Let the Worst One Fail:

A Credible Solution to the Too-Big-To-Fail Conundrum

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Post-GFC Regulations

- Capital requirements ✓
- Supervision ✓
- **Resolution?**

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- **Resolution?**
  - fundamental tension remains: impossible to resolve all banks during a systemic crisis.
  - therefore, the expectation of bailouts will remain and will continue to distort funding costs and to feed moral hazard.

Resolution

- Capital requirements ✓
- Supervision ✓
- **Resolution?**
  - fundamental tension remains: impossible to resolve all banks during a systemic crisis. **Yes.**
  - ~~therefore, the expectation of bailouts will remain and will continue to distort funding costs and to feed moral hazard.~~ **No.**

Our Paper

- Implement first best allocation with credible (= time consistent) policies
- Model
  - Bailouts are efficient in large crises and government always implements ex-post efficient bailout
  - Banks fully anticipate bailout and adjust their risk taking
  - Yet we implement first best
  - How? **Tournaments**
- Our model also provides clear definitions of systemic crises, size, interconnection, substitutability, etc. and how these affect our results

Baseline Model

Ex-Post Capital Shortfalls

- $t = 0, 1$
- "Banks" $i = 1 \ldots N$. One bank ex-post balance sheet

Assets a_i	Liabilities
$r_i a_i$	TLAC : e_i
	Deposits : d_i

- Bank capital shortfall

$$e_i < \underline{e} a_i$$

Microfoundations: runs & fire sales, constraints on new lending

Preferences, Technology, Welfare

- Bank i chooses **safety** x_i to maximize $\mathbb{E}[\max\{0, e_i + m_i\}]$
- Returns, f decreasing concave

$$r_i = \begin{cases} f(x_i) + \xi_i & \text{with probability } p_0 \\ r_{i,s} \sim G(. \mid x_i, s) & \text{with probability } p_s \end{cases}$$

- Welfare

$$W_0 = \mathbb{E}\left[\sum_i e_{i,s} + V\left(\{e_{i,s} + m_{i,s}\}_{i=1..N}\right) - \Gamma(M; \gamma)\right]$$

- First Best $(\mathbf{x}^*, \mathbf{m}^*) = \arg\max_{\mathbf{x},\mathbf{m}} W_0$

Pure Systemic Risk Model

- Value function of Acharya et al. (2016)

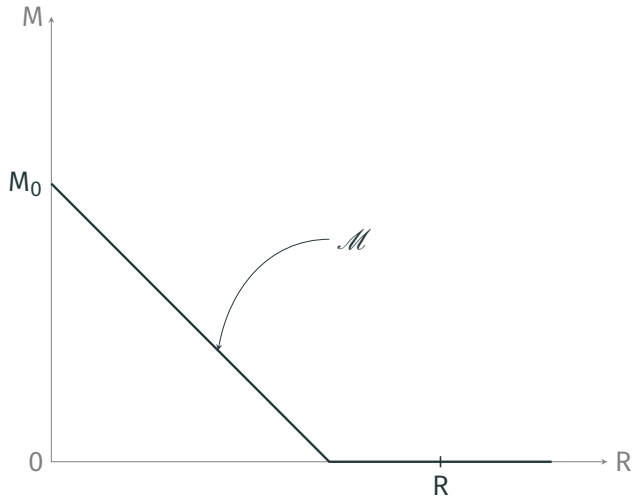
$$V(\{e_i + m_i\}_i) = V\big(\underbrace{E + M - \underline{e}A}_{=R+M-\underline{R}}\big)$$

- Ex-post optimal aggregate bailout

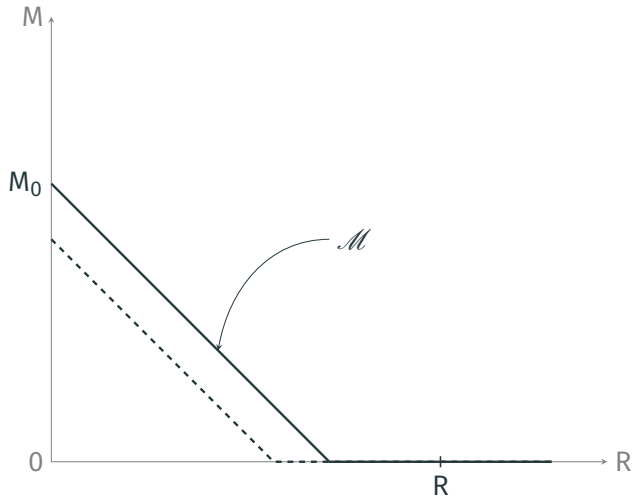
$$\mathscr{M}(\underline{R} - R; \gamma) = \arg\max_M V(R + M - \underline{R}) - \Gamma(M; \gamma)$$

- **Proposition**. $\mathscr{M}$ is such that
  - No bailouts during moderate crises
  - Safety floor $R + \mathscr{M} = M_0$ when Γ' constant
  - US vs. Greece: $\mathscr{M}(\underline{R} - R; \gamma)$ decreasing in cost γ

Optimal Aggregate Bailout



Optimal Aggregate Bailout



Moral Hazard Without Commitment

- Time consistency

$$\sum_i m_i = \mathscr{M}\left(\underline{R} - R; \gamma\right)$$

- **Proposition.** In all equilibria with symmetric bailouts

  (i) Strategic complementarities: $\beta\left(\mathbf{x}_{-i}\right)$ is increasing.

  (ii) More systemic risk than w/o government $(\hat{x}_i < x_i^*)$

  (iii) Moral hazard worsens when γ decreases.

Tournaments

Tournaments

- Implementation with two banks

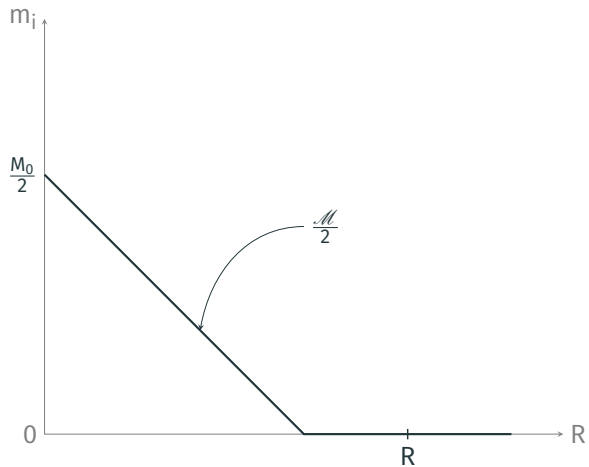
$$m_i = \begin{cases} \frac{\mathscr{M}(\underline{R}-R)}{2} + \Delta & r_{i,s} > r_{j,s} \\ \frac{\mathscr{M}(\underline{R}-R)}{2} - \Delta & r_{i,s} < r_{j,s} \end{cases}$$

  Credible by construction. Previous slide: $\Delta = 0$.

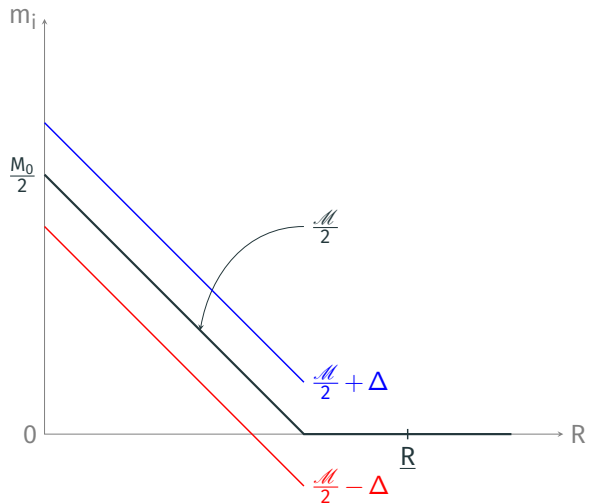
- **Proposition**. With $N = 2$, there exists a unique wedge Δ^* that implements the social optimum $(x^*, x^*, \mathscr{M}(\underline{R} - R))$

  - Same with any $N > 2$. Can use finer ranking, or above vs. below median.
  - Heterogeneous bank size OK as long as not too asymmetric.

Tournament



Tournament


m_i
$\frac{M_0}{2}$
$\frac{\mathscr{M}}{2}$
$\frac{\mathscr{M}}{2} + \Delta$
0
R
R
$\frac{\mathscr{M}}{2} - \Delta$

Example

- Only 1 crisis state $s \neq 0$ with $q = \frac{1-p_0}{p_0}$. Idiosyncratic risk $\varepsilon \sim U[0, \bar{\varepsilon}]$
- $N = 2$ banks. Linear Γ, quadratic $V\{e\}$ and $f(x) = \bar{r} - fx^2/2$
- **Proposition.**

$$\begin{aligned}
\text{First Best:} \quad & x^* = \frac{q}{f}(1+\gamma) \\
\text{No Bailouts:} \quad & \tilde{x} = \frac{q}{f} \\
\text{Sym. Bailouts:} \quad & \hat{x} = \frac{1}{2}\frac{q}{f} \\
\text{Optimal tournament:} \quad & \Delta^* = \frac{\bar{\varepsilon}}{2}\left(\gamma + \frac{1}{2}\right)
\end{aligned}$$

  - Note: aggregate risk q does not appear in Δ^*

Limited Punishments

Limited Liability

- Limited punishment $m_i \geq 0$
- **Proposition.** Maximal implementable safety decreasing in the cost of public funds γ.
  - Opposite of common wisdom: Complementarity between fiscal capacity & incentives.
  - Rationale for clawback clauses in compensation, ex-ante taxes

Differentiated Banks

Differentiated Banks

- Value function $V\{e_i\}_i$ is a CES aggregator with elasticity $\eta < \infty$
- Define ε-commitment as: planner can only commit to ε-optimal ex-post policies
  - **Proposition: simple tournaments can implement policies with** $x \leq C\eta\varepsilon$
  - Rationale for redundancy and regulation of low-η activities as utilities

Discussion

- Was it right to let Lehman Brothers fail?
  - with symmetric bailouts: panic spreading to other banks
  - with tournaments: other banks go up!
- Stigma of accepting government support
  - strong banks did not want bailout money
  - with tournaments: sign of strength
- Pitfalls of high-powered incentives
  - symmetric bailouts: no or weak incentives
  - with tournaments: need to avoid overshooting

Conclusion

- Tournament-like mechanisms can provide incentives even under time consistency constraints
- Extensions in paper
  - Heterogeneous size relatively easy to solve (handicapped tournaments)
  - Limited liability justifies clawbacks and taxes
  - Limited substitution harder to solve: mergers, renegotiation-proof contracts
  - Financial interconnection requires earmarking
- Reverses the common wisdom on financial flexibility: good for incentives (if used with tournaments)