Bailouts, Bail-ins and Banking Crises

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The bank runs problem

- Intermediaries offer deposits that can be withdrawn:
  - on demand (or at short notice)
  - at face value (or not very state contingent)
- In a run, investors know (or fear) a "response" is coming
  - i.e., failure or resolution in which remaining investors lose money

  ⇒ want to withdraw before this response
- Key element of the story: the response is <u>delayed</u>
  - there is a period when the run is underway ...
  - ... but the bank continues to operate as normal

Why the delay?

- Puzzle: the run is making investors as a group worse off
  - why doesn't the response come more quickly?
- Traditional answer: incomplete contracts between banks and investors
  - difficult to write and enforce state-contingent contracts
  - or incompleteness needed to address other incentive problems

  ⇒ legal issues (how to change contracts, impose losses) creates delay
- If so: focus of policy should be on improving these contracts
  - creating legal structures under which better contracts are feasible
  - much effort in this direction (bail-ins, Co-cos, orderly resolution)
  - prime example: Money Market Mutual Fund reforms in the U.S.

Our paper

- Suppose efforts to improve contracts between banks and investors are perfectly successful
- Would that solve the bank-runs problem?
  - existing literature suggests the answer should be 'yes'
  - we argue: answer is likely 'no'
- Study an environment with no contracting frictions with a bank
  - bailing-in investors in a crisis is feasible (and desirable)
  - govt. can provide bailouts and lacks commitment
- Show: Bailouts delay bail-ins
  - result: a bank run (and delayed response) can still arise
  - we then study macroprudential policy in this setting

The model environment

Investors

- $t = 0{,}1{,}2$
- Investors: $i \in [0{,}1]$ in each of many locations k
  - endowed with 1 at $t = 0$, nothing later
- Utility: $u(c_1 + \omega_i c_2) + v(g)$
  - where $\omega_i = \begin{Bmatrix} 0 \\ 1 \end{Bmatrix}$ means investor is $\begin{Bmatrix} \text{impatient} \\ \text{patient} \end{Bmatrix}$
- Type ω_i is revealed at $t = 1$, private information
  - π = prob. of being impatient for each investor

    = fraction of impatient investors at $t = 1$

Diamond-Dybvig plus public good

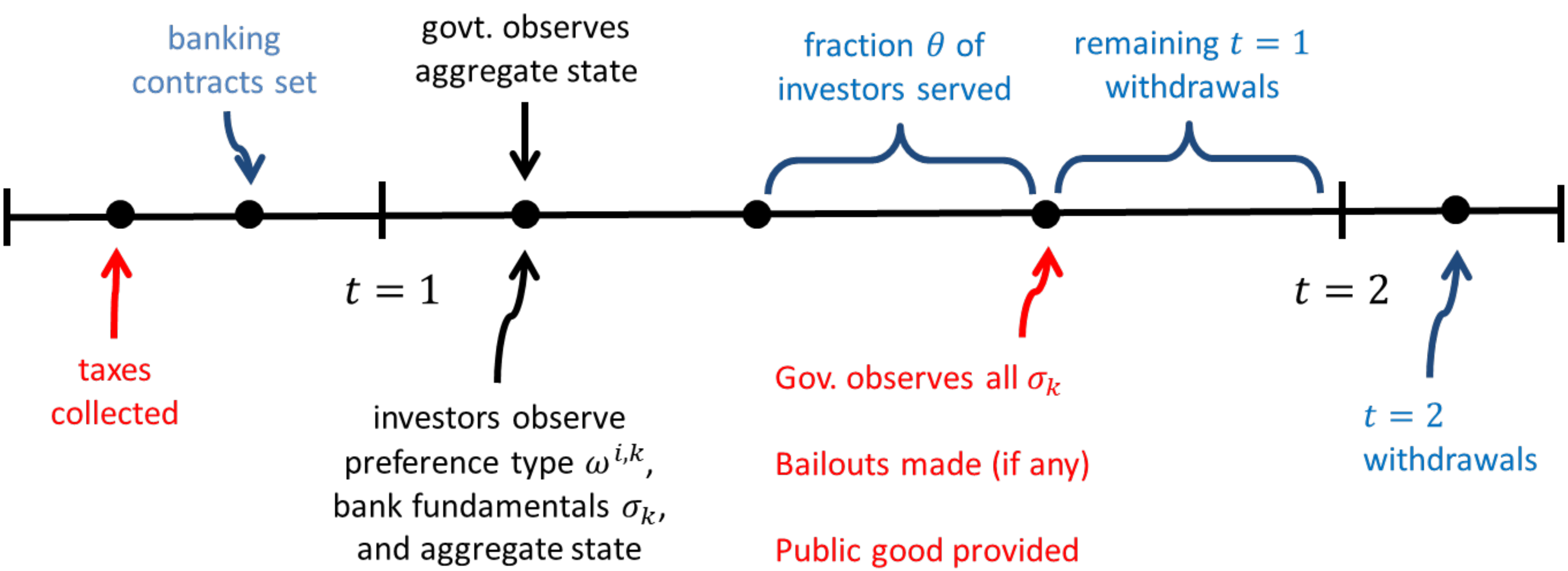
Banks

- Representative bank in each location
  - accepts deposits at $t = 0$; allows withdrawals at $t = 1$ or $t = 2$
  - sets (fully-state-contingent) contract $t = 0$
- Investment yields return $\begin{Bmatrix} 1 \\ R > 1 \end{Bmatrix}$ at $\begin{Bmatrix} t = 1 \\ t = 2 \end{Bmatrix}$ if sound, but ...
- Some assets turn out to be worthless at $t = 1$
  - fraction n of banks → lose fraction σ of their assets
  - two aggregate states: $n = 0$ (good) and $n > 0$ (bad)
  - investors observe both aggregate and bank-specific state

Government

- Fiscal policy:
  - $t = 0$: taxes endowments
  - $t = 1$: provides public good and (possibly) bailouts to weak banks
    - bailouts are chosen as best response to the situation at hand (no commitment)
- Information:
  - observes aggregate state at the beginning of $t = 1$, but ...
  - observes bank-specific states σ_k with a lag, after θ withdrawals
    - captures the time needed to do detailed examinations
  - bailouts are made after some withdrawals have taken place

Timeline



banking contracts set
govt. observes aggregate state
fraction θ of investors served
remaining $t = 1$ withdrawals
$t = 1$
$t = 2$
taxes collected
investors observe preference type $\omega^{i,k}$, bank fundamentals σ_k, and aggregate state
Gov. observes all σ_k
Bailouts made (if any)
Public good provided
$t = 2$ withdrawals

The constrained efficient allocation

A planner's problem

- Suppose a planner could operate all banks plus the govt.
  - and can observe investors' types and dictate withdrawal decisions
  - but is subject to same restrictions on fiscal policy
- Note: planner will have patient investors withdraw at $t = 2$
- Sound banks:
  - choose consumption for each impatient investor (c_{1S}) ...
  - ...and for each patient investor (c_{2S}) to solve

$$\max \ \pi u(c_{1S}) + (1-\pi)u(c_{2S})$$

$$s.t. \qquad \pi c_{1S} + (1-\pi)\frac{c_{2S}}{R} \leq 1 - \tau$$

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solution: (c_{1S}^*, c_{2S}^*)
with $c_{1S}^* < c_{2S}^*$

- Weak banks:

$$\max \pi\, u(c_{1W}) + (1-\pi)u(c_{2W})$$

$$s.t. \qquad \pi c_{1W} + (1-\pi)\frac{c_{2W}}{R} \leq (1-\tau)\underbrace{(1-\sigma)}_{\text{losses}} + \underset{\uparrow \text{bailout}}{b}$$

- Bailouts efficiently distribute resources between g and c:

$$v'(\tau - nb) = u'(c_{1W}^*) = Ru'(c_{1W}^*)$$

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- Properties of the constrained efficient allocation:
  - bailouts: $b^* > 0$ for all weak banks
  - combined with bail-ins: $(c_{1W}^*, c_{2W}^*) \ll (c_{1S}^*, c_{2S}^*)$
  - no incentive to run: $c_{1j}^* < c_{2j}^*$ for $j = S, W$

Equilibrium allocations

Banking contracts

- At $t = 0$, banking contract specifies early payment c_1^k
  - as a function of realized fundamental σ_k and withdrawal demand
- Simplified model: restrict $c_1^k \in \{c_{1S}^*, c_{1W}^*\}$
  - interpretation: can operate as normal (c_{1S}^*)

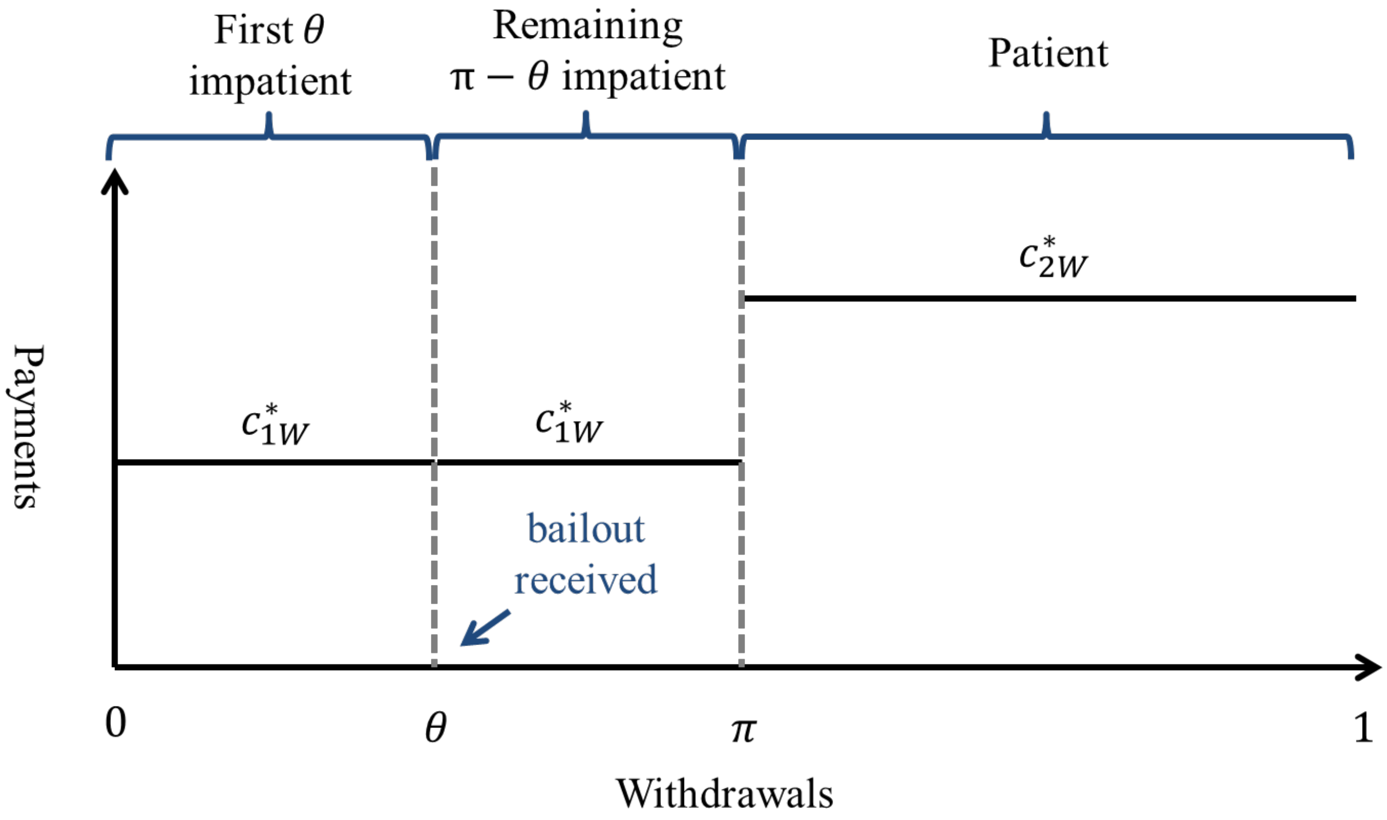
    or bail-in investors $(c_{1W}^* < c_{1S}^*)$
- Govt initially does not observe banks' realized states σ_k
  - activating the bail-in clause is at the bank's discretion
- After θ investors have withdrawn, govt observes all σ_k
  - decides on bailout payments
  - remaining resources are allocated efficiently within each bank

Equilibrium behavior

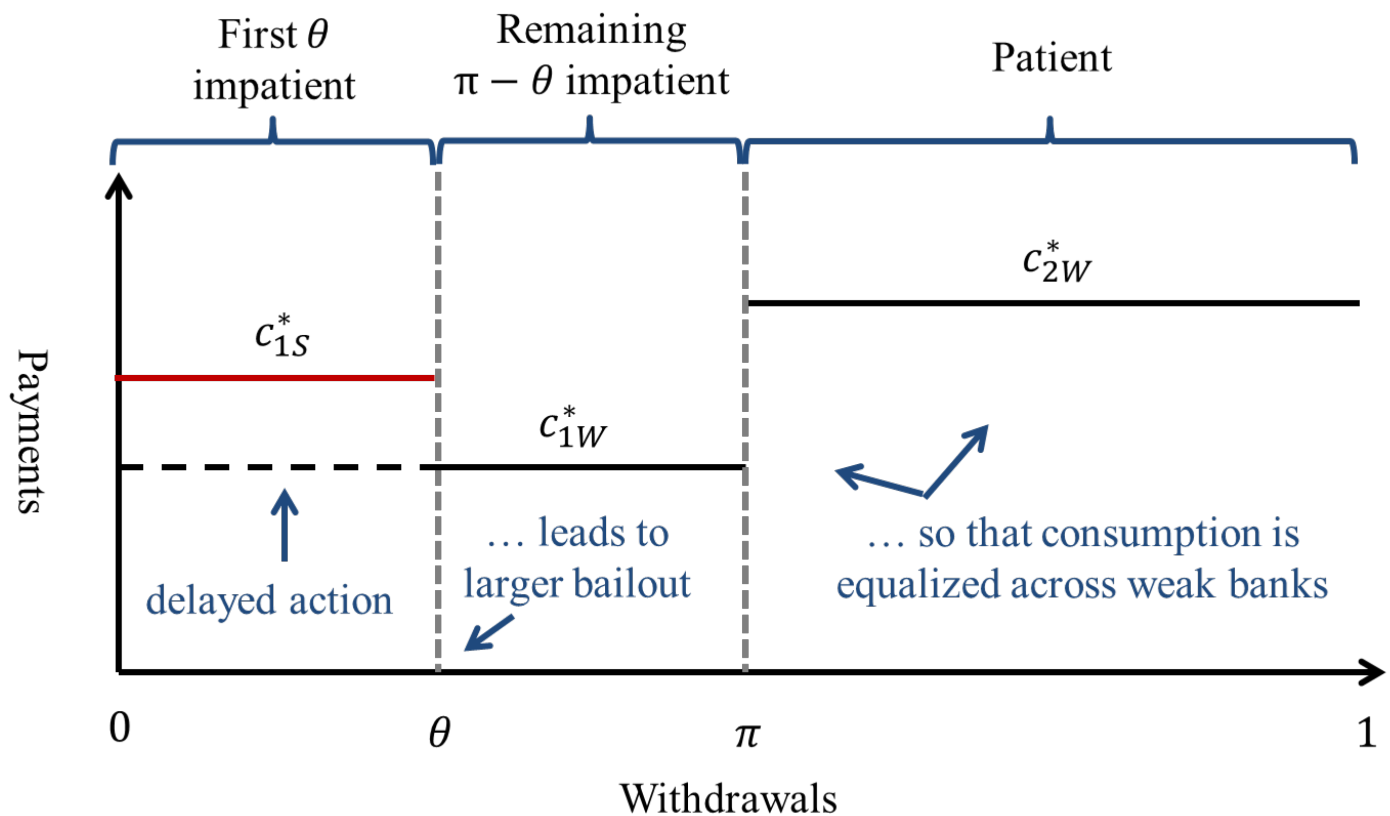
Q: Is the constrained efficient allocation an equilibrium?

- Suppose all other banks follow: $\begin{Bmatrix} c_{1S}^{*} \\ c_{1W}^{*} \end{Bmatrix}$ if $\begin{Bmatrix} \sigma_k = 0 \\ \sigma_k = \sigma \end{Bmatrix}$
- Consider the choice of an individual weak bank i
- Would it choose to follow this same strategy?
  - that is, bail in its investors and pay c_{1W}^{*}?
- Or to deviate?
  - by "delaying" the response and paying c_{1S}^{*}?

- If bank i chooses to bail in:



- If bank i chooses to delay:



⇒ Deviation to c_{1S}^{*} is profitable

Results

Result 1: The constrained efficient allocation is not an equilibrium

- Any equilibrium involves a *delayed response* by weak banks
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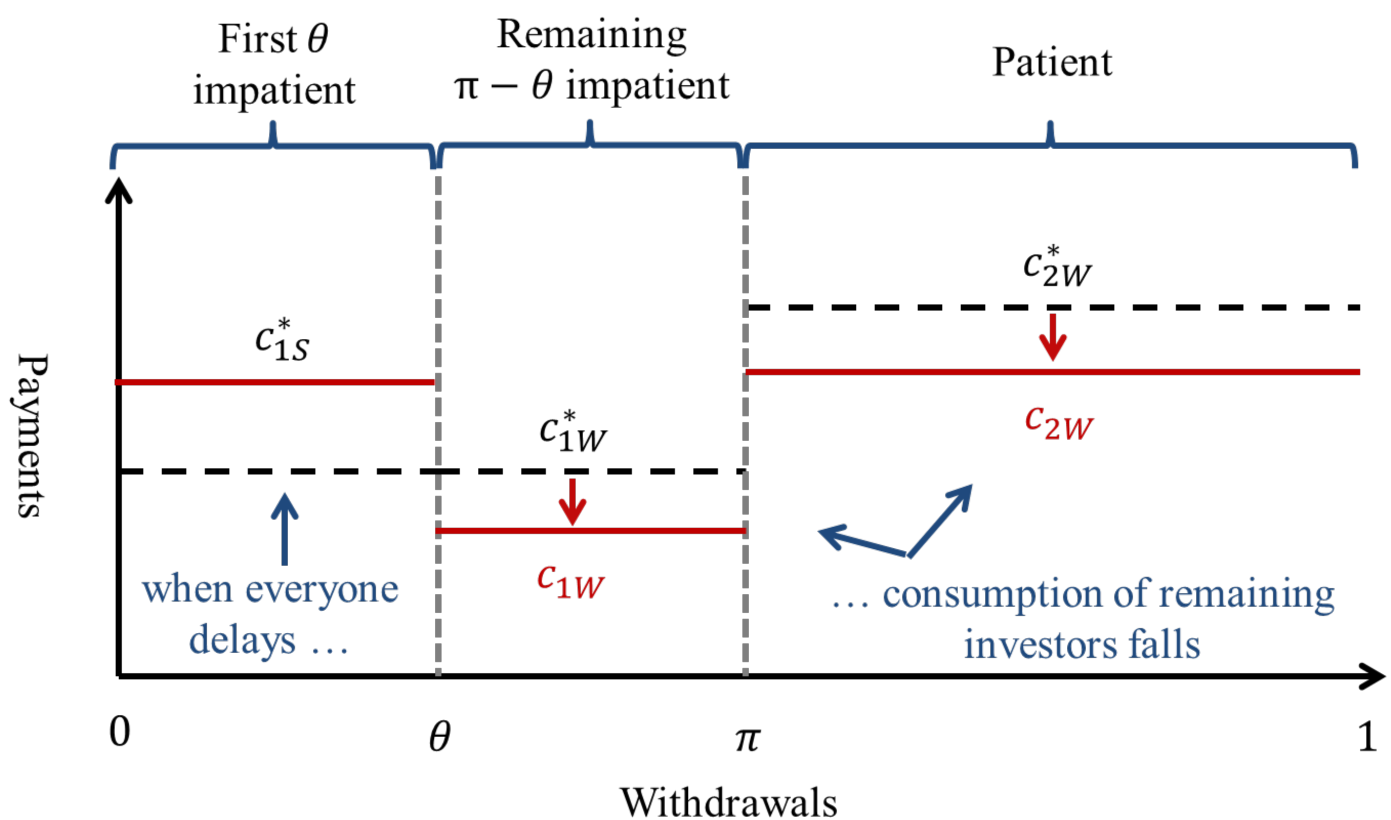
- If all weak banks choose to delay ...
  - more assets are liquidated in period 1 ...
  - putting more strain on the government budget
  - the bailout policy will satisfy

$$v'(\tau - nb) = u'(c_{1W}) = Ru'(c_{1W})$$

$\Rightarrow$ lower consumption levels for remaining investors in weak banks

- When all weak banks delay:



- If c_{2W} falls below c_{1S}^* ⇒ patient investors will not wait

Results

Result 2: For some parameter values, there exists an equilibrium in which investors run on all weak banks

⇒ The delayed response can amplify the real shock in two ways

- directly: resources allocated inefficiently
- indirectly: causes a run → additional liquidation of investment

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⇒ The delayed response can amplify the real shock in two ways

- directly: resources allocated inefficiently
- indirectly: causes a run → additional liquidation of investment

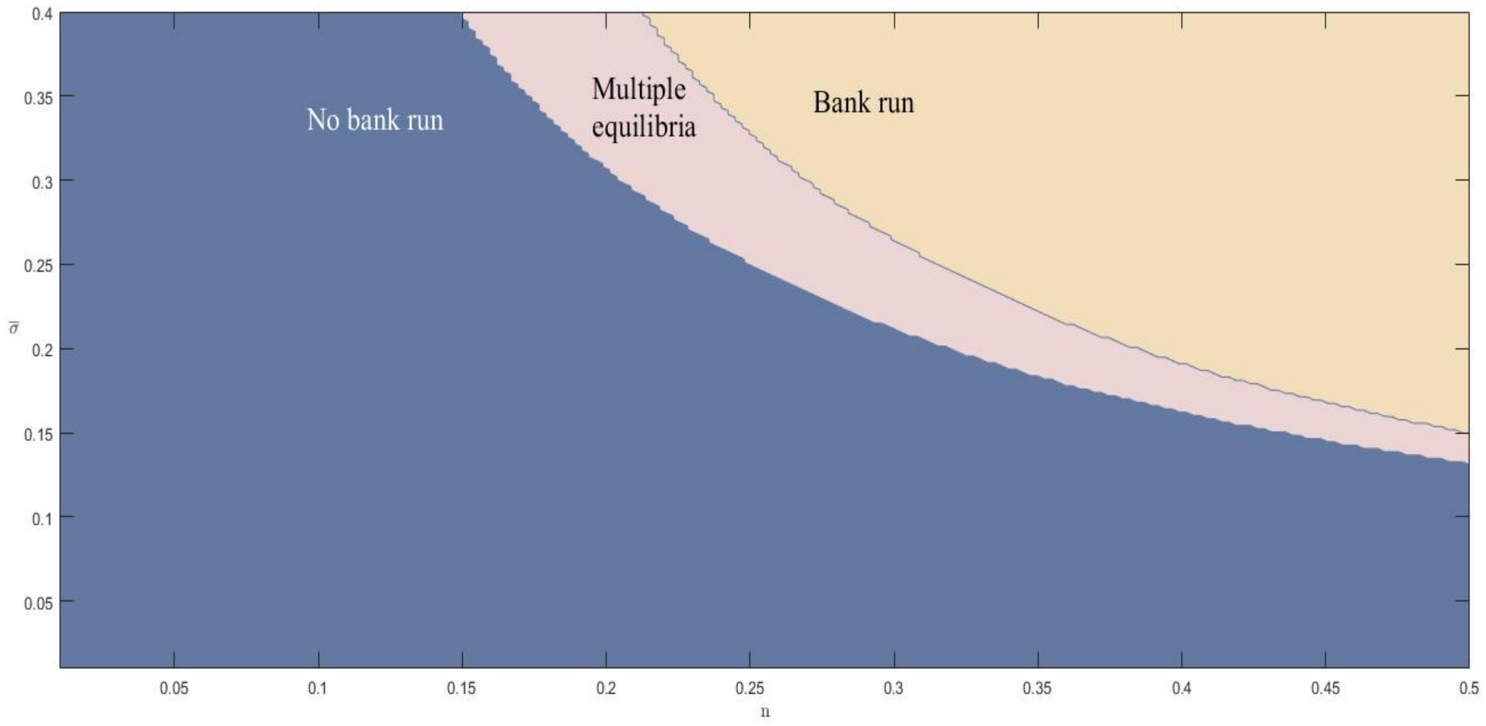
- Note: a strategic complementarity arises across banks here
  - if investors are running on <u>other</u> weak banks
  - bailout received by my bank will be smaller

  ⇒ increases the incentive to run on my bank

- This is *different* from the usual complementarity *within* a bank

Results

Result 3: For some parameter values, there are multiple equilibria



Macroprudential policy

- What should policy makers do in this type of environment?
- We consider three types of prudential policy
  1) a cap on banks' early payments
  2) increasing tax revenue (to provide more "fiscal space")
  3) eliminating bailouts
- Each policy can raise welfare for some parameter values
  - but none of them implement the constrained efficient allocation

1) Suppose the govt. can limit early payments in the bad state

- $c_1^k \in \{\bar{c}, c_{1W}^*\}$ where $\bar{c} \leq c_{1S}^*$ is a policy choice

- Interpretations:

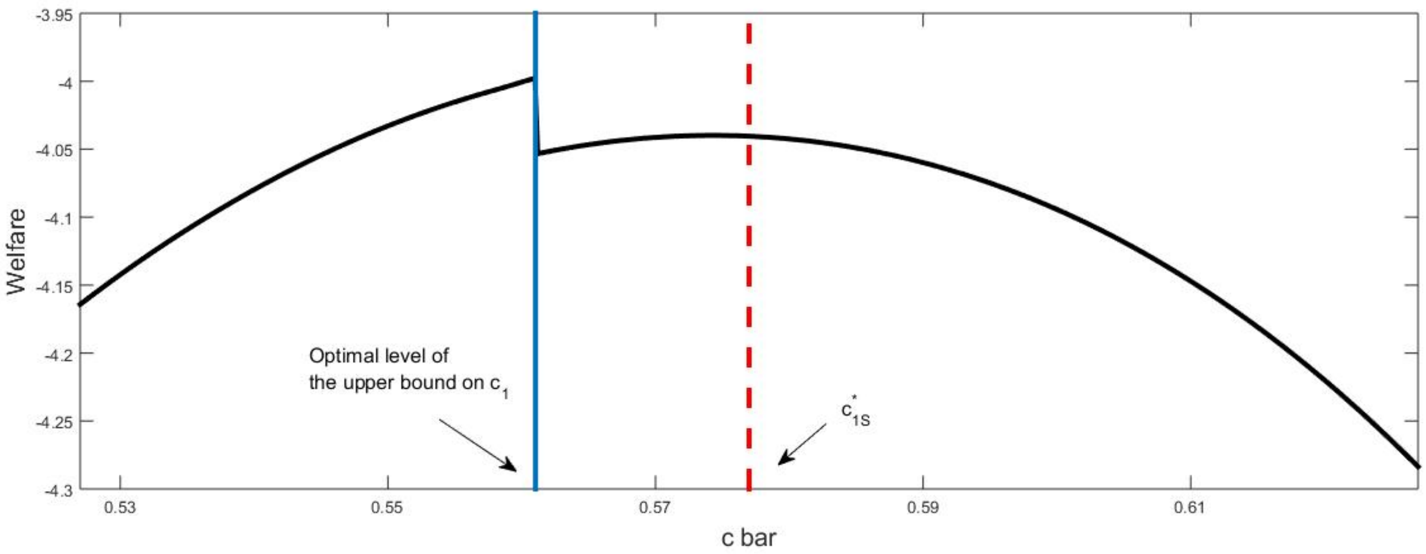
a) restriction on paying dividends (for all banks)

b) requiring contingent debt with a systemic trigger

Result 4: Optimal policy often has $\bar{c} < c_{1S}^*$

- Intuition:
  - moves weak banks closer to constrained optimum
  - also distorts allocation in sound banks, but loss is second order

- In some cases, optimal cap eliminates the run equilibrium
  - if $\bar{c}$ is low enough, weak banks will preserve enough resources
  - … that patient investors will choose to wait
  - in this case, the (ex post) optimal bailout ~ deposit insurance



2) Increasing the tax rate τ

- When weak banks delay bailing in their investors …
  - bailout payments will be larger than in the planner's allocation
  - leading to a lower level of the public good
- Raising the tax rate has two potential benefits
  1) it eases the govt budget constraint in the bad state
  2) and may eliminate the run equilibrium
     - because a govt with more fiscal space will provide larger bailouts

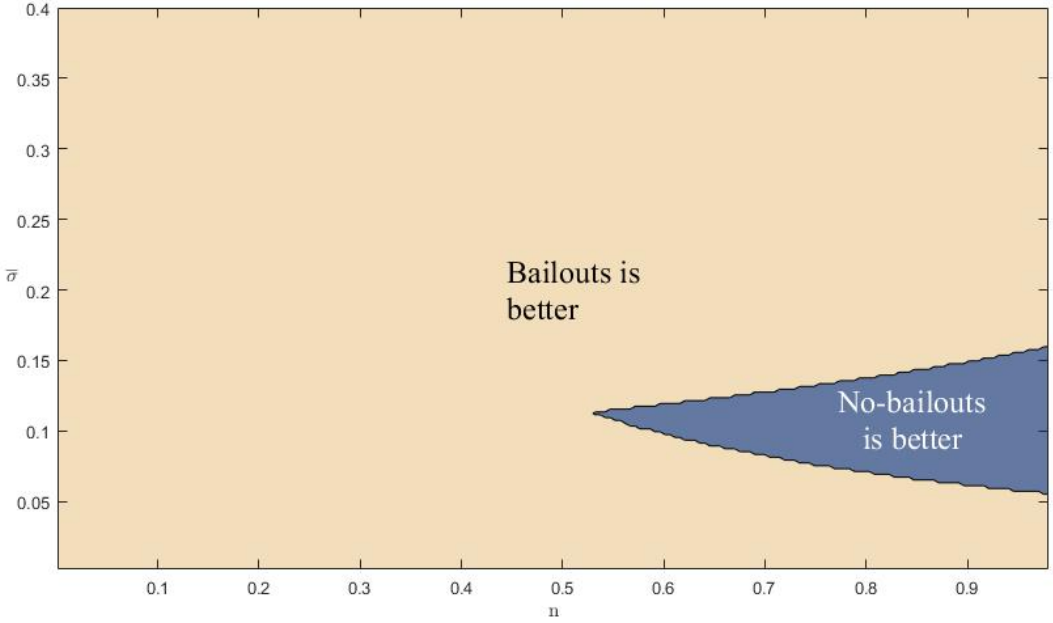
Result 5: Optimal policy always has $\tau > \tau^*$

- can be used together with a cap on early payments

3) Eliminating bailouts

- If govt can credibly commit to a no bailouts policy ...
  - which is a big “if”, but suppose it is possible
- ... weak banks will have no incentive to delay
  - will choose to immediately bail in their investors
  - when there is no delay ⇒ no bank run will occur
- However, this policy prevents socially-valuable risk sharing
  - public good consumption remains high in a crisis
  - even while the private consumption of investors in weak banks is low

Result 6: Eliminating bailouts raises welfare for some parameter values, but not for others



- most useful when other policy tools do not eliminate the run equilibrium

A more general model

The general case

- Suppose we allow banks to set any $c_1^k \leq \bar{c}$ (not just $\bar{c}$ or c_{1W}^*)
- In addition, govt. can examine a fraction $\alpha < 1$ of banks
  - if bank is found to be weak → put into early resolution
- This setting creates a signaling game
  - weak banks want to set c_1^k high to receive larger bailouts
  - but also want to "hide" as govt tries to infer which banks are bad
- Results are qualitatively unchanged:
  - constrained efficient allocation is not an equilibrium
  - there is a pooling equilibrium with delay → all banks choose c_{1S}^*
  - in some cases, this equilibrium also has a bank run

Conclusions

Take-aways

- One aim of financial stability policy: make a quicker response to a crisis *possible*
  - much effort has gone into reforms of this type
  - could potentially solve the bank runs problem
- But will a quick response actually occur?
  - it would likely depend on (private) information of banks
  - need to think about their incentive to act vs. delay
- We argue there is cause for concern
  - bailouts delay bail-ins $\rightarrow$ this delay can lead to a bank run

$\Rightarrow$ Role for prudential policy even if tools are very blunt