Bailouts and Financial Fragility
Todd Keister (Restud 2015)

Sylverie Herbert

April 18, 2016
During a crisis, a fiscal transfer that covers banks’ losses distorts *ex ante* incentives (moral hazard)

But prohibiting bail out can make the economy more susceptible to runs

**Research question:** Is restricting policy makers’ ability to bail out banks an effective way of promoting financial stability? What is an optimal regulatory policy?

Model of financial intermediation based on Diamond and Dybvig (1983) with limited commitment and a public good
Results: no-bailout may increase liquidity but can be welfare deteriorating, or increase financial fragility

Tax on short-term liabilities but no bailout restrictions correct incentives and generates financial stability

Comparison with the literature

- Chari and Kehoe (2015): threat of costly bankruptcy encourage managers to exert efforts, bailout undermines the ex ante effort.
- Farhi and Tirole (2012): bailouts generate strategic complementarity in banks’ maturity transforming decisions, existence of multiple equilibria

Here: 1) insurance is between private and public sector, 2) bailouts create incentive to become more illiquid but also weakens the patient agents’ incentives to withdraw early
Environment: investors

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

\[ U(c_1, c_2, g, \omega_i) = u(c_1 + \omega_i c_2) + v(g) \]

$\omega_i$: binomial random, private information (realized in $t=1$)
- $\omega_i = 1$ patient, $\omega_i = 0$ impatient
- $\pi$: probability (fraction) of impatient
- Each agent endowed with one unit of private good at $t=0$
Environment: technologies

- 1 single constant return to scale technology
- returns 1 if withdrawal at $t=1$ or $R > 1$ if withdrawal at $t=2$
- Public good can be created using private goods as input at $t=1$
- Policy maker: taxes $\tau$ to produce public good (at $t=1$) or to bailout financial intermediaries (unable to commit)
Environment: intermediaries

- Perfect competition, they maximize the expected utility of investors
- No trade between investors in period 1 and 2
- Investors go to the central location (intermediaries)
- Can choose to withdraw at period 1: sequential-service (arrive at the central location given index i) or wait until $t=2$
- Intermediaries can’t commit to future actions
Model II

▶ Welfare measure:

\[ W = \int_0^1 E(U(c_1(i), c_2(i), g; \omega_i)) \, di \]

▶ Crisis: some patient investors withdraw early
▶ Possible states \( S = \{\alpha, \beta\} \) with probability \((1-q,q)\).
▶ Agents can condition their action on an "extrinsic sunspot" \( y_i(\omega_i, s) \)
▶ Observed with a lag by banks and policy maker
Model II

- **Timing**

- **Financial fragility**: if there exists an equilibrium profile such that $y_i(1, \beta) = 0$ for a positive measure of investors
Bailouts

- Partial run strategy profile

\[ y_i(\omega_i, \alpha) = \omega_i \forall i \]

\[ y_i(\omega_i, \beta) = \begin{cases} 0 & i \leq \theta \\ \omega_i & i > \theta \end{cases} \]

1. allocation of remaining resources of financial intermediaries

\[
\begin{align*}
\text{first } \theta & \quad \text{others} \\
\ c_1 & \rightarrow \quad c_{1a}, c_{2a} \\
\ c_1 & \rightarrow \quad c_{1b}, c_{2b}
\end{align*}
\]

maximizing

\[
V(\Psi_s) = (1 - \theta)(\hat{\pi}_s u(c_{1s})^j + (1 - \hat{\pi}_s) u(c_{2s}^j))
\]

subject to \( \Psi_s^j = (1 - \theta)(\hat{\pi}_s c_{1s}^j + (1 - \hat{\pi}_s) \frac{c_{2s}^j}{R}) \)
$c_{2b}$ is determined s.t: \[ u'(c_{1s}^j) = Ru'(c_{2s}^j) \]

2. Policy maker chooses bailout to maximize
\[
\int V(\Psi_b^j) d\sigma(j) + v(\tau - b)
\]

- So \[ u'(c_{1s}^j) = Ru'(c_{2s}^j) = v'(g_b) \]
- Marginal value of resources equalized across all intermediaries
- Intermediaries with fewer resources receive higher bailout
3. Determining $c_1$

$$\theta u(c_1^j) + (1 - q)V(1 - \tau - \theta c_1^j, \hat{\pi}_a) + qV(1 - \tau - \theta c_1 + b, \hat{\pi}_b)$$

- Incentive distortion: set $c_1$ to equate $u'(c_1^j) = (1 - q)\mu_a^j$.
- $c_1$ higher (more short term liabilities)

4. Choose the tax rate $\tau$
Fragile equilibrium

- In which $c_1 \geq c_2 b$

- For low $q$ the delay parameter $\theta$ must be quite large to have fragile system
- $\theta$ decreases with $q$ (higher incentives to give higher return to first fraction $\theta$ of investors)
Restriction on bailouts

- (1) is unchanged, (2) is trivial: $b^j = 0$
- Incentives corrected: intermediaries choose $c^j_1$

$$\theta u(c^j_1) + (1 - q)V(1 - \tau - \theta c^j_1, \hat{\pi}_a) + qV(1 - \tau - \theta c^j_1, \hat{\pi}_b)$$

- Result: more liquid intermediaries
- $u'(c^j_1) = (1 - q)\mu_a + q\mu_b$
Competing effects on financial fragility

- Define degree of illiquidity $\rho = \frac{\theta c_1}{1-\tau}$: $\rho_N < \rho^B$
- but may be more fragile: increase in loss of "late" investors who withdraw (no public funds to mitigate losses)
- Main intuition: it raises incentives to withdraw early
› Comparing the two sets

- $q$ small: threshold for fragility lower under no bailout ($\theta$)
- as probability of crisis increases, intermediaries under no bailout are more cautious: higher threshold for fragility
- There is a $q < \bar{q}$ and $e \in \Phi^B$ implies $e \in \Phi^{NB}$ and $W^{NB} < W^N$
Welfare

- Easy to compare when financial system is fragile under one system and not the other
- Choose a regime both in $\Phi^{NB}$ and $\Phi^{N}$
Pigouvian tax on short-term liabilities to correct *ex ante* distorted incentives created by bailouts
- Intermediary pays $\eta c_1$ for each of first $\theta$ withdrawals
- No restrictions on bailout policies

(1) and (2) are unchanged
- Government chooses $\eta$ to max investors utility
- No commitment

Intermediaries choose $c_1$ to maximize

$$\theta u(c_1^j) + (1-q)V(1-\tau-\theta(1+\eta)c_1^j + T, \hat{\pi}_a) + qV(1-\tau-\theta\overline{c}_1 + b, \hat{\pi}_b)$$
Results

- $\rho^N < \rho^* < \rho^{NB}$ and $\Phi^*$ is contained in $\Phi^{NB}$ and $\Phi^B$
- Pigouvian tax decreases $c_1$ (withdrawing early is less attractive)
- Allowing bailout increases $c_{2b}$
as $q$ increases, bailouts and Pigouvian tax generates higher threshold for fragility than NB regime

$W^* > W^{NB}$ and $W^* > W^B$
conclusion

- 3 keys ingredient for financial fragility:
  - no commitment from intermediaries
  - no commitment from policy maker
  - Aggregate uncertainty (sunspot variable)
- Bailouts are part of a **socially desirable insurance** arrangement
- Bailouts distort incentives, but combined with prudential policies, it is strictly better than
  1. No bailout
  2. Bailout alone