

Monetary Macroeconomics

Chapter 13: Bank Risk

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Bank Risk

In this lecture, we investigate two possible reasons for bank failures:

1. There may be a sudden rush of withdrawals that forces a bank to sell assets with a loss
2. The assets of a bank may realize unexpectedly low returns so that the bank does not have the resources to pay depositors

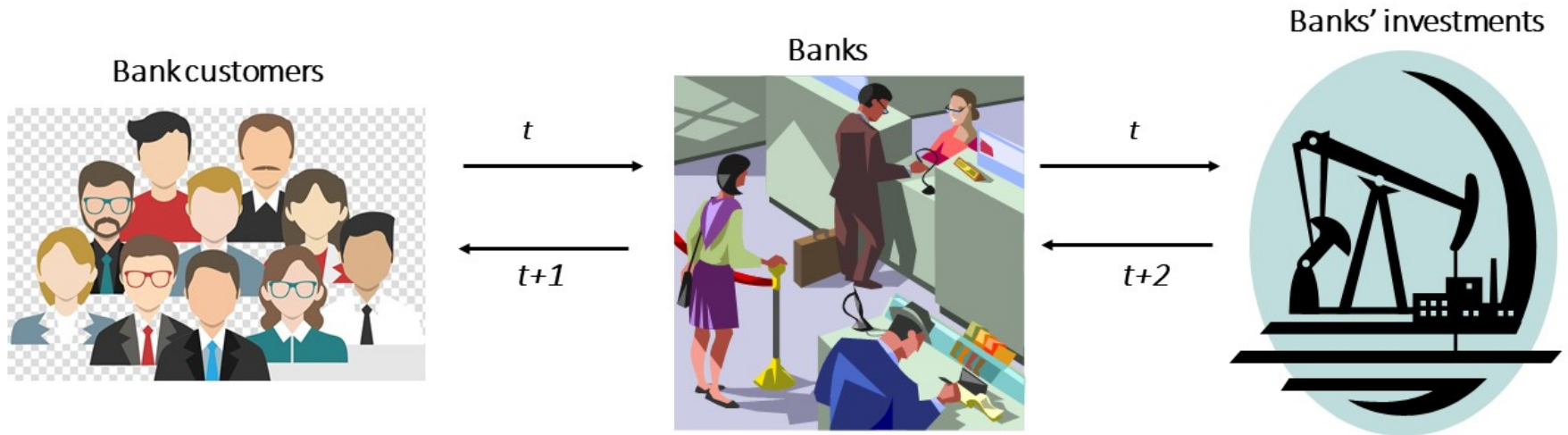
Then we will discuss policies that could be done.

Can bank failures be avoided?

Demand Deposit Banking

- A defining characteristic of banks is that they have liabilities payable on demand.
- Deposits that are returned to the depositor whenever requested are called *demand deposits*.

Maturity mismatch of bank assets and liabilities



- A mismatch of maturity of bank assets and liabilities raises the possibility of a bank panic or run.
 - a bank run concerns one bank
 - when a number of banks experience bank runs it is called a bank panic

Bank Run of the Spar- und Leihkasse Thun in 1991



Demand Deposit Banking — The Model

OLG model with 3-period-lived agents

Each period N agents are born.

There is a single non-perishable consumption good.

Each person is endowed with y units of good when young, and nothing later.

Nobody wants to consume when young.

There is an equal chance of being either type 1 or type 2:

- Type 1 wants to consume when middle-aged (he is impatient).
- Type 2 wants to consume when old (he is patient).

Uncertainty about individual's type is resolved when middle-aged.

Exactly half of each generation will be Type 1, and the other half will be Type 2.

Types are private information.

Production and Storage Technologies

Everybody has access to a production technology. For each good invested when young, you get either $v^k - \theta$ when middle-aged or X when old, depending on when you terminate your investment.

Here $1 > v^k - \theta$ and $X > 1$.

Everybody also has access to a costless storage technology.

Effective rates of return on storage and capital

	$t + 1$	$t + 2$
storage	1	1
capital	$v^k - \theta$	X

If you are Type 1, then it would be better to store your consumption good.

If you are Type 2, then it would be better to invest in capital.

Since nobody knows what type they are going to be (and hence when they would like to consume), they cannot be sure of getting the best rate of return by holding capital or storing the good.

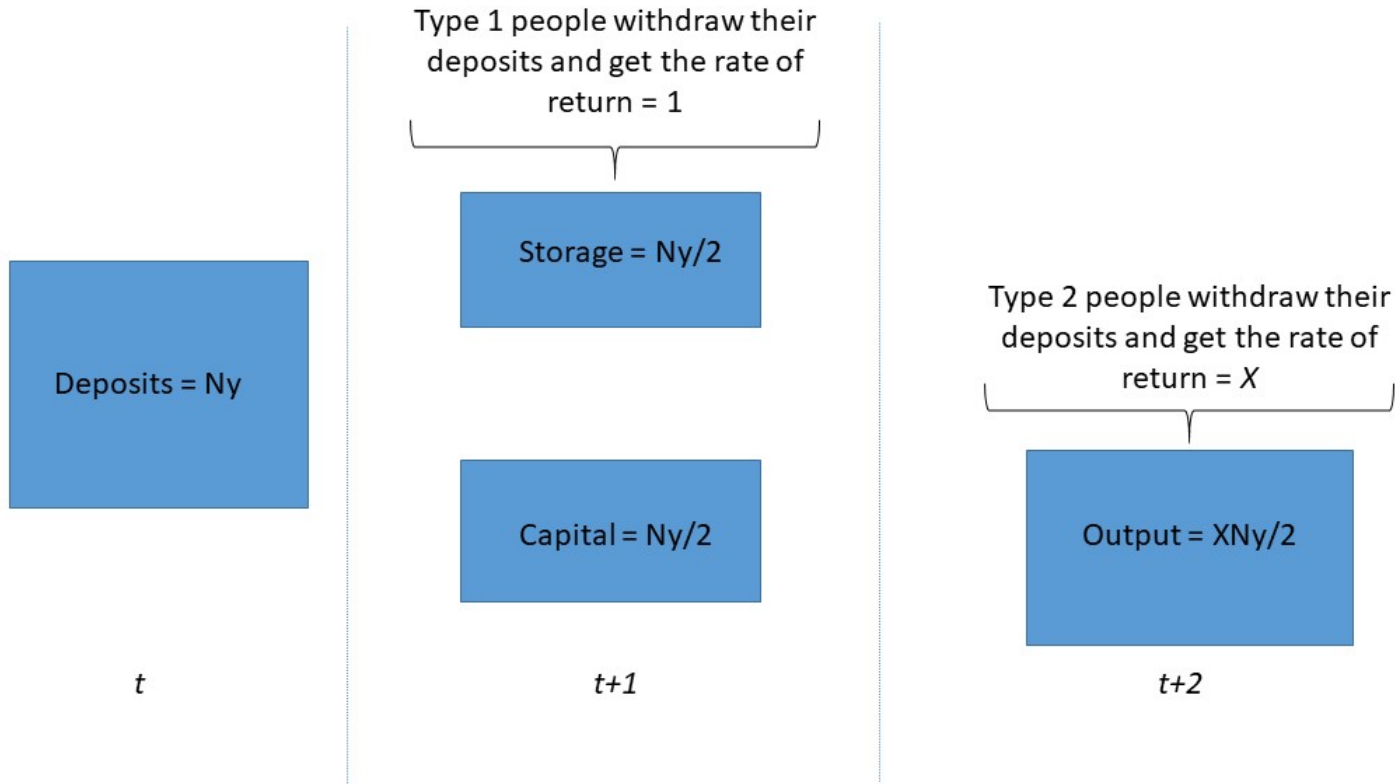
Hence there is role for *financial intermediation*.

Although no single person knows his type in advance, overall the bank will know that half of the people will be Type 1 and the other half Type 2.

The bank can give the best rate of return to the depositors by pooling everyone's savings together.

So everybody in each generation invests in the bank. Total deposits = Ny .

- The bank can keep $\frac{Ny}{2}$ in the storage and invest $\frac{Ny}{2}$ into production.
- Next period, half of the people will be type 1, so the bank can pay each of them y units back using the stored amount.
- And one period after, the production technology will yield $X\frac{Ny}{2}$, and the bank can pay each type 2 person Xy .



Demand deposit banking

The bank offers each person the rate of return

- 1, if the person withdraws the deposit after 1 period.
- X , if the person withdraws the deposit after 2 periods.

All the individuals will be better off by depositing at the bank than investing on their own.

The bank does not make any profit.

How can the bank determine who receives the Type 1 return and who receives the Type 2 return?

The bank relies on the word of the depositor and gives the Type 1 return to any depositor who comes to the bank after one period.

Because $X > 1$, all Type 2 agents will choose to wait for two periods before coming to the bank. So all depositors will be truthful!

Bank Runs

Suppose that you are a Type 2 person. Suppose you hear a rumor about Type 2 agents going to the bank and pretending to be Type 1.

- Should you rush to the bank and withdraw early?
- Or should you wait for another period till you want to actually consume?

- The bank only has $\frac{Ny}{2}$ goods in the storage.
- If more than $N/2$ people pretend to be Type 1, then the bank must sell some of its capital — i.e. terminate production technology.
- But terminating production early is costly: for each good invested one period ago, the bank gets only $v^k - \theta < 1$.
- So the bank must sell more than y units of capital to be able to pay y units to the lying Type 2 agent.

- An honest Type 2 person may get nothing if all others withdraw early and he does not.
- So he rushes to the bank as well.
- This causes a bank run. All are worse off!

Policies that could prevent panics

- Interbank lending
- Identifying unnecessary withdrawals
- Suspension of withdrawals
- Government deposit insurance

Interbank Lending

- A run on a bank makes the bank insolvent by forcing it to sell off its asset at a loss.
- Borrowing from other banks helps to serve all demands.
- If such loans are possible, panics may not occur.

Identifying Unnecessary Withdrawals

- If the bank can learn individual's type, they can refuse Type 2 people who want to withdraw early.
- If Type 2 people think that the other Type 2 people will not be able to withdraw their money, they will not want to withdraw either.
- A bank run can be avoided.

Suspension of Withdrawals

- If the bank can close its doors once its liquid reserves have been used up, then it can avoid selling its capital at a loss.
- Next period, it can reopen and pay the remaining depositors with the capital earnings.
- If a bank has the **right to suspend withdrawals**, it may actually not need to do it because depositors will no longer panic.
- Type 2 people will know that they will be fully paid next period.

- This method does not help if the number of type 1 people is *random*.
- The bank can suspend withdrawals too early, and some real type 1s can starve.

Government Deposit Insurance

- The government can guarantee Type 2 people that they will receive their promised return even if the bank becomes insolvent.
- If credible, Type 2s will not panic.
- The government can tax people in the economy to finance Type 2 people's promised return.
- The power to bail out depositors effectively eliminates the need to bail them out!

Bank Failures

- Not all the investments of the banks are safe.
- Assets pay off in the future, which is never known with total certainty.
- Banks may therefore suffer low returns on the assets they hold.
- These risky assets (with lower returns) may contribute to bank insolvency.

Banks can protect themselves from risk in a number of ways:

- They can choose to hold a large fraction of their portfolio in safe assets.
- Depositors can be protected even when bank assets are risky if the bank attracts investors as shareholders in the bank.

Assets		Liabilities	
Reserves	γH	Deposits	H
Interest-bearing assets	$(1 - \gamma)H + W$	Net Worth	W
Total Assets	$H + W$	Total Liabilities	$H + W$

Equity holders of a bank put up W dollars in return for a share of the bank's value after depositors have been paid.

Depositors have the first claim on the assets of a bank and must be paid before any shareholders.

- If a bank suffers a sudden loss, this is subtracted from the bank's net worth and not from deposits.
- If the bank's asset rise in value, the net worth of the bank will rise by that amount.
- The depositors are entitled only to their deposits plus the interest promised.

Moral hazard of deposit insurance

- If a bank is not insured, it must choose its assets carefully, weighing the risks and average returns of assets, in order to attract shareholders and depositors.
- However, if a bank is fully or partially insured against losses, the careful consideration of risk and return is distorted.

- Suppose the government insures depositors against all losses.
- Then, depositors will no longer care about their bank's exposure to risk.
- The only thing they then care about is a high rate of return.

- Higher rates of return can be achieved by investing in riskier assets.
- Thus, deposit insurance will induce banks to take greater risks than they would if all the risks were borne by the shareholders and depositors of the bank.
- This is the moral hazard problem of insurance.

To reduce the moral hazard problem, the government may

- limit banks legally to safe assets
- charge insurance premiums related to the bank's exposure to risk, so that the bank bears the cost of the risk

Capital Requirements

If the net worth of the bank is relatively small, then the shareholders of the bank would be more willing to invest in risky assets (because they do not have much to lose!)

A capital requirement, on the other hand, forces banks to maintain a net worth no less than some fraction of their assets.

So the shareholders will exercise more care in their selection of assets, the greater their exposure to risk is.

Check out the Basel Framework

International standards for the prudential regulation of banks

Summary

The model shows the usefulness of bank deposit contracts as a way of providing liquidity to agents with uncertain preferences.

Bank runs can be interpreted as an inferior (Nash) equilibrium generated by the deposit contract.

Modifications to the demand deposit contract can improve the allocation by eliminating the inferior equilibrium.