bad news for the people who need the money!

- The CB acts as LLR: provides liquidity to bank at penalty rate.

- The aim of these regulations is to maintain the confidence of patient investors. Do not want them to lose trust in bank.

4.1 Moral Hazard

- Banks may make bad investments. The cause of the run is the bad assets: people withdra money now becuase they think the bank will have insufficient funds to meet interest payments.

- Regulations can protect banks from the consequences of bad outcomes: increase the payoffs in bad states of the world.

- This may encourage banks to take on riskier projects (Leland and Pyle)

- Important to impose costs on banks.

4.2 Fraud.

- Banks enter into long term commitment with depositors and investors

- Banks can "take the money and run". Promise to invest but simply take money. Managers can pay themselves large bonuses...

- Happened in the past: also BICC recently.

- Regulators monitor banks to ensure that they are behaving correctly: examine their accounts and audit behaviour.

5 Regulation: are banks special?

- Monopoly: in many countries, banking is highly concentrated (UK 4 big banks).

- Regulators intervene if they think that the banks are charging too much for services or colluding to keep interest rates to depositors low.

- In UK: competition encouraged: regulators intervene directly only rarely. Recent case: charges for overdrafts and late payments. Regulator said banks could only make charges that reflect the cost.

- Assymetric information. All financial markets are regulated: not just banks. Moral hazard and adverse selection problems.

- Public good/extrnalities? Banks are central to the economic system: an efficient banking system is crucial to the functioning of the economy (but, some managed with highly inefficient banking systems: e.g. US pre 1913).