Transparency and Bank Runs

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Introduction

Calls for enhancing transparency in the financial sector

- Basel III, SEC on MMFs, disclosure of stress tests

Advantage:

- Better market discipline

Disadvantages:

- Decrease in ability to coordinate: Morris and Shin (2002)
- Decrease in incentives to share risk: Hirshleifer (1971)

This paper:

- increase in incentives to coordinate $\Rightarrow \uparrow$ in fragility
- decrease in ability to share risk $\Rightarrow \downarrow$ in welfare
Outline

- Model
- Equilibrium
  - Withdrawal game: incentives to coordinate
  - Bank’s choices: ability to share risk
- Fragility and Welfare
The Model

- $t = 0, 1, 2$
- Continuum of ex-ante identical consumers
  - Preferences
    
    \[ U(c_1, c_2) = \begin{cases} 
    u(c_1) & \text{w.p. } \lambda \\
    c_2 & \text{w.p. } (1 - \lambda) 
    \end{cases} \]
    
    \( u(0) = 0, \ u' > 0 \ \text{and} \ u'' < 0. \)
  - Endowment: \( e = (1, 0, 0) \)
- Competitive bank: maximizes expected utility of consumers.
- 2 assets: safe short-term and risky long-term
Assets

<table>
<thead>
<tr>
<th></th>
<th>t=0</th>
<th>t=1</th>
<th>t=2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe</td>
<td>-1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Risky</td>
<td>-1</td>
<td>(\frac{1}{2}) (r\theta_L) (\theta_H)</td>
<td>(\theta_H)</td>
</tr>
</tbody>
</table>

- \(r\theta_L < 1 < \theta_L < \theta_H\)
- \(\frac{1}{2} (r\theta_L + \theta_H) < 1 < \mathbb{E}(\theta)\)
Deposit Contract

<table>
<thead>
<tr>
<th>t=0</th>
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<th>t=2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>$\min{c, \frac{W_1(\theta)}{\mu(\theta)}}$</td>
<td>$\frac{W_2(\theta)}{1-\mu(\theta)}$</td>
</tr>
</tbody>
</table>

- $\mu(\theta)$: fraction of early withdrawers
- $W_t(\theta)$: bank’s wealth in period $t$. 
Information Structure

- Consumer’s type is private information of the consumer.
- State $\theta$ is not observed by consumers.
- Private signal $\tilde{\theta}_i$ of $\theta$ where
  \[
  \Pr(\tilde{\theta}_i = \theta_j | \theta = \theta_j) = p \text{ for all } i \text{ for } j = L, H
  \]
  \[
  \implies \Pr(\theta = \theta_j | \tilde{\theta}_i = \theta_j) = p
  \]

$p$ is the level of transparency of the economy
Timing

t=0       t=1       t=2

- Deposit contract  - Cons. type realized  - Late withdrawals
- Portfolio choice  - $\theta$ is realized
                - Signals on $\theta$
                - Early withdrawals
Depositor’s withdrawal decision

- Strategies: \( \boldsymbol{\alpha} = (\alpha_L, \alpha_H) \)

- The benefit from withdrawing early is
  \[
  h(\theta_j, \boldsymbol{\alpha}) = c_1(\theta_j, \boldsymbol{\alpha}) - c_2(\theta_j, \boldsymbol{\alpha})
  \]

- A late consumer with signal \( \theta_j \) withdraws early if and only if
  \[
  \mathbb{E}_p(h(\theta_j, \boldsymbol{\alpha})) = ph(\theta_i, \boldsymbol{\alpha}) + (1 - p) h(\theta_j, \boldsymbol{\alpha}) > 0
  \]
Benefit of withdrawing early

Liquidation costs $\rightarrow$ strategic complementarities in withdrawals
Multiple Equilibria

**Proposition** There exist pairs \((c, L)\) such that there are multiple equilibria in the withdrawal game at \(t = 1\)

Equilibria set: \(A(c, L)\)

**Sunspot equilibria:** Probability distribution, \(f_{(c,L)}\), over \(A(c, L)\)
Bank’s Problem

\[
\max_{c,L \in [0,1]} \int_{A(c,L)} \pi(c,L)(\alpha)(EU(c,L,\alpha)) \, d\alpha
\]

- \(\pi(c,L)\) are the bank’s beliefs
- in equilibrium \(\pi(c,L) = f(c,L)\)
- Optimal deposit contract \(\lambda c^* = 1 - L^*\)
Definition An allocation \((c_1, c_2(\cdot))\) is incentive compatible if
\[
c_1 \leq \mathbb{E}(c_2(\theta)|\theta_i) \quad \text{for } i = L, H
\]
where \(\mathbb{E}(c_2(\theta)|\theta_i) = pc_2(\theta_i) + (1 - p)c_2(\theta_{-i})\).
Incentive Compatible Feasible Set

\[
\mathbb{E}(c_2) = \frac{\mathbb{E}_{p=0.5}(\theta)L+1-L}{1-\lambda} \\
= \frac{\mathbb{E}_{p=0.75}(\theta|\theta_L)L+1-L}{1-\lambda} \\
= \frac{\theta_L L+1-L}{1-\lambda}
\]
Proposition The constrained efficient allocation is incentive compatible if and only if

\[ p \leq \hat{p} \]

- \((c^e, L^*)\) attains the constrained efficient allocation if there are no runs.
Proposition

There exists \( p^* \in [0.5, \hat{p}] \) such that if

\[ p < p^* \]

the bank chooses the \((c^e, L^*)\) and the economy is not fragile, i.e., there are no runs in the unique equilibrium.

Moreover, \( p^* \) is decreasing in \( r \).
Transparency and Welfare

Figure: Upper bound on expected utility
Conclusion

- Transparency can be costly
  - increases fragility
  - decreases welfare

- This cost is particular to settings in which strategic complementarities are a concern
  - Not only banks! Money market funds and mutual funds, too.

- The strongest the liquidation costs involved in meeting redemptions of short term liabilities, the more relevant this channel becomes.