Bailouts and Financial Fragility

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The question

- Widespread agreement that bailing out financial institutions creates moral hazard
  - distorts ex ante incentives; increases financial fragility
- How should policy makers deal with this issue?
- One view: focus on credibly committing to no future bailouts

  Phillip Swagel: "*A resolution regime that provides certainty against bailouts will reduce the riskiness of markets and thus help avoid a future crisis.*"
  - in addition, minimizes need for regulation and other ex ante intervention

- Not clear if such a commitment is feasible
  - open for debate; perhaps bailouts are inevitable

Q: If feasible, would commitment to a no-bailouts policy be *desirable*?
  - would it increase financial stability?
  - would it raise welfare?

- Analyze this issue in a version of the Diamond-Dybvig model
  - add fiscal policy and limited commitment

Results

- The anticipation of a bailout in times of crisis distorts incentives
  - financial intermediaries become too illiquid, too fragile
- Committing to a no-bailout policy *over-corrects* the problem
  - intermediaries become too liquid (i.e., do too little maturity transformation)
  - can *increase* financial fragility (surprising)
  - can either raise or lower welfare, depending on parameters
- A tax on short-term liabilities - with no restriction on bailouts - can implement the constrained efficient allocation

Literature

- Growing literature on bailouts and time consistency issues
  - Gale and Vives (2002), Chari and Kehoe (2009), Farhi and Tirole (2009), others
- In many settings, incentive efficiency requires the ex post allocation of resources to be inefficient
  - a "bailout" aims to improve the ex post allocation, but undermines ex ante incentives
  - a no-bailout commitment would solve the problem
- Literature focuses on resulting distortion in resource allocation
- Focus in this paper is on financial stability (undesirable equilibria)

Outline

- The physical environment

- Equilibrium allocations and financial fragility under:
  - a planner-run financial system
  - decentralized financial system with:
    (1) discretionary policy
    (2) a commitment to no bailouts
    (3) a tax on short-term liabilities

- Concluding remarks

The environment

- 3 time periods, $t = 0, 1, 2$
- Continuum of investors, $i \in [0, 1]$
  - utility

$$u\left(c_{1i} + \theta_i c_{2i}\right) + v\left(g\right) \qquad u \text{ is CRRA, with } \gamma > 1$$

$$\text{where } \theta_i = \left\{ \begin{array}{c} 0 \\ 1 \end{array} \right\} \text{ if investor is } \left\{ \begin{array}{l} \text{impatient} \\ \text{patient} \end{array} \right\}$$

  - c_{ti} is private consumption, g is a public good
- Type is revealed at $t = 1$; private information
  - $\pi =$ probability of being impatient for each investor

Technologies:

- Private investment at $t = 0$ yields $\left\{ \begin{array}{c} 1 \\ R > 1 \end{array} \right\}$ at $t = \left\{ \begin{array}{c} 1 \\ 2 \end{array} \right\}$
  - usual incentive to pool resources for insurance purposes

- Public good can be created using private goods as inputs at $t = 1$
  - one unit of private good creates one unit of public good (for simplicity)

- Endowments can be taxed at $t = 0$

- Investors may condition actions on an extrinsic "sunspot" variable
  - $s \in \{s_1, s_2\}$
  - realized state is not observed by intermediaries or policy maker

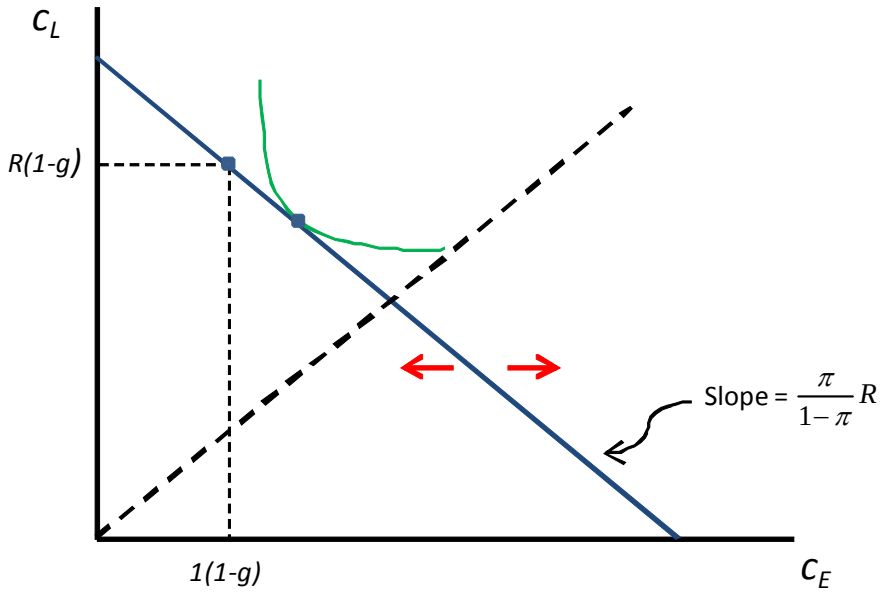
- Could have *fundamental* uncertainty instead of a sunspot signal
  - example: $\pi = \left\{ \begin{array}{c} \pi_L \\ \pi_H \end{array} \right\}$ in state $\left\{ \begin{array}{c} s_1 \\ s_2 \end{array} \right\}$
  - model here is the limiting case as $\pi_H \longrightarrow \pi_L$

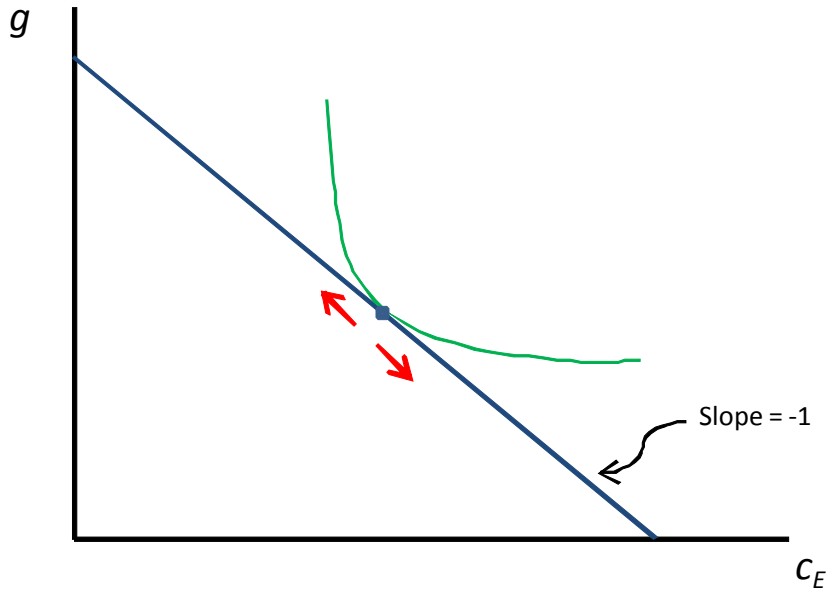
Intermediation

- Investors pool funds at $t = 0$, withdraw in either $t = 1$ or $t = 2$
  - can interpret as a bank, other financial intermediary, etc.
  - withdrawals at $t = 1$ subject to sequential service (as in Wallace)
- Intermediaries' objective is to maximize investors' expected utility
  - cannot commit to future actions (as in Ennis & Keister, 2009)
- No restrictions on contracts
  - financial arrangements are optimal given the constraints imposed by the environment (as in Green & Lin, 2003, others)

The first-best allocation

- A standard Diamond-Dybvig environment ...





... combined with a simple public-finance problem

A benchmark case

- Suppose the financial system is operated by a benevolent planner
  - aims to maximize $\int E\left[u\left(c_1\left(i\right), c_2\left(i\right), g; \theta_i\right)\right] di$
  - does not observe investors' types, cannot commit to future actions
- Each investor observes type at $t = 1$, chooses when to withdraw
- Role of limited commitment: prevents planner from using of certain types of contracts
  - suspension of convertibility (Diamond & Dybvig, others)
  - run-proof contracts (Cooper & Ross, others)

- There is always an equilibrium in which investors do not run
  - first-best allocation of resources obtains

- Is there also an equilibrium where investors run in some state?

- Suppose investors take the following action profile:

s_1 : only impatient investors withdraw early

s_2 : *all* investors attempt to withdraw early

- The fraction of investors attempting to withdraw: $\left\{ \begin{array}{c} \pi \\ 1 \end{array} \right\}$ in $\left\{ \begin{array}{c} s_1 \\ s_2 \end{array} \right\}$

- The planner's best response entails:

state	impatient consumption	patient consumption	public good
s_1 :	c_E	c_L	g
s_2 :	c_E or $\widehat{c}_E$	c_E or $\widehat{c}_L$	$\widehat{g}$

  – $\widehat{c}_E < c_E$, "partial suspension of convertibility" (Wallace, 1990)

- This allocation is indeed an equilibrium if $c_E > \widehat{c}_L$

- Let $\Phi^* =$ set of economies for which $c_E^* > \widehat{c}_L^*$
  - an economy is defined by parameter values $e = (R, \pi, u, v, q)$
- Result: Φ^* is nonempty
  - financial fragility can arise even with a benevolent planner

Key property:

- Result: $\widehat{g}^* < g^*$ $\Rightarrow$ a "bailout" in s_2
  - public funds are used to support the private consumption of investors facing losses
  - this is part of an *efficient* insurance arrangement

Equilibrium under discretionary policy

- In period 0 :
  - policy maker collects taxes; intermediaries take deposits
  - both aim to maximize investors' expected utility
- In period 1 :
  - investors observe type; make withdrawal decisions
  - after π withdrawals, intermediary and policy maker infer state
- If a run has occurred:
  - policy maker can transfer goods to intermediaries (a bailout)
  - intermediaries distribute remaining resources efficiently

Solve by working backward

- In the event of a crisis, bailout payments will be chosen so that

$$u'\left(\widehat{c}_E^{\,j}\right) = Ru'\left(\widehat{c}_L^{\,j}\right) = v'\left(\widehat{g}\,\right) \quad \text{for all } j$$

  - bailout policy equalizes consumption across remaining investors

$\Rightarrow$ an intermediary with fewer resources receives a larger bailout

- An intermediary will choose c_E to maximize:

$$\pi u\left(c_E\right) + (1-q)\left(1-\pi\right)u\left(c_L\right) \; + q\widehat{V}$$

  - no incentive to provision for the run state

- Define the degree of illiquidity to be

$$\rho \equiv \frac{c_E}{1-g}$$

  $\approx$ ratio of short-term liabilities to assets

- Result: For any $q > 0$, $\rho^D > \rho^*$ holds
  - moreover, ρ is increasing in q
  - result of the incentive problem: too much illiquidity

- Result: $\Phi^* \subset \Phi^D$
  - higher illiquidity in the decentralized economy increases fragility

A no-bailouts policy

- Suppose policy maker can commit to $b = 0$ in all states
  - a very limited form of commitment
- In the event of a run, intermediaries still reschedule liabilities
  - implement the desired allocation of remaining *private* consump.
  - but now all tax revenue must go into public good
- Intermediaries will now maximize

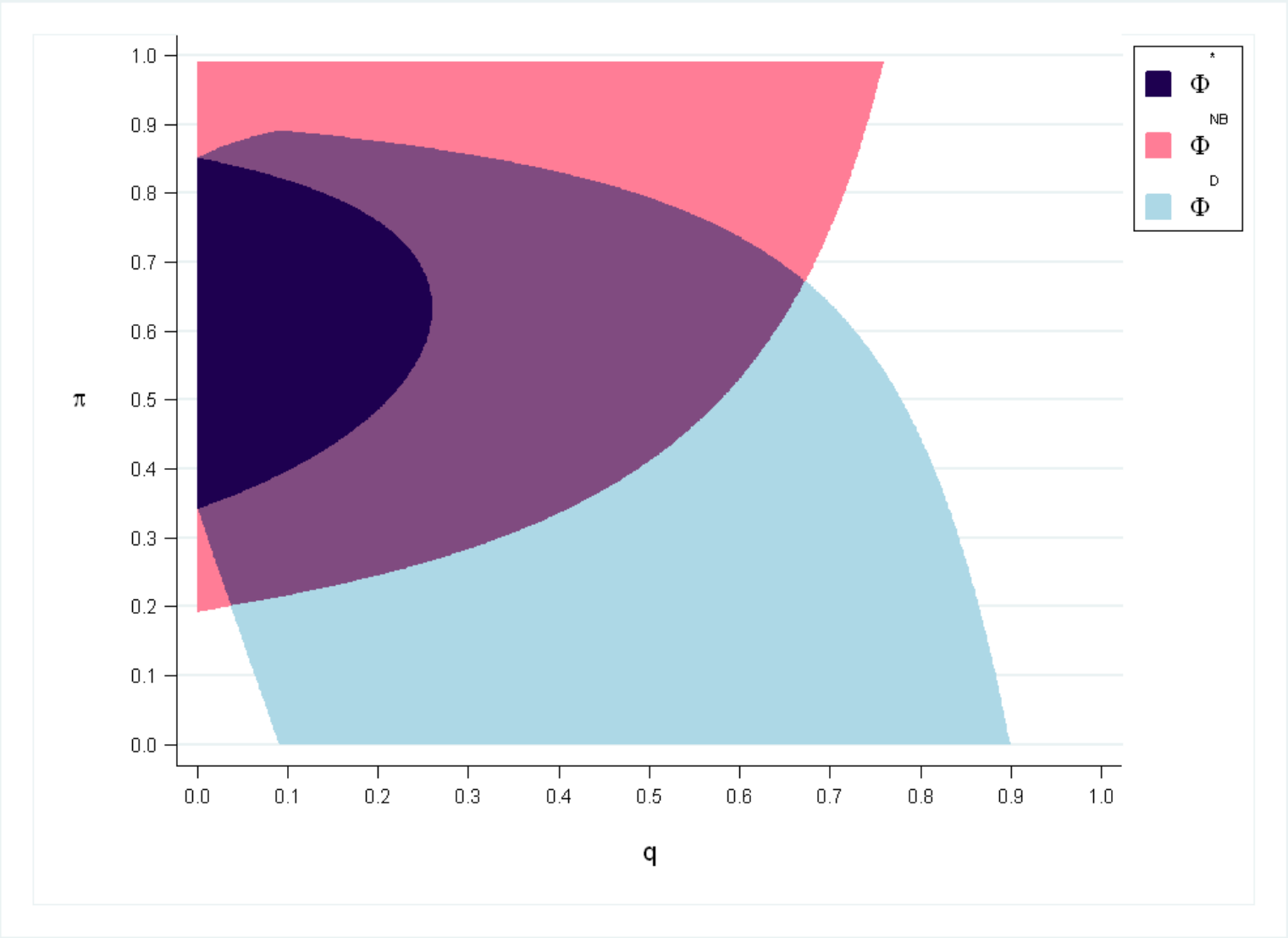
$$\pi u\left(c_E\right) + (1-q)\left(1-\pi\right)u\left(c_L\right) \; + q\widehat{V}\left(\frac{1-g-\pi c_E}{1-\pi}\right)$$

- Result: For any $q > 0$, $\rho^{NB} < \rho^*$ holds
  - the policy "over-corrects" the incentive problem

- In addition: the allocation of resources in s_2 is ex post inefficient

- Result: $\Phi^* \subset \Phi^{NB}$
  - still more fragility than in the planner's allocation
  - moreover, some economies are in Φ^{NB}, but not Φ^D
  - these economies *become* fragile when policy is introduced

Graphically



Intuition: two competing effects are at work

(1) Having intermediaries be more liquid tends to reduce fragility

(2) but – loss of insurance for investors tends to increase it

  – in some cases, the latter effect dominates

  – this insurance role has been largely absent in the policy debate

Finally

- Result: If q is small, $e \in \Phi^D$ implies both $e \in \Phi^{NB}$ and
$$EU^D > EU^{NB}$$

  – no-bailout commitment lowers welfare, does not help with fragility

Taxing short-term liabilities

- Now suppose the policy maker places imposes a tax on either short-term liabilities or illiquidity (ρ)
  - no restrictions on bailout policy
  - note: many other policies would have the same effect

- Result: There exists a tax rate that implements the efficient allocation
  - efficient tax rate exactly offsets the incentive problem

- Policy *decreases* fragility relative to either Φ^D or Φ^{NB}

Concluding remarks

- Recall: "*A resolution regime that provides certainty against bailouts will reduce the riskiness of markets and thus help avoid a future crisis.*"
- Main point: this is not so obvious
  - bailouts can be part of an efficient insurance arrangement
  - this insurance reduces investors' incentives to run

  $\Rightarrow$ the claim is simply not true (at least in some settings)
- The model here abstracts from many features of reality, of course
- However, the effects it highlights are fairly general
  - are likely to appear in a wide range of settings

- In the model here, the best approach is to not restrict bailouts
  - use taxation/regulation to correct the distortion
- But ... bailouts here represent the *efficient* reallocation of resources
  - no rent-seeking behavior, political motivations, etc.
- Message is **not** that any bailout policy is ok as long as ex ante effects are corrected
  - limits on policy makers' ability to reallocate may well be desirable
- Rather, limits on bailouts alone cannot generate efficient outcomes
  - some ex ante taxation/regulation is needed