Global Financial Systems
Chapter 8
Bank Runs and Deposit Insurance

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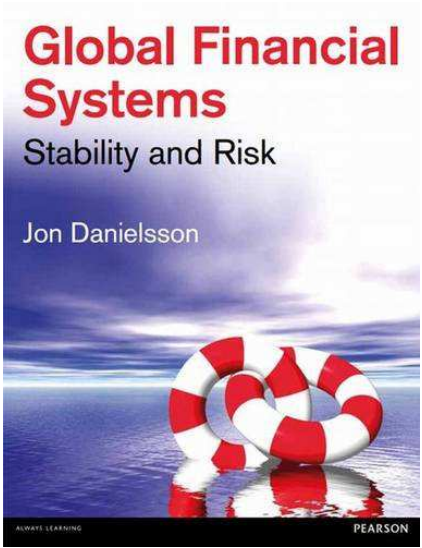
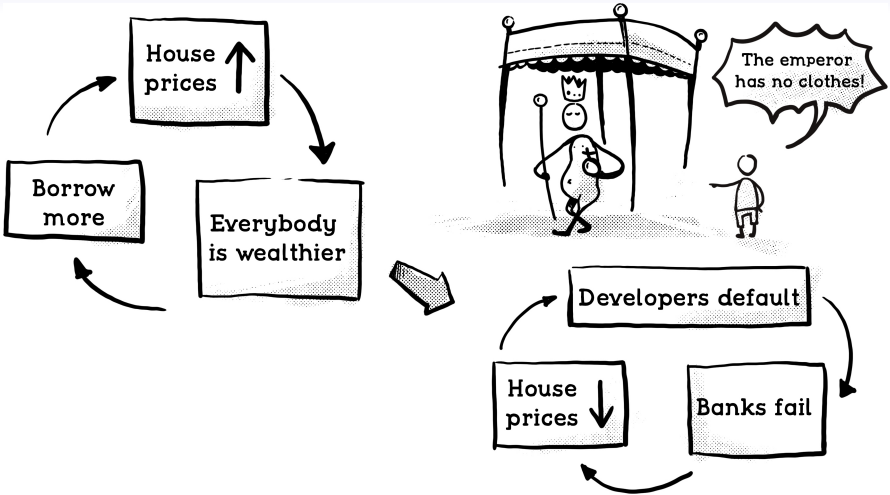
Book and slides



- Updated versions of the slides can be downloaded from the book web page `www.globalfinancialsystems.org`



illusionofcontrol.org

Bank Runs and Crises

2023

- SVB and CS
- We discuss in Chapter 21 after we had a chance to discuss regulations and bailouts

Bank runs and deposit insurance

- Banks suffer from *maturity mismatches*
- Deposits are short term — assets (loans) are long term
- A bank does not have liquid funds to meet all deposits
- If every depositor in a bank wants their money, the bank goes bust
- We saw this with the *Great Depression*
- Bank runs can develop into bank panics
- Two forms of contagion: *adverse information* and *cross–held assets*. See next two slides

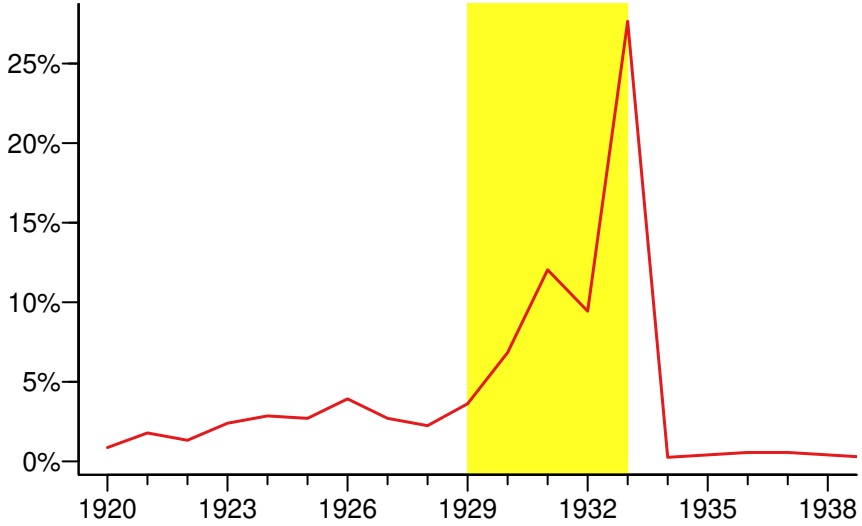
Adverse information

- The depositors have less information about the quality of bank loans (assets) than the bank
- So long as they trust the bank, there is no problem
- If, however, they lose that trust, they will want their money back
- Which may trigger a bank run
- The trust may not be confined to each bank individually
- Instead, depositors may lose trust in the entire banking system

Cross–held assets

- Banks don't operate in isolation
- They may be exposed to each other or exposed to the same assets
- Therefore, a problem with one bank may cause a problem with all the banks

Bank failure rate 1920–1939 in the United States



It's a wonderful life (1946)

- https://www.youtube.com/watch?v=OTJCI1FNBfA


northern rock

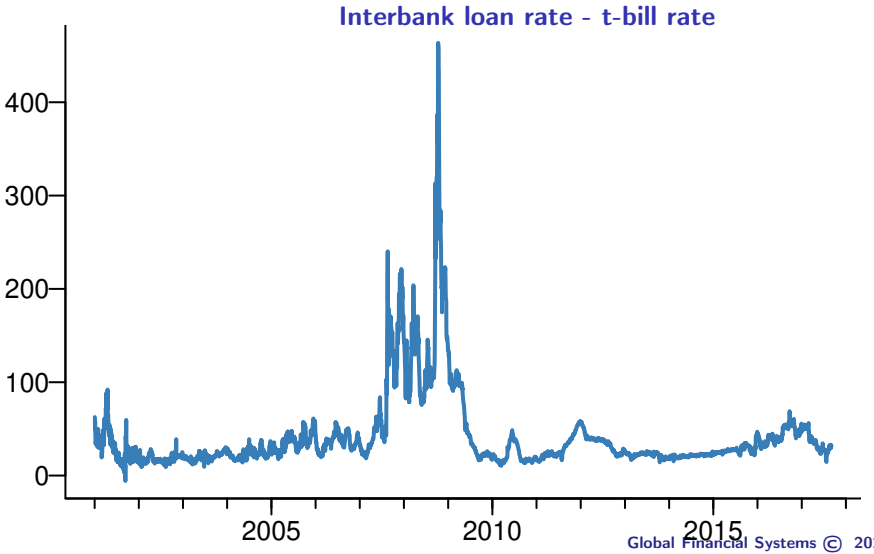
Case — Northern Rock

- The first bank run in the UK since the Overend & Guerney run in 1866 (prevented in 1914 only due to extreme preventative measures)
- The immediate bank run seems to have been triggered by an announcement by the Bank of England that it was providing emergency liquidity support for Northern Rock
- The underlying cause was its funding structure
- The bank run that was shown on TV screens was only the endgame in a bank run that started months earlier in the international asset markets

Business plan

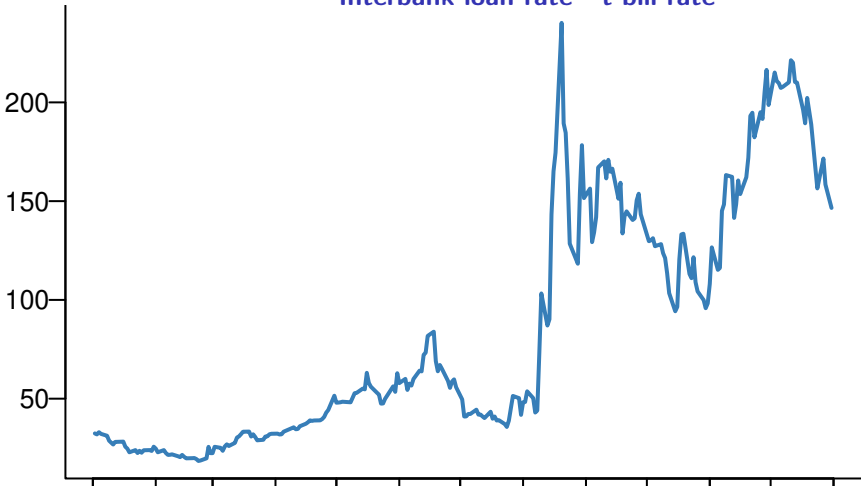
- 1/3 of the UK mortgage market
- Old-school banking, people deposit money in banks that then make mortgages
- Northern Rock got short-term loans, made mortgages, sold them off and repaid the loan
- Simplified example
  1. Borrow £100 million for three months from the wholesale markets,
  2. Make 1,000 mortgages
  3. Structure the mortgages — sold on to investors (discuss securitization in a later Chapter)
  4. Repay the three-month £100 million loan
- Hidden liquidity risk

TED spread Zoomed on next slide

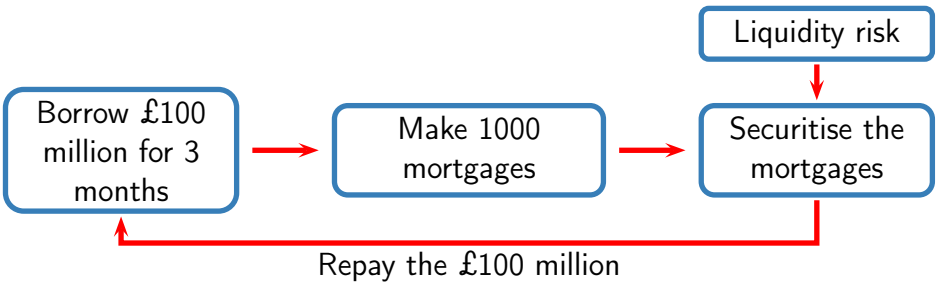


TED spread 2007

Interbank loan rate - t-bill rate



Northern Rock



Hidden liquidity risk

- What if it can't sell the mortgages?
- Investors "*went on strike*" in the summer of 2007
- Bank was walking dead by late summer of 2007
- Wholesale investors knew immediately
- Took some time for the Financial Services Authority to learn
- Tried to resolve the crisis behind the scenes
- BoE announced liquidity support in October 2007
- Run started the following day
- Recall the Reconstruction Finance Corporation

Two waves of bank runs

- Sophisticated wholesale investors in July 2007
- Unsophisticated retail investors in October
- The UK deposit insurance scheme was quite bad, one that was an invitation to a bank run
- The only sensible strategy for depositors was to run the bank.
- With the benefit of hindsight, it is clear that the failure of Northern Rock was inevitable, given time

"To stop the Duke, go for gold"

- Many attempts to get people to cause bank runs for political reasons by withdrawing money from banks
- E.g. some "occupy" groups
- All unsuccessful, except
- 1832
- Parliamentary reform in the UK
- Run on BoE to force Duke Wellington to support reform
- Over £1 million was withdrawn from the Bank

Deposit Insurance and Diamond–Dybvig

Diamond and Dybvig (1983)

- Banks issuing demand deposits can provide better risk–sharing
- The demand deposit contract will introduce an undesirable equilibrium (a bank run)
- Deposit insurance provided by governments can prevent bank runs
- The bank is assumed to be *mutually* owned
- Individual uncertainty about the desired time profile of consumption
- Sequential service constraint

Diamond–Dybvig (1983)

- Three periods, *$t = 0$, 1 and 2*
- \$1 deposited in $t = 0$
  - yielding one if withdrawn at $t = 1$
  - yielding $R > 1$ if withdrawn at $t = 2$
- Agents are identical and have a wealth of \$1 in $t = 0$. There are two types of agents:

  Early Prefer to consume c_1 in $t = 1$, getting $U(c_1)$
  Late Prefer to consume c_2 in $t = 2$, getting $U(c_2)$
- Agent does not know if she is early or late at $t = 0$, but learns it at $t = 1$
- Fraction λ are early, and $1 - \lambda$ late

Autarky

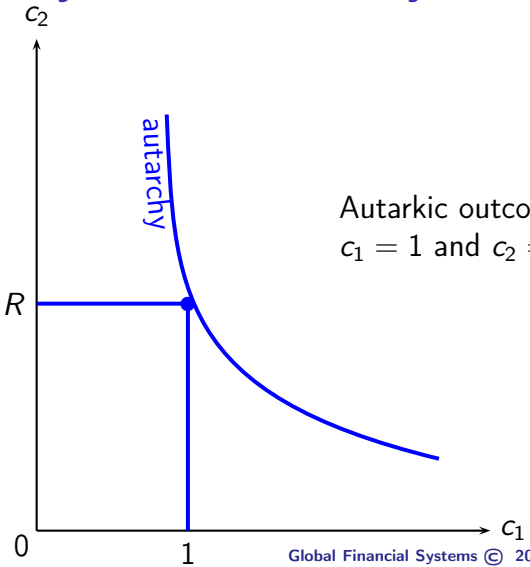
No trade

- Suppose there are no means to shift consumption, i.e. *autarchy*
- And since the agent does not know if she is late or early
- At $t = 0$ her expected utility is

$$\begin{aligned} \mathrm{E}(U) =& \lambda U(c_1) + (1 - \lambda) U(c_2) \\ =& \lambda U(1) + (1 - \lambda) U(R) \end{aligned}$$

- The late agent will have a higher eventual utility than the early agent

Utility under autarchy



Autarkic outcome:
$c_1 = 1$ and $c_2 = R$

Optimal social insurance

- Suppose there are two agents. One is late, the other is early, with $\lambda = 0.5$. Is there a way for the agents to insure against the unlucky outcome of being an 'early' agent?
- At $t = 0$ they make the following agreement:
  - At $t = 1$ the late agent will pay the early agent some amount π
  - The *early* will have consumption $\tilde{c}_1 = 1 + \pi$ and the *late* $\tilde{c}_2 = R(1 - \pi)$
- If π is chosen correctly, it will increase expected utility

Solving

We are maximizing for both agents, so the intertemporal budget constraint is

$$\tilde{c}_2 = R(2 - \tilde{c}_1)$$

so the problem is

$$\begin{aligned}\max_{\tilde{c}_1} \mathrm{E}(U) =& U(\tilde{c}_1) + U(\tilde{c}_2) \\ =& U\left(\tilde{c}_1\right) + U\left(R\left(2 - \tilde{c}_1\right)\right)\end{aligned}$$

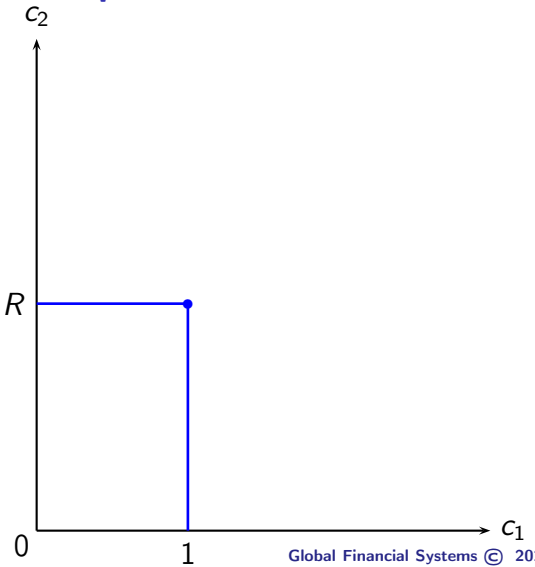
Differentiating w.r.t. $\tilde{c}_1$ gives the standard result

$$\frac{U'(\tilde{c}_1)}{U'(\tilde{c}_2)} = R$$

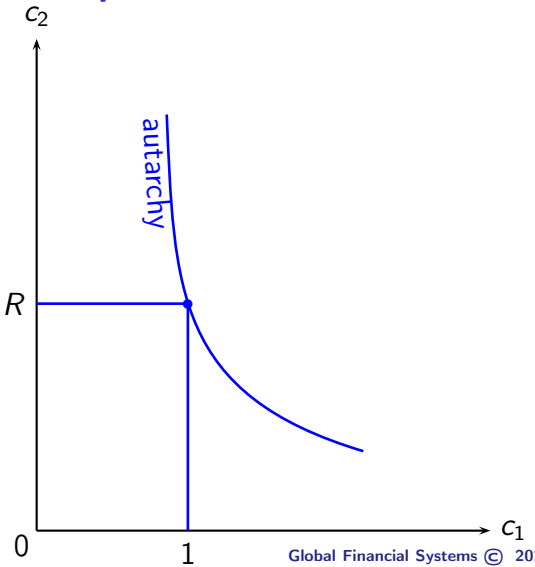
i.e., the marginal rate of substitution equals the marginal rate of transformation

$$c_2^* \geq c_1^* \iff R \geq 1$$

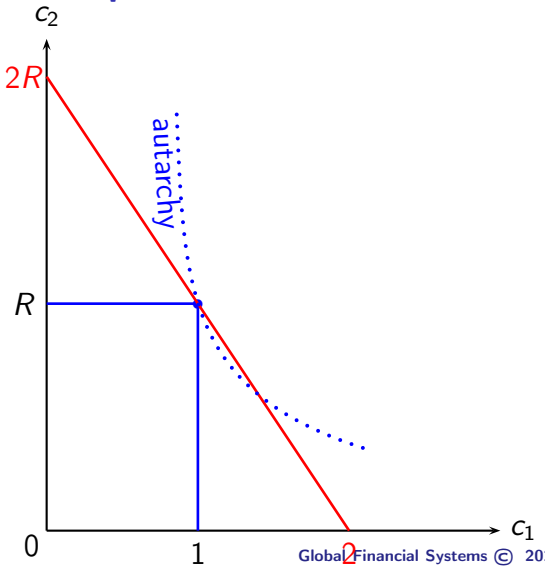
Utility under optimal social insurance



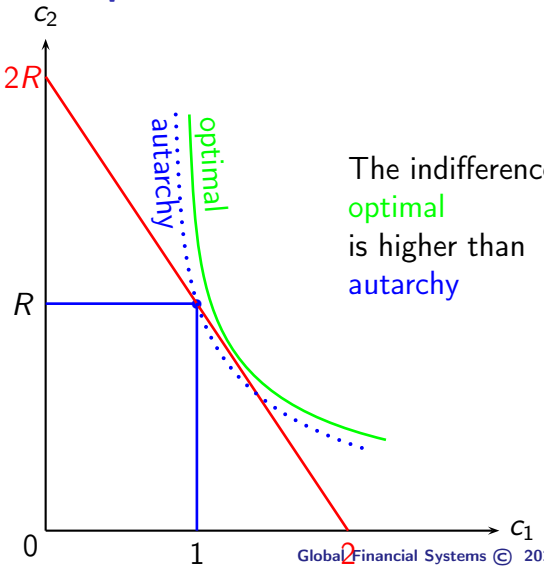
Utility under optimal social insurance



Utility under optimal social insurance



Utility under optimal social insurance



The indifference curve
optimal
is higher than
autarchy

A bank

- Suppose there is a large number of agents
- Diamond–Dybvig show that the same the solution is obtained if a financial institution (a bank) creates a bank account that pays the optimal amounts $1 + \pi$ in $t = 1$ and $R(1 - \pi)$ in $t = 2$
- This shows the role of *financial intermediation* in increasing welfare

What about bank runs?

Fractional reserve banking

- Fractional reserve: collect the endowments of consumers and invest a fraction of them in the long-term investments
- Will the bank be able to fulfil the contractual obligation?
- $R < 1$, late investors will always withdraw early
- $R \geq 1$, two equilibria — good and bad
- (see two slides down)

Cash

- Suppose there are *N depositors*
- The amount the bank has on hand at $t = 1$ is $\$N$
- But the total value of deposits is $\$N(1 + \pi)$
- So the bank *does not have enough cash* to pay off all depositors at $t = 1$

Bank run

- The *first* person to demand the money at $t = 1$ will get the full amount $1 + \pi$
- Up to the fraction $1/(1 + \pi)$
- That *last* $\pi/(1 + \pi)$ get *nothing*
- Hence, agents want to be the first and *run* the bank

Two equilibria — good and bad

No run $\quad \mathrm{E}(U) = \lambda U(\tilde{c}_1) + (1-\lambda)U(\tilde{c}_2)$

Run $\quad \mathrm{E}(U) = \frac{U(\tilde{c}_1)}{1+\pi} < \lambda U(\tilde{c}_1) + (1-\lambda)U(\tilde{c}_2)$

Deposit insurance

- Government makes the agents that were *first in the queue* and get $1 + \pi$ pay a *tax* of π
- Which is enough to pay the unlucky ones late to the queue
- That is, the government *guarantees* that every agent can get \$1 at $t = 1$
- So agents always know they get their initial deposit back regardless of whether there is a run or not
- So long as the probability of a run is not 100% *late* agents are better off not running since they have a chance of getting $\tilde{c}_2 > 1$
- This, in turn, makes the good equilibria *unique*, so there will be no run

Deposit insurance

- Who should carry out the deposit insurance scheme, *government* or a *insurance company*?
- Power of taxation
- Deposit insurance law

Analysis

Moral hazard

- Deposit insurance can perform a variety of roles, most importantly, preventing bank runs
- It has been criticized for generating moral hazard and incentives for excessive risk-taking by banks
- Both bank depositors and bank managers may contribute to moral hazard

Pros of deposit insurance

- Protects unsophisticated depositors in the event of closure
- Levels the playing field for large financial institutions of systemic relevance and small ones
- Acts as a speedy source of funds for the resolution of institutions
- Prevents bank runs

Cons of deposit insurance

- Generats moral hazard
- Creates incentives for excessive risk-taking by banks
- By guaranteeing deposits, market incentives to monitor banks and to demand an interest payment commensurate with the risk of the bank are diminished
- Insurance premium charged cannot always fully internalize the cost of risk, which creates an incentive for banks to take on more risk
- Who should pay for it? The government? Other banks? Insurance premiums?
- Raises difficult questions in Europe

Misguided views on deposit insurance

- Before the crisis, there was the view that because deposit insurance was not used, it was not needed
- This is wrong
- The central conclusion from the DD model is that a deposit insurance scheme that works will never be needed
- The absence of runs does not mean deposit insurance is useless or worse

Wholesale markets

- Banks increasingly rely on the wholesale market
- Northern Rock's experience indicates that bank runs can come in two waves
  - first sophisticated institutional investors
  - then by unsophisticated retail depositors

Argentina

- Before 1991, deposit insurance
- In 1991 and 1992, Argentina reversed this policy — intending to convince financial markets that it would not under any circumstances rescue a failing bank
- In 1995, in the face of a forthcoming election and a severe economic crisis sparked by the Mexican peso devaluation of December 1994, the Argentine government reinstituted a form of deposit insurance in an effort to stave off an all-out bank panic
- Suggests it is not credible to forswear deposit insurance

2007

- Triggered a reconsideration of the effectiveness of insurance arrangements in the UK
- After the first *£2,000*, legislation only protected *90%* savings of up to £33,000 — guaranteeing a maximum payout of £31,700
- The time it could take for depositors to get their money-back was far too long
- On 1 October 2007, Chancellor Alistair Darling announced that the scheme to protect savers with money deposited in UK banks was expanded to guarantee *100%* of savings

Cyprus and deposit insurance

- Slow run on Cypriot banks from second part to lesson 2012
- Crisis in March 2012
- Government insists on hitting depositors with insured deposits (below €100,000)
- Undermines the entire deposit insurance scheme in Europe
- Quick backtracking

Bibliography I

Diamond, D.W., and P. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91:401–419.