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 should be on limiting/eliminating 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.*"

  $\longrightarrow$ limiting bailouts is an effective way to promote financial stability

- Commitment may be difficult, of course, but .... many current reform efforts clearly reflect this view
  - Dodd-Frank: "*An Act to promote financial stability ... [and] to protect the American taxpayer by ending bailouts.*"

Q: If feasible, would commitment to a no-bailouts policy be *desirable*?

  - would it increase financial stability?
  - would it raise welfare?

- Analyze this question 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 is not necessarily desirable
  - intermediaries become too liquid (i.e., do too little maturity transformation)
  - can *increase* financial fragility
- A tax on short-term liabilities - with no restriction on bailouts - can implement the constrained efficient allocation

$\Rightarrow$ Efficiency requires allowing bailouts and using prudential policy

- a no-bailouts policy may be **worse** than pure discretion

Literature

- Growing literature on bailouts and time consistency issues
  - Gale and Vives (2002), Chari and Kehoe (2009), Farhi and Tirole (2012), Bianchi (2012), others
- Common approach: consider a setting in which 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
- Here: bailouts are a socially-desirable insurance arrangement
  - also affect fragility via the incentive for investors to withdraw early

Outline

- The model environment

- Equilibrium allocations and financial fragility under:

  (1) A planner-run financial system (a benchmark)

  (2) Discretionary policy (where bailouts distort incentives)

  (3) A no-bailouts policy

  (4) Taxing short-term liabilities (bailouts with prudential policy)

- Concluding remarks

Preferences

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

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

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

  - 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

- Investors have endowments at $t = 0$
- Goods invested at $t = 0$ yield $\left\{ \begin{array}{c} 1 \\ R > 1 \end{array} \right\}$ 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)
- Policy maker can tax endowments at $t = 0$
  - invests funds until $t = 1$, then produces public good
    ... or makes transfers

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 (Wallace, 1988)
- 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)

Crises

- A *crisis* occurs if some patient investors withdraw at $t = 1$
  - a "run" on the financial system
- Investors may condition actions on an extrinsic "sunspot" variable
  - $s \in \{a, b\}$; represents investor sentiment
- s is observed by intermediaries and policy maker with a lag
  - after θ withdrawals have taken place (with $0 \leq \theta \leq \pi$)
  - re-optimize to utilize remaining resources efficiently
    (so $\theta \approx$ how quickly authorities react to a crisis)

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(1) A planner-run financial system

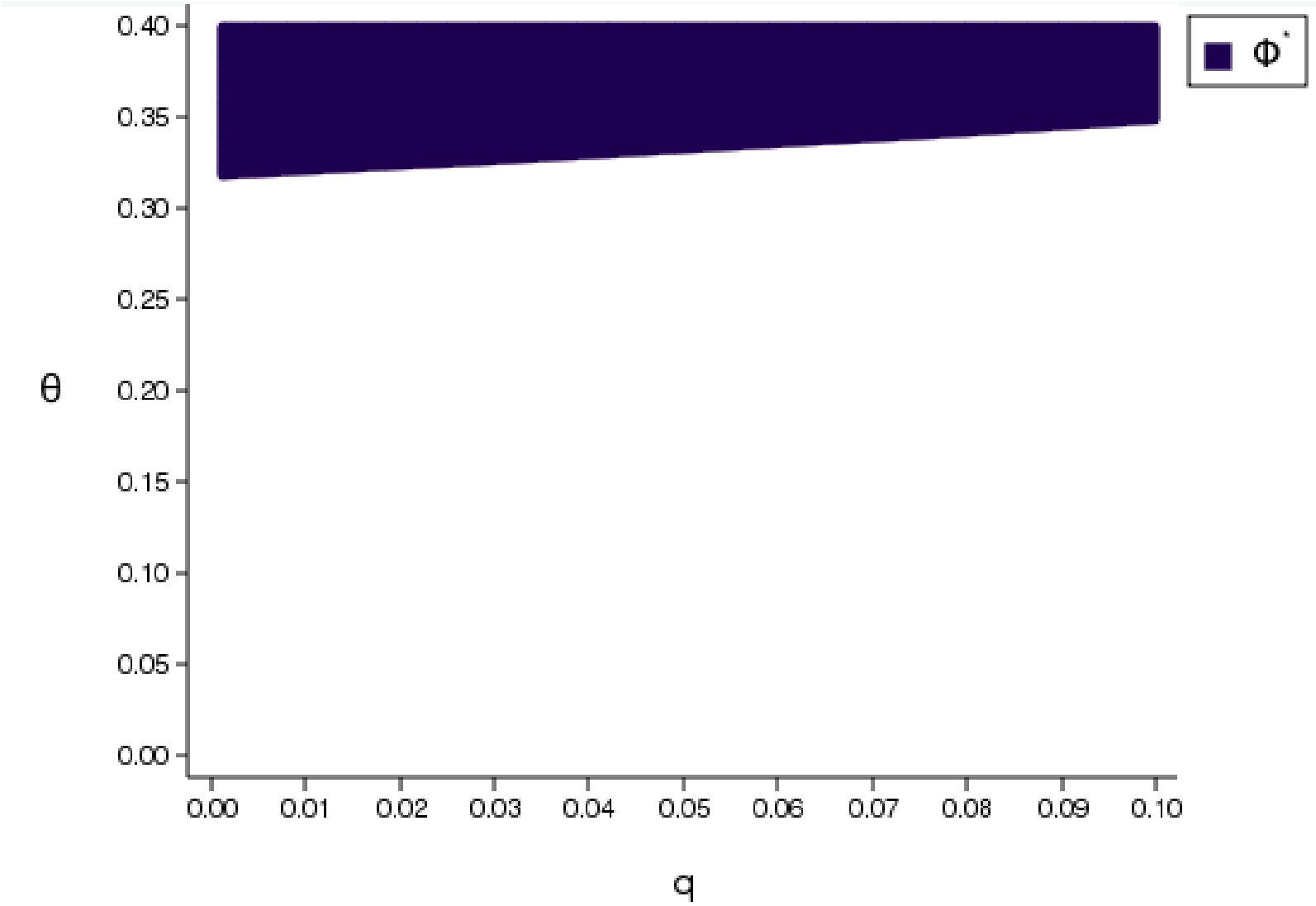
- Benchmark case: financial system operated by a benevolent planner
  - aims to maximize $\int E\left[U\left(c_1\left(i\right), c_2\left(i\right), g; \omega_i\right)\right] di$
  - does not observe individual investor's types
- Study equilibria of the game in which:
  - planner chooses a payment schedule and level of public good
  - each investor chooses a withdrawal strategy
- 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?
  - if so, the financial system is *fragile*
- Suppose all investors choose to run in state b
- The planner's best response entails:

first θ	others		everyone
c_1 ↗	(c_{1a}, c_{2a})	and	g_a
c_1 ↘	(c_{1b}, c_{2b})	and	g_b

- This allocation is indeed an equilibrium if $c_{2b} \leq c_1$
- Let $\Phi^* =$ set of fragile economies

The set Φ^*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Φ*

- If $e \notin \Phi^*$, no run will occur in equilibrium
  - first-best allocation obtains in both states

- For $e \in \Phi^*$, let (c^*, g^*) denote the allocation in the run equilibrium
  - maximizes expected utility *conditional* on investor behavior

Key property:

- Proposition: $g_b^* < g_a^* \quad \Rightarrow$ a "bailout" in state b
  - public funds are used to support the private consumption of investors facing losses
  - this is part of an *efficient* insurance arrangement

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(2) Discretionary policy

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

Bailout policy now distorts incentives

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

$$u'\left(c_{1b}^{j}\right) = Ru'\left(c_{2b}^{j}\right) = v'\left(g_b\right) \quad \text{for all } j$$

  – bailout policy equalizes consumption across remaining investors

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

- Intermediary's best response: choose c_1 to maximize

$$\theta u\left(c_1\right) + (1-q)\, V_a\left(1-\tau-\theta c_1\right) \; + qV_b$$

  – no incentive to provision for the run state

Result: intermediaries are more illiquid, fragile

- Define the degree of illiquidity to be

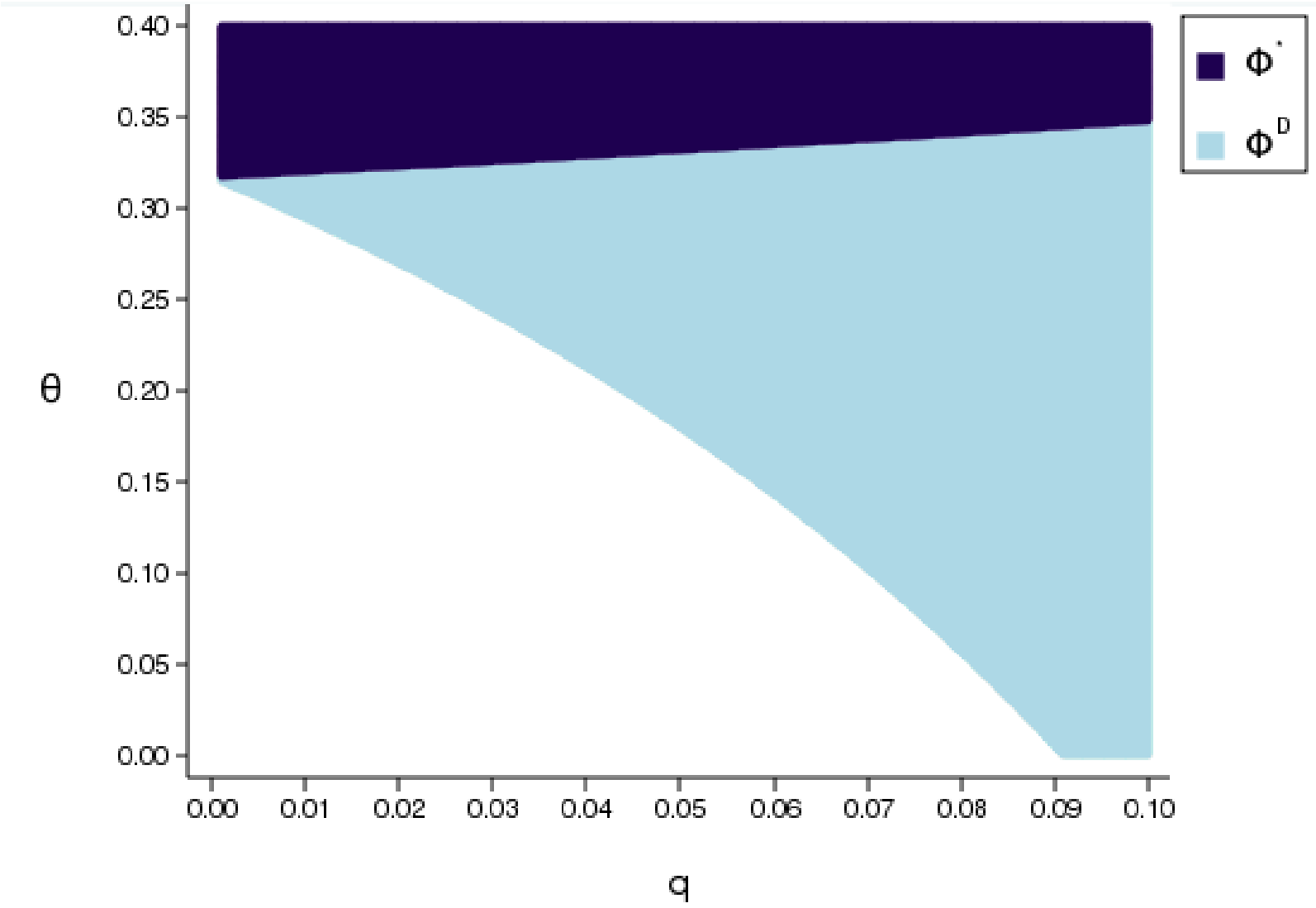
$$\rho \equiv \frac{c_1}{1-\tau}$$

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

- Proposition: For any $q > 0$, we have $\rho^D > \rho^*$
  - moreover, ρ is increasing in q

- Proposition: $\Phi^* \subset \Phi^D$
  - higher illiquidity leads to increased fragility

Graphically: $\Phi^* \subset \Phi^D$



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(3) A no-bailouts policy

- Suppose policy maker can commit to $b = 0$ in all states
  - all tax revenue must go into public good

- Intermediaries will now maximize

$$\theta u(c_1) + (1-q) V_a(1-\tau-\theta c_1) + q V_b(1-\tau-\theta c_1)$$

Result: intermediaries are more liquid ...

- Proposition: For any $q > 0$, we have $\rho^{NB} < \rho^*$
  - in fact, they do *too little* maturity transformation
  - due to the loss of social insurance from bailouts

... but they are still too fragile

- Proposition: $\Phi^* \subset \Phi^{NB}$
  - moreover, some economies are in Φ^{NB}, but not Φ^D

Intuition: two competing effects are at work

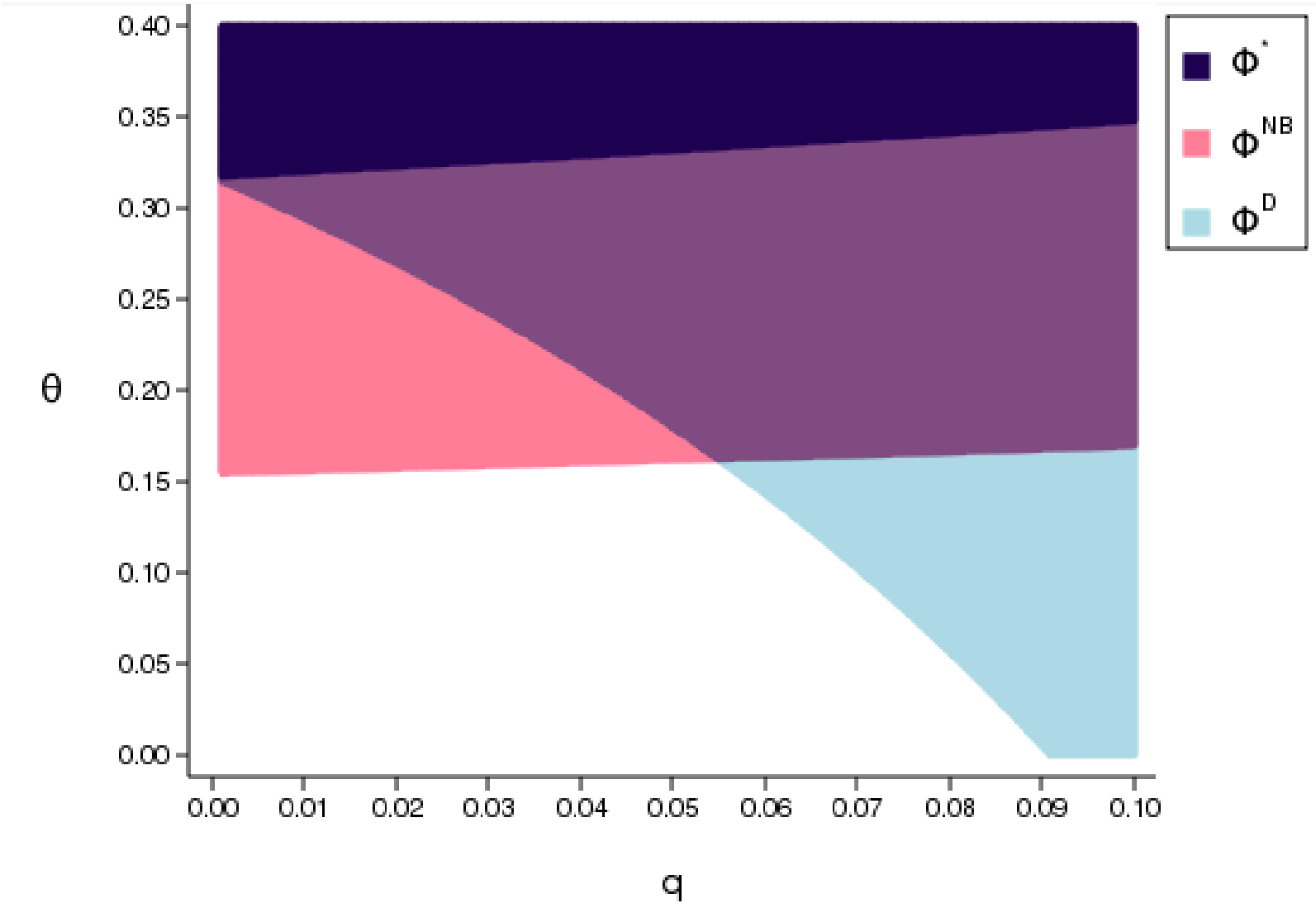
(1) A no-bailout policy leads intermediaries to be more liquid

$\Rightarrow$ tends to reduce fragility

(2) But ... bailouts provide insurance against the loss from staying invested in a crisis
  - removing this insurance increases the incentive to withdraw early

$\Rightarrow$ tends to increase fragility

Graphically



Welfare

- Consider an economy in both Φ^D and Φ^{NB}
  - a no-bailout policy can either raise or lower welfare

- Proposition: If q is small, $e \in \Phi^D$ implies both $e \in \Phi^{NB}$ and $EU^D > EU^{NB}$
  - no-bailout policy lowers welfare, does not help with fragility

Takeaway: In many cases, a no-bailout policy is undesirable

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(4) 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
- Proposition: There exists a tax rate that implements the equilibrium allocation with a planner-run financial system
  - efficient tax rate exactly offsets the incentive problem
- Policy *decreases* fragility relative to either Φ^D or Φ^{NB}
  - effective macroprudential policy

Concluding remarks

- I have presented an environment where:
  - bailouts are part of a socially-desirable insurance arrangement
  - the anticipation of bailouts distorts incentives, increases fragility
  - investors are more prone to run when potential losses are larger
- Note: all of these features arise naturally in a fairly standard model
- Implication: the best outcome requires combining bailouts and prudential policy
  - cannot be achieved by committing to a no-bailouts policy

... but suppose effective prudential policy is difficult/infeasible

Recall: "*A resolution regime that provides certainty against bailouts will reduce the riskiness of markets and thus help avoid a future crisis.*"

- The model highlights two important forces. Eliminating bailouts:
  - leads to an underprovision of financial services
  - makes investors more prone to run

  $\Rightarrow$ a no-bailouts policy may increase fragility, lower welfare

- Argues for a shift in policy focus
  - less emphasis on committing to be "tough" in times of crisis
  - more on developing (prudential) policy tools to correct distortions ... and determining the right mix/balance

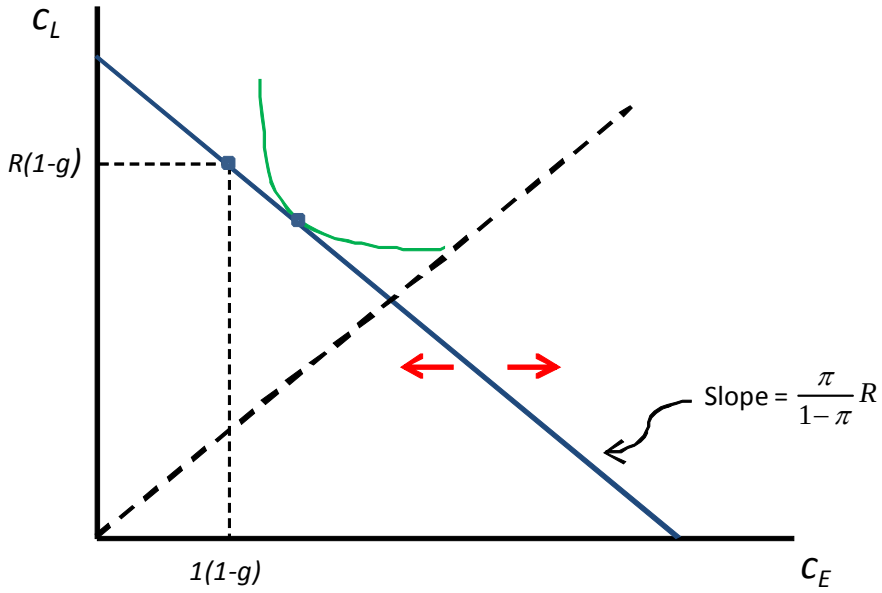
Caveats

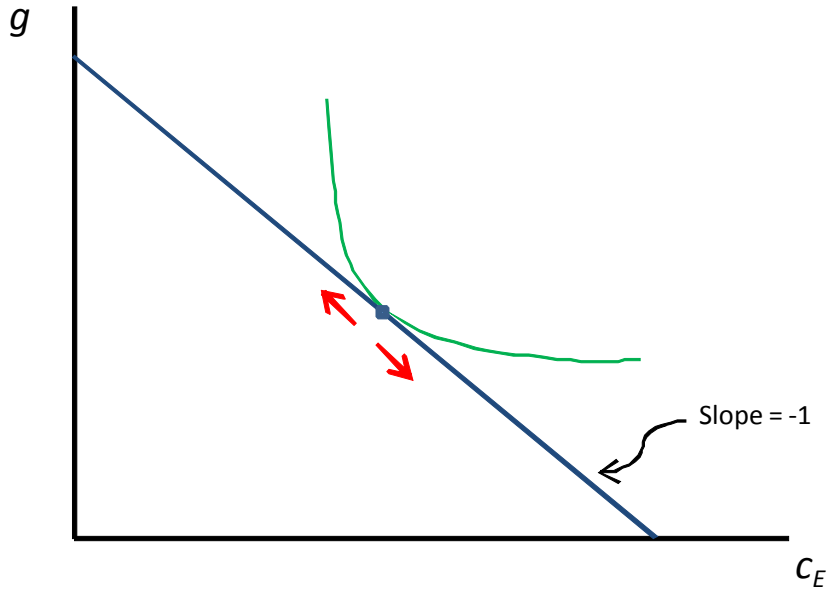
- Some important features of reality are missing, of course
  - distributional issues (and public finance issues more generally)
  - rent-seeking behavior, political motivations in bailouts
- Limits on policy makers' ability to reallocate may well be desirable
- But ... the main message remains
  - restrictions on bailouts do not necessarily promote efficiency or financial stability
  - *efficient* bailouts with prudential regulation promote both

Extra stuff

The first-best allocation

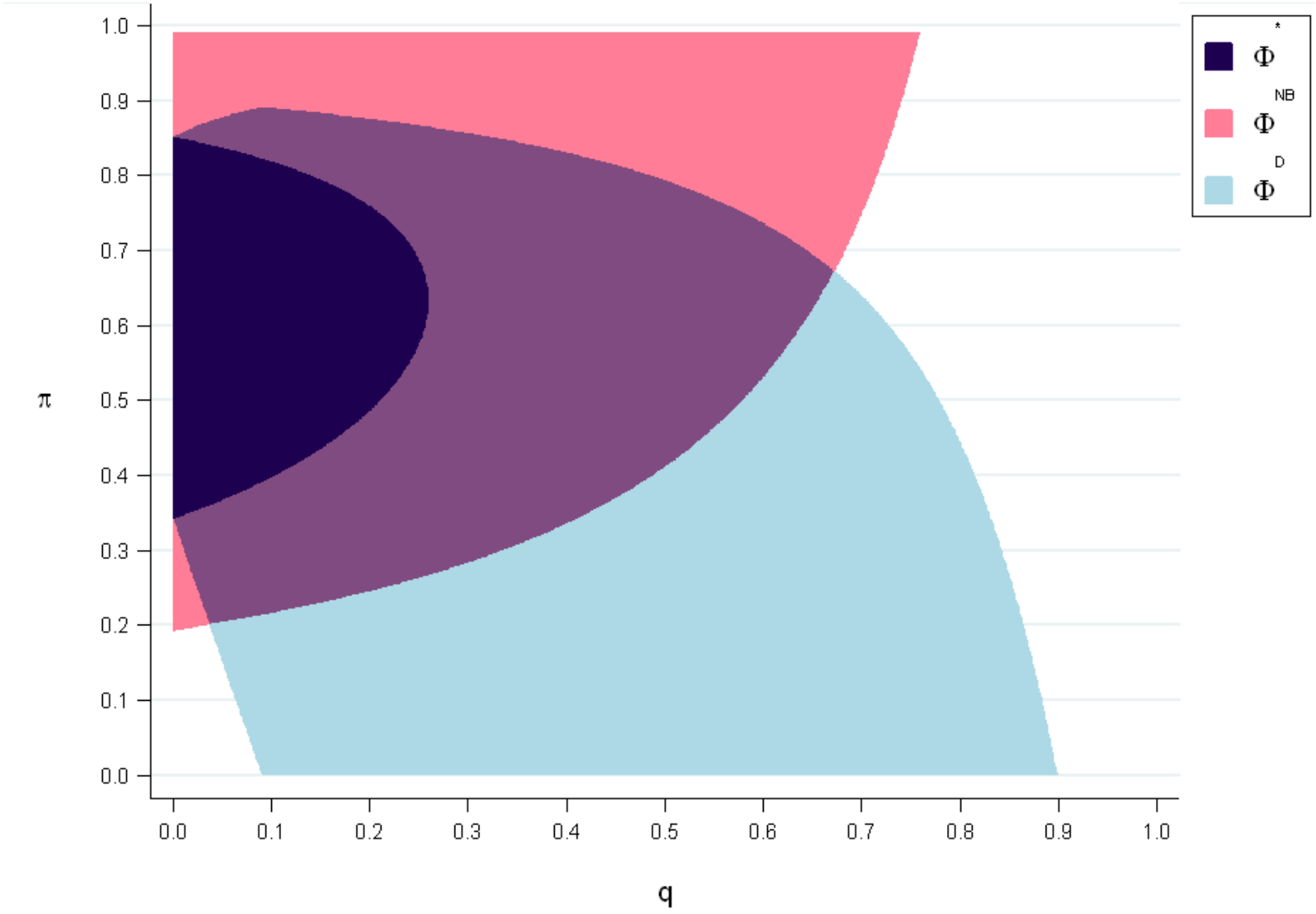
- A standard Diamond-Dybvig environment ...



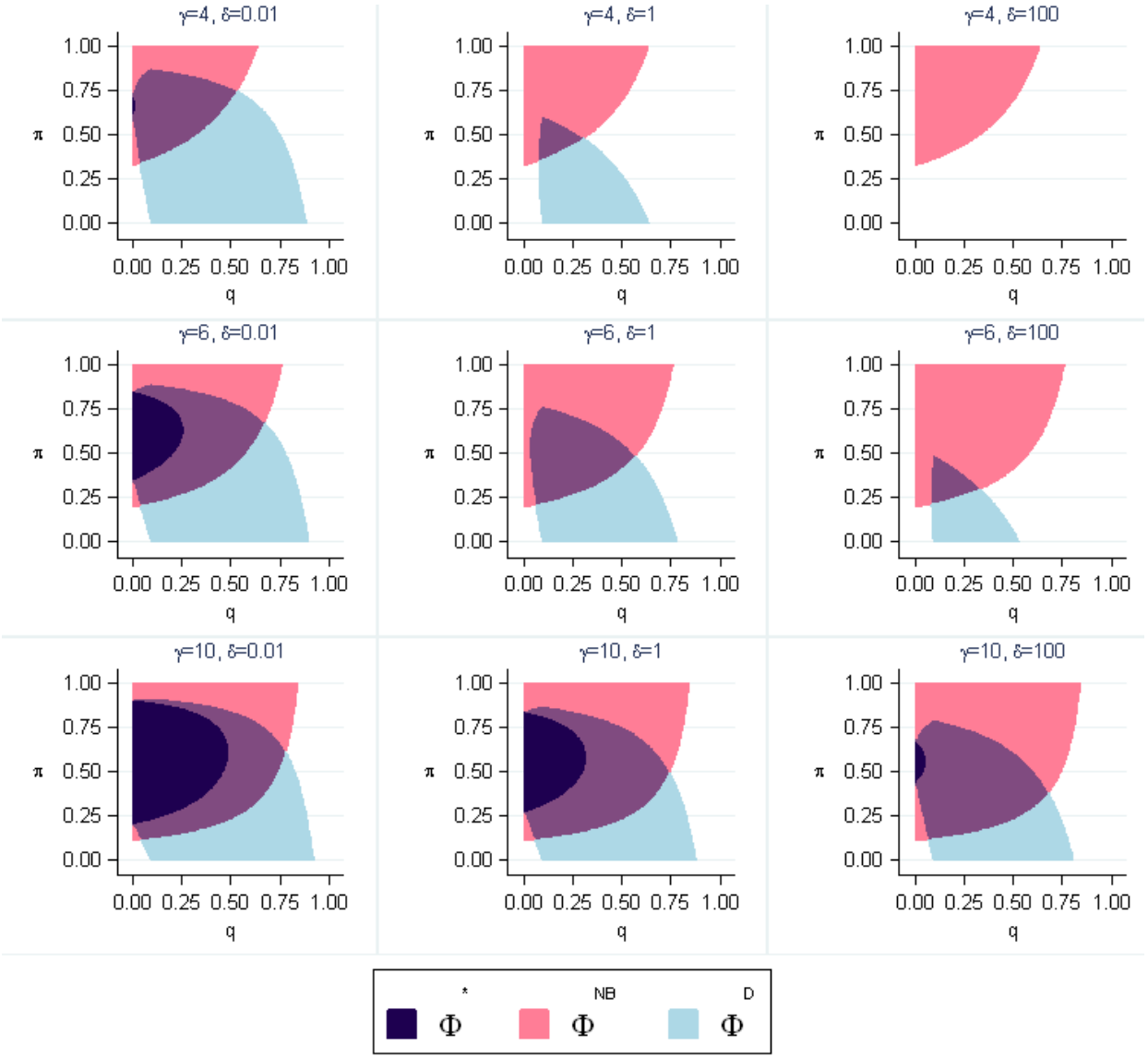


... combined with a simple public-finance problem

Another view of the fragile sets



Varying parameters



The role of the public sector

- A bailout policy in this model has two elements

  (i) transfer of funds from public to private sector

  (ii) distribution of funds across intermediaries (chosen ex post)

- Consider a model without (i), i.e. suppose $v(g) \equiv 0$ and $\tau = 0$
  - "bailout" $=$ intervention to equate $\left(c_{1b}^{j}, c_{2b}^{j}\right)$ across j
  - similar to Chari & Kehoe (2009), Farhi and Tirole (2012)

  $\Rightarrow$ result: a no-bailout commitment is desirable

- Key idea: a bailout here is part of an efficient insurance arrangement (as in Bianchi [2012])
  - but .. it introduces a distortion in ex ante incentives

Shocks and amplification

- Suppose π is random: $\pi_a < \pi_b$. Then a crisis has two components:

  (i) more impatient investors (real shock)

  (ii) patient investors try to withdraw early (amplification)

- Amplification was clearly important during the financial crisis

- Bernanke (2010; testimony to Financial Crisis Inquiry Commission)

  [P]rospective subprime losses were clearly not large enough on their own to account for the magnitude of the crisis. . . . Rather, the [financial] system's vulnerabilities . . . were the principal explanations of why the crisis was so severe and had such devastating effects on the broader economy.

  – focus here is on one aspect of these vulnerabilities