

# Lecture 25

Money and Banking, Econ 345

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# Bank failures

- So far assumed that banks face no risk and are always solvent (Assets=Liabilities at all times)
- In reality there are bank failures, sometimes systemic (involve many banks)
- Bank failures happen because
  - bad shock to asset returns  $\implies$  cannot pay depositors
  - sudden and large deposit withdrawal  $\implies$  need to sell assets quickly
- Important to think about bank failures because
  - banks are important for creating inside money and intermediating investment
  - banks rely on public trust, and policy guarantees affect trust
  - large buyouts are costly to taxpayers

# Demand deposit banking

- Key feature of a bank's balance sheet: liabilities (deposits) are payable on demand, but assets (loans) are not
- This creates a potential for a **bank panic** or **run**
- Bank run:
  - large and sudden withdrawal of deposits
  - bank needs to sell assets quickly, usually at a low price
  - selling assets cheap may not be enough to pay off withdrawn deposits
  - other depositors who fear that their deposits will not be paid off now also want to withdraw
- Many bank runs = bank panic
- Why then banks offer demand deposits at all?

# A model of demand deposit banking

- 3-period OLG model with storage and capital
- Endowment  $y$  when young
- 2 types of individuals (half of population each):
  - Type 1 want to consume in period 2
  - Type 2 want to consume in period 3
  - types are not directly observed
- Learn type only in period 2
  - uncertainty about consumption determines need for liquidity

## Rates of return

- Invest in storage or capital when young, sell for consumption
  - but the timing of consumption is uncertain
- Return on storage:
  - 1 after one period
  - 1 after two periods
- Return on capital
  - $r^k$  after 1 period
  - $X$  after 2 periods
- One-period return on capital is low because of transaction cost,  $r^k < 1$
- If timing of consumption was known in advance
  - Type 1 would invest in storage ( $1 > r^k$ )
  - Type 2 would invest in capital ( $X > 1$ )
- With uncertain consumption how can liquidity be provided?

## Financial intermediaries

- Offer demand deposits (can withdraw upon request)
  - return of 1 after 1 period, and  $X$  after two periods
- This works because know with certainty that half of depositors will want to withdraw after 1 period and the other half after 2 periods
  - total deposits =  $Ny$
  - invest half in storage, total return after 1 period  $Ny/2$
  - invest other half in capital, total return after 2 periods,  $XNy/2$
- Individuals do not pretend to be the other type:
  - Type 1 demand their deposits in period 2, Type 2 - in period 3

# Bank runs

- Suppose some Type 2 people want withdraw earlier (period 2)
- Bank must sell some capital to pay the off, price is  $r^k < 1$ 
  - for each unit of deposit withdrawn by people of Type 2, bank must sell more than 1 unit of capital
- Those Type 2 individuals who wait may not get anything back
  - incentive to rush to the bank to get something instead of nothing!
- Bank run occurs when individuals rationally withdraw early, believing that the others withdraw early
  - all are worse off getting return of 1, instead of  $X$  if there were no panic

## Example 12.1 from Champ-Freeman (page 218)

Consider the model of demand deposits described above. Suppose  $N = 900$ ,  $y = 10$ ,  $r^k = 0.9$ , and  $X = 1.2$ . Let each person have a  $2/3$  chance of being Type 1 and a  $1/3$  chance of being Type 2.

- a. What bank portfolio can guarantee the rate of return 1 to all Type 1 people and the rate of return 1.2 to all Type 2 people? How many goods are placed in storage? In capital?
  
- b. Now suppose the Type 2 people pretend to be Type 1 people and withdraw early. How many people can be paid before the bank runs out of assets?