Reporting Choices in the Shadow of Bank Runs

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Outline

1. Motivation and overview
2. The Model
3. The benchmark
4. The equilibrium
5. The efficiency implications
Financial Institutions (FI) use accounting discretion strategically

- Substantial reporting discretion is built into accounting rules and regulations.
- FI use the discretion to inflate earnings and capital ratios.

Examples of empirical evidence include:

- Restructuring of transactions: Acharya et al. (2013)
- Impairment: Vyas (2011) and Huizinga and Laeven (2012)
- Reclassification of level 2 and 3 assets: Kolev (2009), Song, Thomas, and Yi (2010), and Huizinga and Laeven (2012)
- Securitization: Dechow, Myers, and Shakespeare (2010), Dou, Liu, Richardson, Vyas (2014)
- Deferred tax assets: Skinner (2008)
- Surveys: Laux and Leuz (2010), Beatty and Liao (2013) and Bushman (2014)
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- Substantial reporting discretion is built into accounting rules and regulations.
- FI use the discretion to inflate earnings and capital ratios.
- Examples of empirical evidence
  - restructuring of transactions (Acharya et al. 2013)
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What are the economic consequences of FI’ reporting discretion?

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- What do we take away from this large body of empirical evidence?
- The answer is an important component of various issues
  - mark-to-market v.s. historical cost accounting
  - incurred loss v.s. expected loss models
  - the simple method v.s. the advanced internal-rating based (IRB) approach to risk weights
Two streams of related literatures

- FI’s transparency literature: transparency v.s. discretion
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- FI’s transparency literature: transparency v.s. discretion
- Reporting discretion literature: non-FI v.s. FI
Two streams of related literatures

- FI’s transparency literature: transparency v.s. discretion
- Reporting discretion literature: non-FI v.s. FI
- This paper: reporting discretion of FI
What is special about FI

- The significant mismatch of assets and liabilities leads to runs:
  - anecdotal and empirical evidence (Shin (2009), Bear Stearns, etc.)
  - theoretical micro-foundation (Diamond and Dybvig (1983), Goldstein and Pauzer (2005))
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- Runs can be fundamental-based or panic-based.
- Panic runs are caused by coordination failure.
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- How does reporting discretion affect the incidence and efficiency of bank runs?
The economic consequences of FI’s reporting discretion

- Reduces panic runs.
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The model - as in MS

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- Bank’s liability: allows withdrawal at date 1.

\[ I_{\text{Short-term return}} = e^{0} I_{\text{Long-term return}} = e^{r} \delta l \]
\[ I_{l} \text{is the total withdrawal at date 1 and } r \text{ is the fundamental.} \]

Agent’s differential of staying versus running:
\[ \Delta(r, l) = \ln e^{r} \delta l \ln 1 = r \delta l \]

Strategic complementarity: better to run when more are running.

Banks are stand-in for financial institutions.

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- Strategic complementarity: better to run when more are running.
- Banks are stand-in for financial institutions.
Add reporting discretion - departure from MS

- At date 1, the bank manager observes $r$ and adds a bias $m(r)$. 
- Each agent receives the report 

$$ x = r + m(r) $$

- Bias $m$ costs $kc(m)$. $k$ represents reporting discretion. 
- MS is the special case with $k = \infty$. 

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MS is the special case with $k = \infty$.

The manager’s payoff is

$$w = r - l - kc(m)$$
The timeline

- **Date 0**: the bank invests in a long-term project.
- **Date 1**: two decisions
  - the manager privately learns $r$ and chooses a bias $m(r)$;
  - each agent observes $r + m(r)$ and decides whether to withdraw.
- **Date 2**: remaining investment, if any, pays out.
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Benchmark: the first-best run

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- She chooses \( l \) to maximize \( \ln(l + (1 - l)e^{r - \delta l}) \).
Benchmark: the first-best run

- A single agent knows $r$ and decides withdrawal at date 1.
- She chooses $l$ to maximize $\ln(l + (1 - l)e^{r-\delta l})$.
- $l^{FB} = 0$ if $r \geq 0$ and $l^{FB} = 1$ if $r < 0$
- Runs are fundamental-based and discipline insolvent banks.
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Multiple equilibria with common knowledge about the report - absent discretion

- the payoff differential: $\Delta(r, l) = r - \delta l$
Multiple equilibria with common knowledge about the report - absent discretion

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Multiple equilibria with common knowledge about the report - with discretion

- the payoff differential: \( \Delta(r, l) = r - \delta l \)
- the upper dominance region: \( x \geq \delta + c^{-1} \left( \frac{1}{k} \right) \)

Multiplicity is not conducive for comparative statics. Both fundamental-based run and panic-based run exist.

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Global game refinement: break common knowledge

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- the payoff differential: $\Delta(r, l) = r - \delta l$
- Introduce noises into each individual agent’s signals:

$$x_i = r + \varepsilon_i$$
Global game refinement: break common knowledge

- the payoff differential: $\Delta(r, l) = r - \delta l$
- Introduce noises into each individual agent’s signals:
  \[ x_i = r + \varepsilon_i \]

- In MS, $x_i = r + \varepsilon_i$. The unique equilibrium is characterized by threshold $x_{MS} = \frac{\delta}{2}$.
Applying the refinement to our model

- Complex interaction between agent’s withdrawal strategies and manager’s reporting strategy.
Applying the refinement to our model

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- Outline of the determination of equilibrium:
Applying the refinement to our model

- Complex interaction between agent’s withdrawal strategies and manager’s reporting strategy.
- Outline of the determination of equilibrium:
  - The equilibrium report is monotone in $r$, regardless of agents’ strategies. (Lemma 3)
  - Agents use a common threshold strategy in equilibrium. (Lemma 4)
  - Characterize the best responses of the manager and the agents
  - There is a unique threshold equilibrium. (Proposition 1)
The manager’s reporting strategy

- The report is monotone in $r$. A bad bank never finds it optimal to out-report a good bank.
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- Intuition: good banks incur lower costs for the same (inflated) report.
The manager’s reporting strategy

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- Intuition: good banks incur lower costs for the same (inflated) report.
- Implication: misreporting does not change the ordering of signals. A higher report indicates better fundamentals.
An agent’s withdrawal strategy

- All agents use a common threshold strategy in equilibrium.
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- Intuition for a threshold strategy:
An agent’s withdrawal strategy

- All agents use a common threshold strategy in equilibrium.
- Intuition for a threshold strategy:
  - an agent’s utility differential of staying:

\[
\Delta(x_i, l) = E[r|x_i, \hat{m}] - \delta E[l|x_i, \hat{m}]
\]

- agents interpret a high report as good news, i.e., \(E[r|x_i, \hat{m}]\) increasing in \(x_i\) for any \(\hat{m}\).
- agents also expect others to interpret a high report as good news, i.e., \(E[l|x_i, \hat{m}]\) decreasing in \(x_i\) for any \(\hat{m}\).
- any equilibrium strategy has to be a threshold strategy.
An agent’s withdrawal strategy

- All agents use a common threshold strategy in equilibrium.

Intuition for a threshold strategy:

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<table>
<thead>
<tr>
<th>Run</th>
<th>Uncertain</th>
<th>Run</th>
<th>No Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(X_A)</td>
<td>(X_B)</td>
<td>(X_i)</td>
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Determination of the unique equilibrium

Given the common threshold $\hat{x}$, the manager chooses a unique manipulation strategy $m^*(r; \hat{x})$. (Lemma 5)
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- Rational expectation requires \( \hat{x} = x^* \). Proposition 1 shows a unique pair of \( x^* \) and \( m^*(r; x^*) \).
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- Rational expectation requires $\hat{x} = x^*$. Proposition 1 shows a unique pair of $x^*$ and $m^*(r; x^*)$.
- We focus on the case when $\sigma \to 0$, i.e., the limiting case.
Equilibrium in the limiting case

- the manager’s optimal strategy:
  - $m^*(r) = 0$ if $r \notin [r_1, r_2]$
  - $m^* = r_2 - r$ if $r \in [r_1, r_2]$. 

Proposition 2: 
$x = r_2 = x_{MS} + \frac{1}{2} c_1 (1 + k)$

$r_1 = x_{MS} - \frac{1}{2} c_1 (1 + k)$
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- the agents’ optimal strategy:
  - Stay if and only if $x \geq x^*$. 

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The manager’s equilibrium strategy

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The equilibrium

Run
No manipulation

Manipulate to $r_2$

No run
No manipulation

$\mathbf{r}_1$

$x^{MS}$

$x^* = r_2$

Intuition:

I strongest banks do not need to misreport: $r_2 = x$ and $m = 0$ for $r < r_1$.

I weakest banks cannot afford misreporting: $k_c(r_2 - r_1) = 1$ and $m = 0$ for $r < r_1$.

I the middle banks are pooled to survive: $r_2 + r_1 = \delta$ and $x = r_2$ for $r_2 \in [r_1, r_2]$. 

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The equilibrium

\[ r_1 \]

<table>
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<th>Run</th>
<th>Manipulate to ( r_2 )</th>
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\[ x^{MS} \]

\[ x^* = r_2 \]

Intuition:

- Strongest banks do not need to misreport: \( r_2 = x \) and \( m = 0 \) for \( r > r_1 \).
- Weakest banks cannot afford misreporting: \( k_c (r_2 - r_1) = 1 \) and \( m = 0 \) for \( r < r_1 \).
- Middle banks are pooled to survive: \( r_2 + r_1 = \delta \) and \( m = r_2 \) for \( r_2 \in [r_1, r_2] \).
The equilibrium

Intuition:

- strongest banks do not need to misreport: $r_2 = x^*$ and $m^* = 0$ for $r \geq r_2$. 
The equilibrium

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<td>$r_1$</td>
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$X^{MS}$

$x^* = r_2$

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The equilibrium

Run
No manipulation

Run
Manipulate to $r_2$

No run
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Intuition:

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- weakest banks cannot afford misreporting: $kc(r_2 - r_1) = 1$ and $m^* = 0$ for $r < r_1$
The equilibrium

Run | No manipulation
--- | ---
| Run | Manipulate to $r_2$
| No run | No manipulation

| $r_1$ | $x^{MS}$ | $x^* = r_2$ |

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- weakest banks cannot afford misreporting: $kc(r_2 - r_1) = 1$ and $m^* = 0$ for $r < r_1$.
- the middle banks are pooled to survive: $\frac{r_2 + r_1}{2} = \frac{\delta}{2} = x^{MS}$ and $m^* = r_2 - r$ for $r \in [r_1, r_2]$. 
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The key driving force: misreporting affects runs

- Reporting discretion reduces the equilibrium incidence of runs (Proposition 3).
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  - the reporting equilibrium is partial pooling
The key driving force: misreporting affects runs

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  - the reporting equilibrium is partial pooling
  - agents’ threshold strategy generates the asymmetric consequences of beliefs.
  - agents’ beliefs of weaker banks are inflated, offsetting the pessimism resulting from coordination failure.
Result 1: reporting discretion reduces panic runs

- The run threshold is lower, i.e., \( r_1 < x^{MS} \).

![Diagram showing the relationship between reporting discretion, manipulation, panic run, weakened market discipline, solvency, liquidity, and fundamental values.]

- Large Discretion: \( k < 1/c(\delta) \)
- Small Discretion: \( k > 1/c(\delta) \)
- Morris-Shin (MS): \( k = \infty \)
- First-Best (FB): Solvency, Liquidity

\( \delta \): Liquidity
\( r_1 \): Run threshold
\( x^{FB} \): First-Best solvency level
\( x^{MS} \): Morris-Shin solvency level

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Result 2: excessive discretion weakens market disciplines

- The run threshold can be too low, i.e., $r_1 < x^{FB} = 0$ if $k < \frac{1}{c(\delta)}$. 

Diagram:
- Large Discretion ($k < \frac{1}{c(\delta)}$)
- Small Discretion ($k > \frac{1}{c(\delta)}$)
- Morris-Shin (MS) ($k = \infty$)
- First-Best (FB)
Result 3: discretion generates a distributional inefficiency

- Banks safe in MS engage in misreport, i.e., \( r_2 > r^{MS} \).
- Banks safe in the most run-prone equilibria engage in misreport, i.e., \( r_2 > \delta \) if \( k < \frac{1}{c(\delta)} \).

\[
\begin{align*}
\text{Large Discretion} & \quad (k<1/c(\delta)) \\
\text{Small Discretion} & \quad (k>1/c(\delta)) \\
\text{Morris-Shin (MS)} & \quad (k=\infty) \\
\text{First-Best (FB)} & \\
\end{align*}
\]

\[
\begin{align*}
& r_1 \quad x^{FB} \quad r_1 \quad x^{MS} \\
& \text{(large discretion)} \quad \text{(solvency)} \quad \text{(small discretion)} \quad \text{(small discretion)} \\
& \delta \quad r_2 \\
& \text{(liquidity)} \quad \text{(large discretion)} \\
\end{align*}
\]
The empirical and policy implications

1. Three main results can be tested
2. The optimal degree of discretion increases in the degree of coordination failure.
3. Stronger institutions oppose discretion while weaker ones prefer.
The conclusions

- Reporting discretion inflates agents’ beliefs about others’ beliefs and is powerful in reducing runs.
- Reporting discretion is a two-edged sword!

Diagram:

- Large Discretion ($k<1/c(\delta)$)
  - Weakened Market Discipline
- Small Discretion ($k>1/c(\delta)$)
  - Panic Run
- Morris-Shin (MS) ($k=\infty$)
  - Panic Run
- First-Best (FB)
  - (large discretion) $r_1$
  - (solvency) $x_{FB}$
  - (small discretion) $r_1$
  - (small discretion) $x_{MS}$
  - (liquidity) $r_2$
  - (large discretion) $r_2$
Thank you!