PRINCETON UNIVERSITY
Economics Department
Bendheim Center for Finance

**FINANCIAL CRISES
ECO 575 (Part II)**

Spring Semester 2003

Section 3: Banking Crises

March 24, 2003 and April 7, 2003

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(All materials available on my website:
http://finance.wharton.upenn.edu/~allenf/)

1. Introduction

Issues raised by comparison of European and US experience in the nineteenth and early twentieth centuries

(i) Why did the banks find it (individually) optimal to allow runs?

(ii) What ability if any does a central bank have that a private agent lacks?

Answers depend on your view of banking crises

Two theories

- Financial Panic Model

- Business Cycle Model

Financial Panic Model

Classical form:

"Mob psychology" or "Mass hysteria"

e.g. Kindleberger (1978)

Modern form:

Multiple equilibria - "Sunspot" phenomenon

e.g. Diamond and Dybvig (1983)

In this view the answers to the two questions depends on *equilibrium selection*. Runs occur because the "bad" equilibrium is selected. Policy issues also come down to equilibrium selection. The central bank or government may be able to ensure a "good" equilibrium is chosen.

Business Cycle Model

Classical form:

e.g. Mitchell (1941)

Modern form:

e.g. Allen and Gale (1998)

This view leads to substantially different answers to the two questions. In the business cycle view crises can be "essential". In other words they must occur given the institutions and the parameter values. Crises can be optimal. The central bank may have no advantage or disadvantage compared to private agents.

Both models are considered below.

2. The Diamond-Dybvig Model

See Douglas Gale's notes on A Model of Banking at
http://www.econ.nyu.edu/user/galed/banking.pdf

The Model

Single good

Two assets:

	t = 0	1	2

Short asset y: 1 ⟶ 1 ⟶ 1

Long asset x: 1 ⟶ R>1

Liquidate ⟶ r<1

or trade at P

Consumers:

Early/Late with probabilities $\lambda / 1 - \lambda$

$$U(c_1, c_2) = \lambda u(c_1) + (1 - \lambda)u(c_2) \quad \text{with u'>0, u''<0}$$

Endowment of each individual at t = 0 is 1

Market Equilibrium

Individual's problem is to choose portfolio (x,y) to

$$\text{Max.} \quad U(c_1, c_2) = \lambda u(c_1) + (1 - \lambda)u(c_2)$$

subject to

$$x + y \leq 1$$

$$c_1 \leq y + Px$$

$$c_2 \leq (x + \frac{y}{P})R$$

Equilibrium in market for long asset requires

$$P = 1$$

If $P > 1$ long better than short so nobody holds short. At date 1 early consumers sell long asset but nobody on the other side of the market so $P = 0$ but this is a contradiction

If $P < 1$ short better than long so everybody holds short at date 0. Late consumers try to buy long asset at date 1 but there is none available so it's price is bid up above 1 but this is a contradiction.

At equilibrium price of P = 1 individuals are indifferent between long and short assets so

$$c_1 = x + y = 1$$

$$c_2 = (x + y)R = R$$

$$EU = \lambda u(1) + (1 - \lambda)u(2)$$

Market clearing requires

$$y = \lambda$$

$$x = 1 - \lambda$$

The Banking Solution

(c_1, c_2) is now the optimal deposit contract

(x, y) is now the optimal portfolio of the bank

Competitive banking sector: This ensures that banks maximize the expected utility of depositors otherwise another bank would enter and bid away all the customers.

Bank's problem is

$$\text{Max.} \quad U(c_1, c_2) = \lambda u(c_1) + (1 - \lambda)u(c_2)$$

subject to

$$x + y \leq 1$$

$$\lambda c_1 \leq y$$

$$(1 - \lambda)c_2 \leq Rx$$

From first order conditions:

$$\frac{u'(c_1)}{u'(c_2)} = R$$

so $\qquad\qquad c_1 < c_2 \qquad\qquad$ since u" < 0

This ensures late consumers never want to imitate early consumers

Result: The bank can do at least as well as the market and usually it is strictly better.

Since the market allocation is $(c_1, c_2) = (1, R)$ is feasible for the bank if it chooses $(x, y) = (\lambda, 1 - \lambda)$ the bank does strictly better unless

$$\frac{u'(1)}{u'(R)} = R$$

With $u = \ln(c)$ this is true but for other members of the HARA family such as $u(c) = \dfrac{c^{1-\gamma}}{1-\gamma}$ it is not. Here the bank does strictly better.

When does the bank give more to early consumers than the market?

When the budget constraints hold with equality the first order condition for the bank simplifies to

$$u'\left(\frac{y}{\lambda}\right) = Ru'\left(\frac{1-y}{1-\lambda}\right)$$

When $y = \lambda$ as in the market solution this becomes $u'(1) = Ru'(R)$ so a necessary and sufficient condition for $c_1 = y/\lambda > 1$ and $c_2 = R(1-y)/(1-\lambda) < R$ is that

$$u'(1) > Ru'(R)$$

Since $R > 1$ a sufficient condition for this is that $cu'(c)$ be decreasing in c, i.e.

$$u'(c) + cu''(c) < 0$$

or equivalently relative risk aversion is greater than 1

$$-\frac{cu''(c)}{u'(c)} > 1$$

If relative risk aversion is less than one then the early consumers get less and the late consumers more than in market solution.

Result: With banks and a market the allocation is inferior or the same as with just a bank.

This result, due to Jacklin (1987), follows from the fact that both early and late depositors will always choose the c_1 or c_2 that offers the highest present value of consumption. What the bank offers is therefore restricted by market prices and it can't do any better. It is like a Modigliani and Miller result that the bank can't do better than the market if both coexist.

<u>Bank Runs</u>

There is another equilibrium in addition to the one above.

Suppose the bank's deposit contract says that it must pay out the promised amount to anybody who requests it at date 1. If $c_1 > 1$ and everybody including early and late consumers shows up at date 1 then the bank will have to liquidate its assets since

$$rx + y < x + y = 1$$

Anybody who does not attempt to withdraw at date 1 will be left with nothing since all the banks assets will be liquidated in the first period. Hence it becomes rational to run if everybody else is running.

The rows correspond to the payoff of the late consumer we are considering (payoff is first element) and the columns the payoff of the typical late consumer (payoff is second element)

	Run	No Run
Run	(rx+y, rx+y)	(c_1, c_2)
No Run	(0, rx+y)	(c_2, c_2)

If
$$0 < rx + y < c_1 < c_2$$

then (Run, Run) and (No Run, No Run) are both equilibria.

This analysis assumes that bank must liquidate all its assets to meet the demand from consumers.

Another response is to *suspend convertibility*. Once it realizes a run is under way the bank closes its doors. This means the early consumers may be frustrated but it does stop the inefficient liquidation of assets. If suspension occurs early enough in the run it may prevent runs from taking place if late consumers perceive they will have to wait anyway.

Diamond and Dybvig's response was to introduce the *sequential service constraint*. Depositors reach the bank one at a time and withdraw until all the bank's assets are liquidated. There are two effects of this:

1. It forces the bank to deplete its resources.
2. It gives an incentive for depositors to get to the front of the queue.

Diamond and Dybvig didn't formally introduce the equilibrium selection mechanism but one way to do this is through "sunspots." When a sunspot is observed depositors assume there is going to be a run.

3. Equilibrium selection

Morris and Shin (1998) developed a technique for equilibrium selection in the context of models of currency crises with multiple equilibria. Their technique was based on an example from Carlsson and van Damme (1993).

Allen and Morris (2001) develop a simple example to illustrate the basic idea in the context of the Diamond-Dybvig model of bank runs.

The Example

There are two depositors in a bank with types ξ_i, i = 1,2.

If $\xi_i < 1$, depositor i has liquidity needs and has to withdraw.

If $\xi_i \geq 1$ depositor i does not have to withdraw but may choose to.

If a depositor withdraws the money the payoff is r > 0.

If both depositors keep their money in the bank then the payoff is R.

If a depositor keeps his money on deposit and the other person withdraws the remaining depositor receives 0.

- The equilibrium that is chosen depends crucially on the relationship between r and R

Case 1:   r < R < 2r

Case 2:   R > 2r

Depositors are effectively playing a game with payoffs:

	Remain	Withdraw
Remain	(R,R)	(0,r)
Withdraw	(r,0)	(r,r)

Key issue in analyzing equilibrium is knowledge of other type's liquidity needs.

Common knowledge both have liquidity needs:

(r,r) is the unique equilibrium.

Common knowledge that neither have liquidity needs there are two equilibria: (R,R) and (r,r).

BUT

If there is not common knowledge about liquidity needs then higher-order beliefs as well as fundamentals determine the outcome and there is in fact a unique equilibrium.

Suppose depositors' types are highly correlated:

T is drawn from a smooth distribution on the non-negative numbers

Each ξ_i is distributed uniformly on $[T - \varepsilon, T + \varepsilon]$ for some (small) $\varepsilon > 0$

When do both depositors know that both ξ_i are greater than or equal to 1?

- Only if both ξ_i are greater than $1 + 2\varepsilon$

  e.g. suppose $\varepsilon = 0.1$ and depositor 1 has $\xi_1 = 1.1$. She can deduce that T is within the range $1 - 1.2$ and hence that depositor 2's signal is within the range $0.9 - 1.3$.

When do both investors know that both know that both know ξ_i are greater than or equal to 1?

- Only if both ξ_i are greater than $1 + 4\varepsilon$

  e.g. suppose $\varepsilon = 0.1$ and depositor 1 has $\xi_1 = 1.3$. She can deduce that T is within the range 1.2-1.4 and hence that depositor 2's signal is within the range 1.1-1.5.

  However if depositor 2 received the signal $\xi_2 = 1.1$ then he would attach positive probability of depositor 1 having $\xi_1 < 1$ and having liquidity needs.

Similarly as we go up an order of beliefs the range goes on increasing. Hence it can never be common knowledge that both depositors are free of liquidity needs.

Result: For small enough ε, the unique equilibrium is r no matter what signals are observed.

This can be seen in a number of steps.

1. Each depositor must withdraw if $\xi_i < 1$.

2. Suppose that depositor 1's strategy is to stay only if ξ_1 is greater than some k where k $\geq$ 1.

   Suppose that depositor 2 observes the signal, $\xi_2 = k$.

   Since T is smoothly distributed the probability that depositor 1 is observing a smaller signal and is withdrawing converges to 0.5 as ε $\rightarrow$ 0.

prob. density fn of T

T'−ε   T'   T'+ε   T

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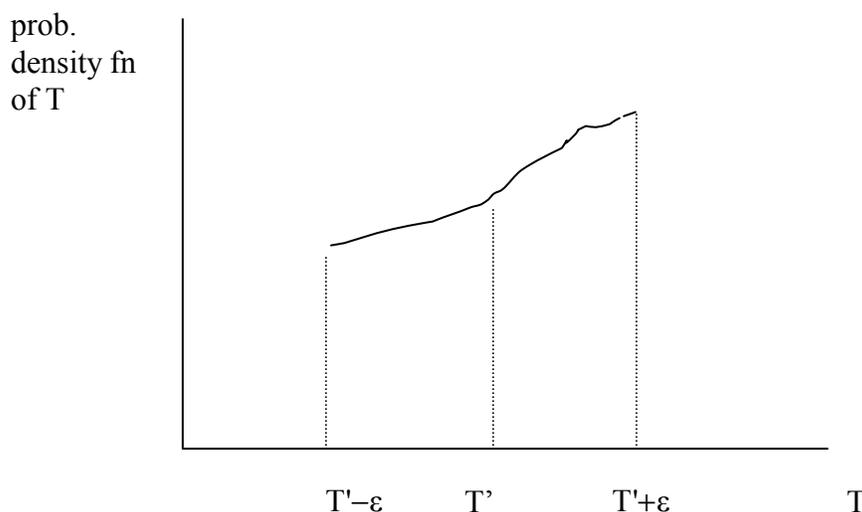
Depositor 2 attaches a probability of about 0.5 to depositor 1 having a lower signal and withdrawing and a probability of about 0.5 to having a higher signal and staying in.

Expected payoff of 2 (remaining) = 0.5R

Expected payoff of 2 (withdrawing) = r

Case 1: Here $r < R < 2r$ we know that $r > 0.5R$ so withdrawing is an optimal strategy.

In order for remaining to be an optimal strategy it must be the case that depositor 2 observes some k* a finite amount above k. Since everything is symmetric, we can use the same argument to show that depositor 1 will have a cutoff point somewhat higher than k*. There is a *contradiction* and both remaining can't be an equilibrium.

The unique equilibrium is that they both withdraw.

Case 2: Here $r < 0.5R$ and it can similarly be shown that the unique equilibrium is that they both stay.

This type of reasoning to refine the equilibrium in multiple equilibria models of crises seemed like a real breakthrough because it eliminated the indeterminate sunspot aspect of these kinds of crisis model.

It can be shown that this way of choosing equilibria depends on there just being private information. If there is also public information then there can be a different result (see, e.g., Hellwig (2001) and Morris and Shin (2003)).

Remarks on the multiple equilibria view

Multiple equilibria models have been widely used to explain crises where it's difficult to identify the fundamental cause of crises such as those in Asia (see, e.g., Kaminsky and Schmukler (1999)).

One of the crucial issues with multiple equilibria models of crises has been what determines the sunspot that triggers the crisis.

Morris and Shin showed how lack of common knowledge can do this.

Welfare:

In the good equilibrium the bank provides insurance against the liquidity shock

If the depositors have access to markets this risk sharing is destroyed (Jacklin (1987))

Public policy implications:

Focus of policy is on ruling out the bad equilibrium. Diamond and Dybvig suggested deposit insurance would achieve this.

4. Business Cycle Model

Classical form:
e.g. Mitchell (1941)

Empirical evidence?

Gorton (1988):

Evidence supports the hypothesis that US banking panics in the late nineteenth and early twentieth century are related to the business cycle.

Gorton found that panics were systematic events: whenever the leading economic indicator represented by the liabilities of failed businesses reached a certain threshold, a panic ensued.

Allen and Gale (1998) has two objectives:

1. Formulate a model that is consistent with the business cycle view of the origins of banking panics in the same way that Diamond and Dybvig formalizes the sunspot view

2. Analyze the welfare properties of the model and derive some conclusions for the performance of central bank and other forms of government intervention

Table 1

National Banking Era Panics

NBER Cycle Peak–Trough	Panic Date	%Δ(Currency/ Deposit)*	%Δ Pig Iron†
Oct. 1873–Mar. 1879	Sep. 1873	14.53	−51.0
Mar. 1882–May 1885	Jun. 1884	8.80	−14.0
Mar. 1887–Apr. 1888	No Panic	3.00	−9.0
Jul. 1890–May 1891	Nov. 1890	9.00	−34.0
Jan. 1893–Jun. 1894	May 1893	16.00	−29.0
Dec. 1895–Jun. 1897	Oct. 1896	14.30	−4.0
Jun. 1899–Dec. 1900	No Panic	2.78	−6.7
Sep. 1902–Aug. 1904	No Panic	−4.13	−8.7
May 1907–Jun. 1908	Oct. 1907	11.45	−46.5
Jan. 1910–Jan. 1912	No Panic	−2.64	−21.7
Jan. 1913–Dec. 1914	Aug. 1914	10.39	−47.1

*Percentage change of ratio at panic date to previous year's average.

†Measured from peak to trough.

(Adapted from Table 1, Gorton (1988), p. 233.)

The model

Three dates:

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        |_____|_____|
   t=   0                1                2
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One cons. good
and two assets
(i.e. technologies):

Safe: 1 unit cons.——→1 unit cons.——→1 unit cons.

Risky: 1 unit cons.————————————————→ R units cons.
                                                density fn f(R);
                                                    $R \geq 0$

Leading economic   Observed at date 1:
indicator: perfect signal of R
                                (usually non-contractible)

Consumers:

        Ex ante identical   (Non-contractible)
                             type discovered:
                             Early   Late
                             consume c_1 consume c_2

Utility function:

$$U(c_1, c_2) = u(c_1) \text{ with prob. } 1/2 \qquad \text{where } u'>0; u''<0$$
$$u(c_2) \text{ with prob. } 1/2$$

- Type is non-observable to outsiders. Late consumers can always mimic early consumers

- Consumers can invest in the safe asset

- Free entry into the banking industry implies banks offer contracts that maximize depositors' ex ante EU

- The behavior of the banking industry is represented as an *optimal risk sharing problem*. A variety of different risk sharing problems, corresponding to different assumptions about the informational and regulatory requirement are considered.

4.1 The Optimal, Incentive-Compatible, Risk Sharing Problem

Initial assumption: R can be contracted upon (benchmark case)

E is a consumer's initial date 0 endowment of consumption goods

X is representative bank's holding of risky asset

L " " " " " safe "

Optimal contract is $c_1(R)$, $c_2(R)$

Optimal risk sharing problem:

$$\max E[u(c_1(R)) + u(c_2(R))]$$
$$s.t.$$
$$(i) L + X \leq E$$
$$(ii) c_1(R) \leq L$$
$$(iii) c_2(R) \leq (L - c_1(R)) + RX$$
$$(iv) c_1(R) \leq c_2(R)$$

(P1)

Maintained Assumptions

To ensure interior solutions:

$E[R]>1$

$u`(0)>E[u`(RE)R]$

Results:

Consider (P1) subject to the first three constraints only. Suppose λ_1, ..., λ_3 are the Lagrange multipliers for the constraint then we can show that the first order conditions are

$$u'(c_1(R)) + \lambda_2 + \lambda_3 = u'(c_2(R)) + \lambda_2$$

Hence canceling the λ_2's and using the fact that $\lambda_3 \leq 0$ it follows

$$u'(c_1(R)) \geq u'(c_2(R))$$

and hence that

$$c_1(R) \leq c_2(R)$$

i.e. constraint (iv) can be dispensed with
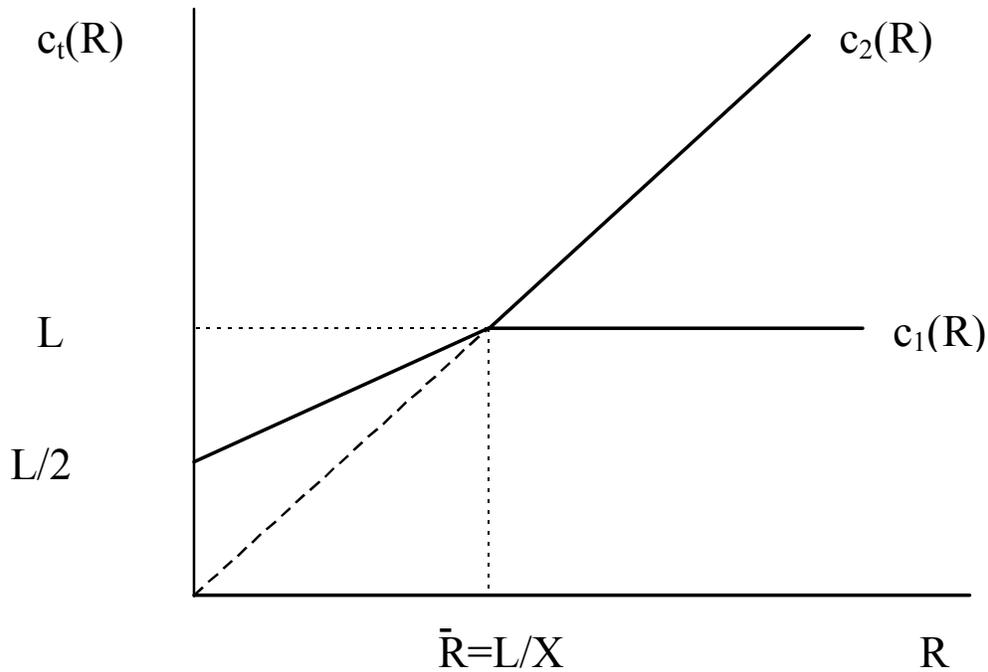
Theorem 1:

For $R \leq L/X$, $c_1(R) < L$ and $c_1(R) = c_2(R) = (L+RX)/2$.

For $R \geq L/X$, $c_1(R) = L$, and $c_2(R) = RX$.

The optimal L and X are such that:

$$E[u'(c_1(R))] = E[Ru'(c_2(R))]$$

<u>Numerical Example:</u>

$U(c_1, c_2) = \ln(c_1) + \ln(c_2)$; $E=2$; $f(R) = 1/3$ from 0 to 3.

Solution: $(L,X) = (1.19, 0.81)$; $R=1.47$ and $EU=0.25$

2.2 Optimal Deposit Contracts

Contract can't be explicitly conditioned on R.

Standard contract promises $\bar{c}$ or if infeasible an equal share of available assets at date 1 and whatever is available at date 2.

$c_1(R)$ and $c_2(R)$ are now the equilibrium consumption levels.

$$u'(c_1(R)) + \lambda_2 + \lambda_3 = u'(c_2(R)) + \lambda_2$$

Hence canceling the λ_2's and using the fact that $\lambda_3 \leq 0$ it follows

$$u'(c_1(R)) \geq u'(c_2(R))$$

and hence that

$$c_1(R) \leq c_2(R)$$

i.e. constraint (iv) can be dispensed with

$\alpha(R)$ is the proportion of late consumers who withdraw early.

Another constraint (v) is added to the optimal risk sharing problem:

$$\max E[u(c_1(R) + u(c_2(R)))]$$

$s.t.$

$(i) \quad L + X \leq E$

$(ii) \quad c_1(R) \leq L$ **(P2)**

$(iii) \quad c_2(R) \leq (L - c_1(R)) + RX$

$(iv) \quad c_1(R) \leq c_2(R)$

$(v) \quad c_1(R) \leq \bar{c}$ and $c_1(R) = c_2(R)$ if $c_1(R) < \bar{c}$

Constraint (v) says either early consumers must receive $\bar{c}$ or early and late consumers must receive the same amount.

Underlying this constraint is a formulation which makes explicit the equilibrium conditions and the possibility of runs:

R High (i.e. such that contract suggests $c_1(R)=\bar{c} \le c_2(R)$):

- No run and in equilibrium $c_1(R) = \bar{c}$

R Low (i.e. such that contract suggests $c_1(R)=\bar{c} > c_2(R)$):

- Run and in equilibrium

$$c_1(R) = c_{2\,EW}(R) = \frac{L}{1+\alpha(R)} = c_{2\,LW}(R) = \frac{RX}{1-\alpha(R)}$$

(P2) has the same solution as (P1):

Put $\bar{c} = L$ then the optimal solution of P1 satisfies constraint (v). Since the best we can do when adding constraint (v) is the same as without constraint (v) the two problems have the same solution.

Theorem 2: A banking system subject to runs can achieve the same allocation of resources and level of welfare as the optimal incentive compatible allocation.
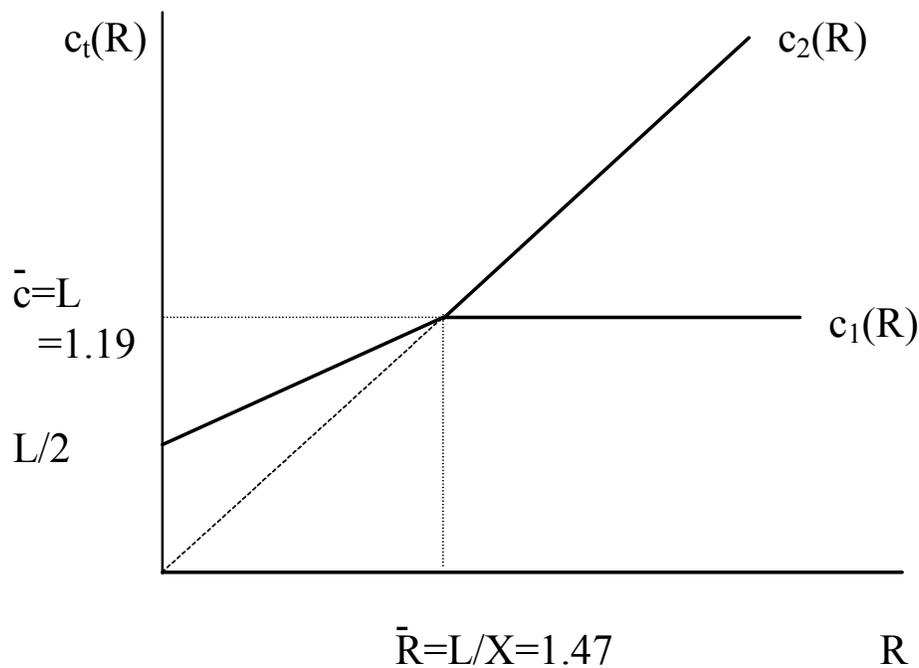
For R ≥ 1.47 there is no run.

For R < 1.47 there will be a run.

The lower is R the higher is $\alpha(R)$:

$$\text{At R=1:} \quad c_1(R) = c_{2EW}(R) = \frac{1.19}{1+\alpha(R)} = c_{2LW}(R) = \frac{0.81}{1-\alpha(R)}$$

so $\alpha(R)=0.19$ and $c_1(R)=c_2(R)=1$.

At R=0.5: $\alpha(R)=0.49$ and $c_1(R)=c_2(R)=0.78$.

With runs risk sharing is achieved by progressively more people withdrawing their funds as R falls. $\alpha(R)$ goes to 1 as R falls to 0.

4.3 Standard Deposit Contracts without Runs

What would happen if the central bank decided that runs are bad and adopted regulations that ensured banks were always able to meet their commitments? With R=0 the optimal allocation involves runs and welfare must be strictly lower.

Theorem 3: If the support of R contains 0, the allocation in which runs are prevented by central bank regulations is strictly worse than the equilibrium with runs.

Example: The optimum portfolio is (L,X)=(1.63,0.37), $\bar{c} = 0.82$ and EU=0.08.
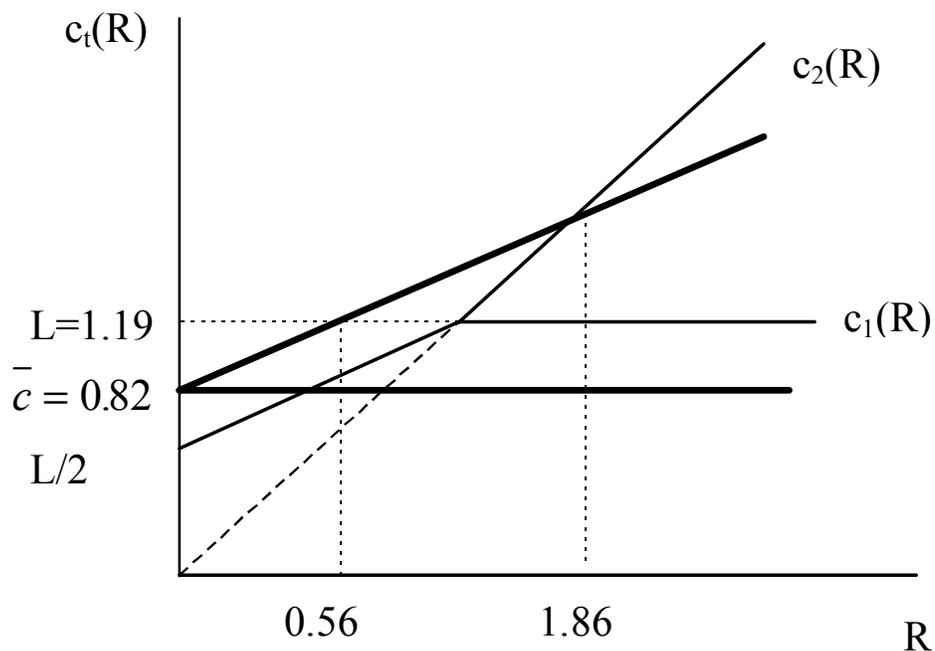
5. Costly Financial Crises

To introduce some costs of bank runs it is assumed next that the return on the safe asset, r, (where previously r=1) that can be obtained by banks between dates 1 and 2 is

$$r>1$$

and

$$ER>r$$

5.1 Optimal Risk Sharing

The optimal risk sharing problem is now

$$\max E[u(c_1(R)+u(c_2(R))]$$

$s.t.$

$(i) L + X \le E$

$(ii) c_1(R) \le L$ **(P3)**

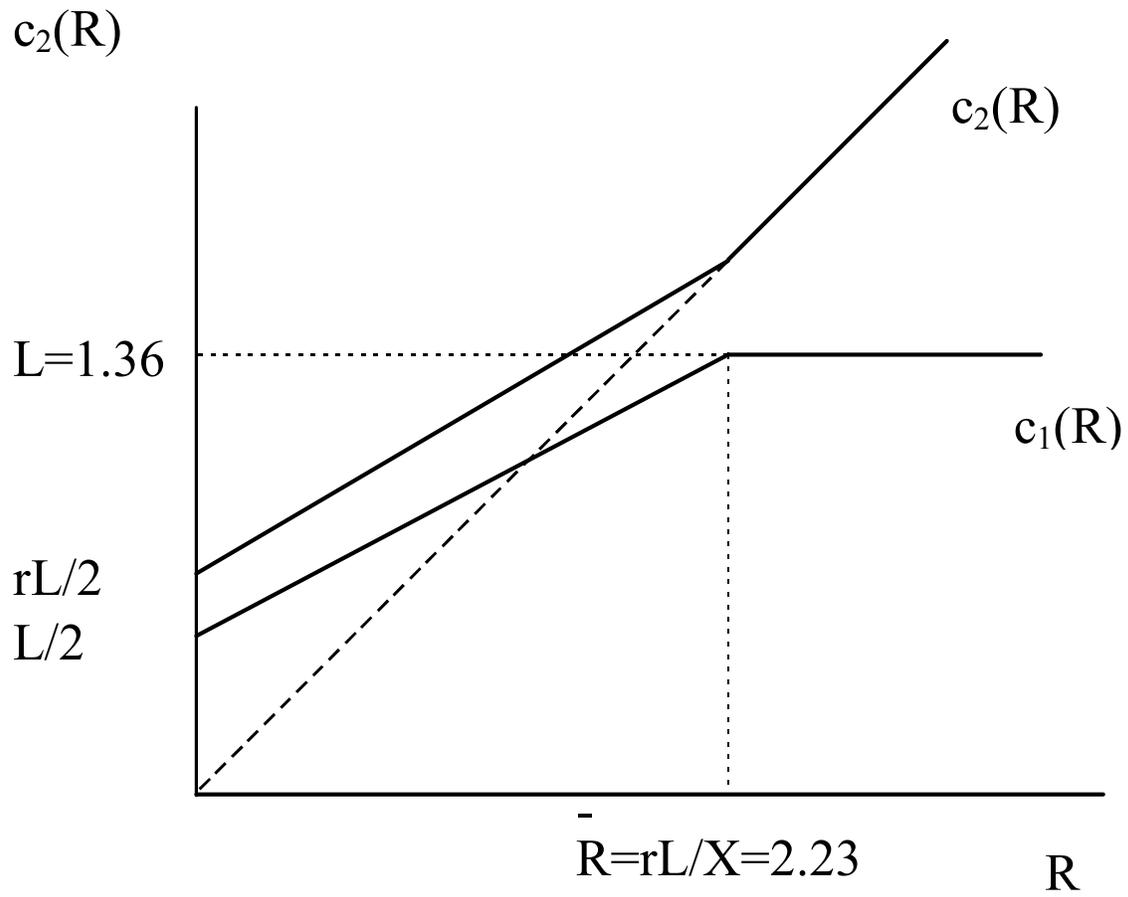$(iii) c_2(R) \le r(L - c_1(R)) + RX$

$(iv) c_1(R) \le c_2(R)$

First order conditions:
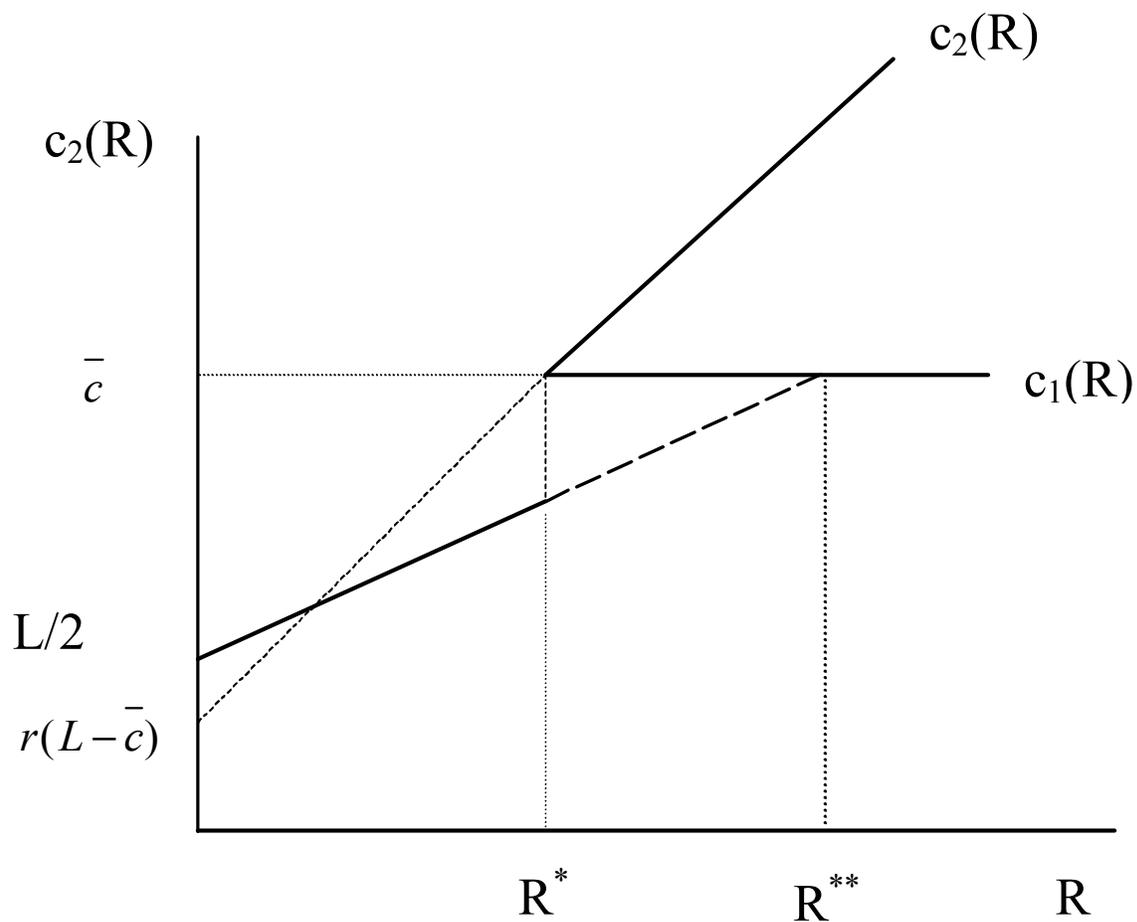
$$u'(c_1(R)) = ru'(c_2(R)) \ if \ R < \overline{R}$$

$$c_1(R) = L, c_2(R) = RX \ if \ R \ge \overline{R}$$

$$E[u'(c_1(R))] = E[Ru'(c_2(R))]$$

For the standard example but with r=1.05:

$c_2(R)$

$c_2(R)$

L=1.36

$c_1(R)$

rL/2
L/2

$\overline{R}$=rL/X=2.23

R

5.2 Optimal Deposit Contract

The optimal allocation can no longer be implemented by a deposit contract.

5.3 Multiple Equilibria

Between R^* and R^{**} there are multiple equilibria as in Diamond and Dybvig (1983)

In our model crises are *essential* so if there are multiple equilibria the best one is chosen

In general for fundamental driven models, there is the property that for low values equilibrium is unique, for intermediate values there are multiple equilibria and for high values equilibrium is unique

As we saw above Morris and Shin (1998) have a way of picking out unique equilibria based on slight informational perturbations

Crucial point is that crises are not the result of multiple equilibria. They are the result of poor fundamentals.

Importance is that the policy prescriptions are quite different.

With multiple equilibria as in Diamond and Dybvig (1983) policy focus is ruling out the bad equilibrium

With fundamental driven crises the problem must be handled directly

5.4 Optimal Monetary Policy

Central bank intervention allows the optimum to be obtained.

The central bank makes a line of credit of M available to the representative bank that must be repaid in the last period.

The representative bank promises D units of money or its equivalent in goods to depositors.

Below R^* money is withdrawn and this prevents an efficiency loss. Bank runs are again valuable since they make the value of deposits contingent on R but here it operates through the price level.

At date 1 the price level adjusts so that

$$p_1(R)c_1(R)=D$$

To avoid premature liquidation of the safe asset early withdrawing late consumers hold money between dates 1 and 2 so
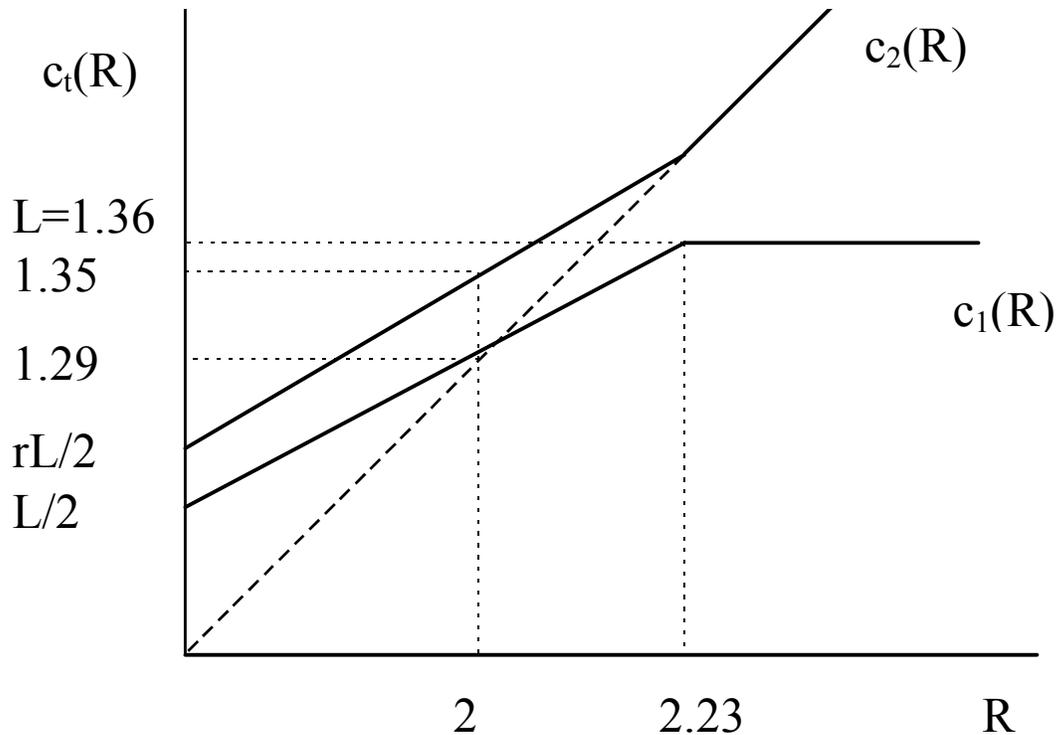
$$\alpha(R)D=M$$

The early withdrawing late consumers must be able to afford just $c_2(R)$ at date 2 so

$$\alpha(R)p_2(R)c_2(R)=M$$

Using the last two equations it follows

$$p_2(R)c_2(R)=D$$

We can illustrate this using our numerical example.

Suppose D=1.36. At R= 2, the prices needed are

$$p_1(2)=D/c_1(R)=1.36/1.29=1.05$$
$$p_2(2)=D/c_2(R)=1.36/1.35=1.01$$

In the aggregate banks provide goods and money to withdrawing depositors in just the right ratio so that the goods market at each date clears at these prices.

The main result for this section is that:

Theorem 4: The central bank can ensure efficiency by allowing the representative bank to borrow M in money at date 1 and repay it at date 2. The representative bank uses this money to satisfy demands for withdrawal when it needs to.

6. Asset Markets

So far it has been assumed that the risky asset is illiquid but often assets can be sold. What happens if there is a market for the risky asset?

Participants in the market: **Risk neutral speculators** who hold some portfolio (L_s, X_s). They cannot short sell or borrow.

For simplicity, **r=1**.
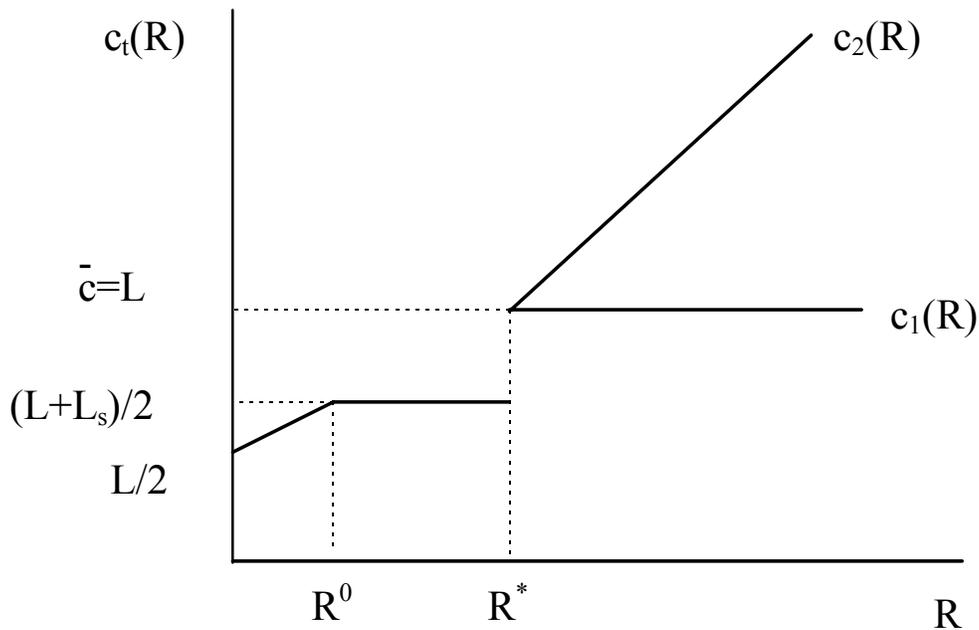
For $R^0 \leq R \leq R^*$, there is "cash-in-the-market" pricing:

$$P = L_s/X$$

Numerical Example:

Bank and bank depositors:

$(L, X) = (1.06, 0.94)$ $R^0 = 0.25$ $R^* = 1.13$

$P = 0.26$ for $R^0 \leq R \leq R^*$ $EU = 0.09$

Speculators:

$W_s = 1$ $(L_s, X_s) = (0.24, 0.76)$ $EU_s = 1.5$

Note that the bank depositors are worse off than under (P1)

Theorem 5: The central bank can implement the solution to (P1) by entering into a repurchase agreement for the risky asset with the representative bank at date 1. The central bank supplies money at date 1 in exchange for the risky asset and the representative bank must repurchase the asset for the same cash value at date 1.

Corollary 5.1: The solution to (P1) implemented by a repurchase agreement as in Theorem 5 is Pareto preferred to the laisser-faire equilibrium outcome with asset markets.

7. Concluding remarks

Two views of banking crises have been considered:

- Financial panic view

- Business cycle view

Both theories are logically consistent. In some cases of crises the financial panic view may be an appropriate explanation while in others the business cycle view may be appropriate.

It is crucial to develop good methods of distinguishing between the two types of crisis because the policy implications of the two are quite different.

Financial panic view policy implications

In the Diamond and Dybvig model the key to avoiding crises is ensuring only the good equilibrium is selected. They suggested deposit insurance would do this.

Business cycle view policy implications

This type of model suggests that allowing runs can be optimal when there are no costs of liquidation.

With costly liquidation intervention by the central bank in the form of a monetary interjection is necessary to attain the optimum. A run still occurs but now money rather than real assets is withdrawn. The special ability of the central bank is the provision of credible money.

With asset markets appropriate intervention by the central bank allows a Pareto improvement over the laisser-faire equilibrium.

It is <u>never</u> optimal in this framework to impose artificial constraints on banks to eliminate runs.

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