

Monetary Macroeconomics

Lecture 9: Bank Risk

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May 3, 2019

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Bank Risk

In this lecture, we will try to answer the following questions:

- What is the role of a bank in the economy?
- What if depositors withdraw at once and the bank does not have enough liquid resources to meet its promises?
- How can bank runs be avoided?

Demand Deposit Banking — The Model

3-period lived N agents born each period.

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.
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.

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 knows that half of the people will be type 1 and the other half type 2.

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 .

No profit to the bank.

All the individuals are better off than investing on their own.

Bank Runs

Suppose that there is a rumor about type 2 agents going to the bank and pretending like type 1.

But the bank only has $\frac{Ny}{2}$ goods in the storage. So 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 that 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.

Preventing Bank Runs

- **Interbank Lending**

If a bank faced with a run can borrow from other banks/people to meet all withdrawals, it can avoid the losses from selling its capital.

- **Identifying Unnecessary Withdrawals**

If the bank can learn individual's type, they can refuse to allow type 2 people to withdraw early and avoid a bank run.

- **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. And 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 no longer panic.

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!

The government may also have to bail out insured banks if bank assets are risky.

Bank Failures

Not all the investments of the banks are safe. But depositors can be protected from losses even when bank assets are risky if the bank attracts investors as shareholders in the bank in addition to depositors.

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

Depositors have the first claim on the assets of a bank. Only after net worth of the bank falls to zero will depositors lose anything.

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!) if the bank is insured against losses. That creates a moral hazard problem.

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.

Summary

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

We also see that bank runs can be interpreted as an inferior (Nash) equilibrium generated by the deposit contract.

We have seen modifications to the demand deposit contract that improve the allocation by eliminating the inferior equilibrium.