

Transparency in the Financial System: Rollover Risk and Crises

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More or less transparency in the system?

Banking crises often trigger demands for an increase in the transparency of the banking system

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The Squam Lake Report, 2010

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But increasing transparency seems to also involve risks.

“when the stress test assessment was getting started, some observers had warned that the assessment and, in particular, the public disclosure of the results might backfire.”

Chairman B. Bernanke, May 2010

Objective of this paper

- Study the trade-offs faced by regulators when setting the level of transparency in the banking system.
- Examine the ability of the regulator to implement this optimal policy in the presence of market frictions:
 - ▶ Asymmetric information,
 - ▶ Liquidity externalities.

Key aspects of the model

- Mismatch between maturities on the asset and liability sides of banks' balance-sheets \Rightarrow **Banks are subject to Rollover Risk.**
- Banks' returns have **an idiosyncratic component** that, if known to investors, affects their decisions to roll over their investment.
- Whether this idiosyncratic component is known to investors depends on the choice by a regulator of a **transparency policy.**

Setup of the Model: Banks

- Continuum of competitive banks indexed by $i \in [0, 1]$.
- Banks' technology returns $1 + r_i$ per unit of consumption good invested. Each active bank invests a mass 1 of good.
- Bank i 's return is $r_i = \mu + \eta_i$, where
 - ▶ η_i s are independent (idiosyncratic components of returns).
 - ▶ $\eta_i = \Delta > 0$ with prob. p ("high-quality bank"), and $\eta_i = -\Delta$ with prob. $1 - p$ ("low-quality bank"),
 - ▶ p is *a priori* random (aggregate uncertainty), uniform on $[0, 1]$.

Setup of the Model: Investors

- Continuum $[0, 1] \times [0, 1]$ of identical agents, each endowed with one unit of consumption good.
- At $t = 0$, agents decide to invest in a bank or store their good.
- At $t = 1$,
 - ▶ Shock to the expected return of the banking system: p is realized and observed by investors (in the baseline model).
 - ▶ η_i is realized, possibly observed by investors.
 - ▶ Investors who invested at $t = 0$ may roll over their investment, or withdraw and get their unit back.
- At $t = 2$, investors who rolled over get $1 + r_i - c l_i$, where l_i is the proportion of investors who withdrew at $t = 1$.

Setup of the Model: The Regulator

- The regulator sets the disclosure policy, *i.e.*, decides at $t = 1$ whether to disclose bank-specific information, $\{\eta_i\}_{i \in [0,1]}$, to investors.
- The regulator's objective is to maximize welfare, *i.e.*, total quantity of consumption good available in the economy at $t = 2$.

Rollover Equilibrium

- Strategic complementarities between depositors \Rightarrow coexistence of a “run” equilibrium and a “rollover” equilibrium.

\Rightarrow global game treatment delivers equilibrium uniqueness.

Proposition

Investors rollover their investment in bank i iff $\mu + \mathbb{E}_1(\eta_i) \geq \frac{c}{2} > 0$.

where $\mathbb{E}_1(\eta_i) = \eta_i$ under transparency and $\mathbb{E}_1(\eta_i) = p\Delta_\eta - (1-p)\Delta_\eta$ under opacity.

- To focus on the most interesting cases, we assume

$$0 < \mu - \Delta_\eta < \frac{c}{2} < \Delta_\eta + \mu.$$

Optimal Transparency

Transparency increases following a negative aggregate shock to the profitability of the banking system.

Proposition

The regulator follows a policy of transparency if and only if $p < p^*$ where

$$p^* \equiv \frac{1}{2\Delta_\eta} \left(\frac{c}{2} - \mu \right) + \frac{1}{2}$$

Remark: p^* is such that $\mu + E(\eta_i | p^*) = \frac{c}{2}$.

Optimal Transparency

Intuition:

- In bad times, transparency prevents runs on high-quality banks by separating them from low-quality banks,
- In good times, opacity prevents runs on low-quality bank by pooling them with high-quality banks.

Key feature of the model: probability of a run is non-linear function of expected returns.

(Anecdotal) Evidence

In the words of Governor Daniel Tarullo, FED Board (March 2010)

“This departure from the standard practice of keeping examination information confidential was based on the belief that greater transparency of the process and findings would help restore confidence in U.S. banks at a time of great uncertainty.”

but

“In more normal economic times, when market participants are not fearing the worst and when banks do not have access to government capital injections as a backstop, the revelation that some major banks may have capital needs under a stress scenario might be unnecessarily destabilizing.”

Asymmetric information

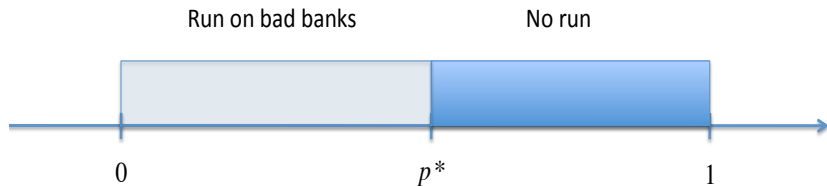
Modification:

- Regulator perfectly observes aggregate shock p .
- Investors observe $z = p + u$ where u uniform on $[-\frac{\delta}{2}, \frac{\delta}{2}]$.
- Assumption: $\delta < \min(p^*, 1 - p^*)$.

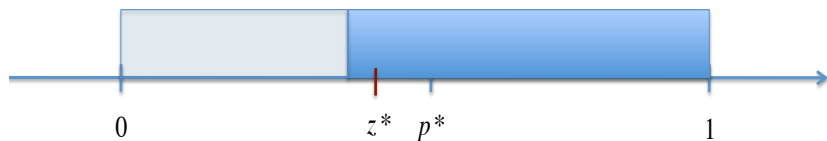
Proposition

It is ex-ante optimal to disclose η_i when p falls below $p^C < p^*$.

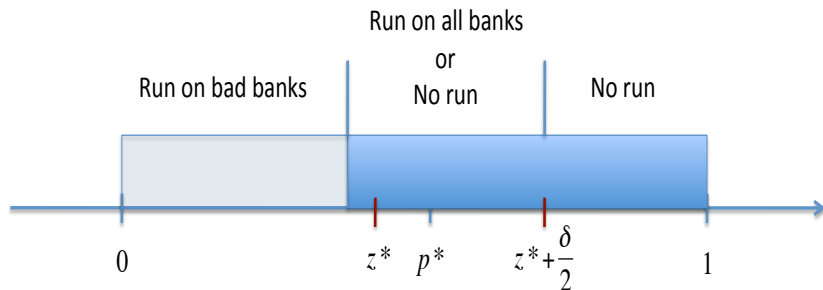
Ex-ante Optimal Transparency: run size vs run frequency



Ex-ante Optimal Transparency: run size vs run frequency



Ex-ante Optimal Transparency: run size vs run frequency



⇒ Optimal transparency provides insurance against bank-specific shocks *and* (moderate) aggregate shocks

Asymmetric Information: the commitment problem

- The ex-ante policy transparency signals aggregate information:
 - ▶ Optimal transparency policy is contingent on p .
 - ▶ If the regulator has private information on p , investors interpret transparency as a signal that the system is weak.
- ⇒ Ex-post (once he knows p), the regulator does not internalize the impact of switching to opacity on other realizations of p .

Equilibrium transparency without commitment

Transparency still increases following a negative aggregate shock to the profitability of the banking system

Proposition

The regulator follows a policy of transparency if and only if $p < p^{NC}$ where

$$p^{NC} < p^C$$

- Inability to commit \Rightarrow excessive opacity
- \Rightarrow Higher probability of systematic runs.

Equilibrium Transparency without commitment

Remarks:

- δ large increases the scope for signalling \Rightarrow the model can have two equilibria, one with opacity and one fully transparent.
- if the regulator can credibly disclose p without disclosing η_i , only aggregate information is released for intermediate p s (e.g. U.S. stress tests in 2009 and 2010).

Cross exposures

- Baseline model: liquidation in bank i does not affect banks $j \neq i$.
- In practice, there may be liquidity externalities: fire sales + capital constraints, cross-deposits, OTC derivatives, trading relationships...
- Modification of the baseline model: net return of an investor who rolls over becomes

$$\tilde{\mu} + \eta_i - c \left[(1 - \alpha_i)l_i + \alpha_i \int_{z \neq i} \frac{\alpha_z}{\int_{j \neq i} \alpha_j dj} l_z dz \right].$$

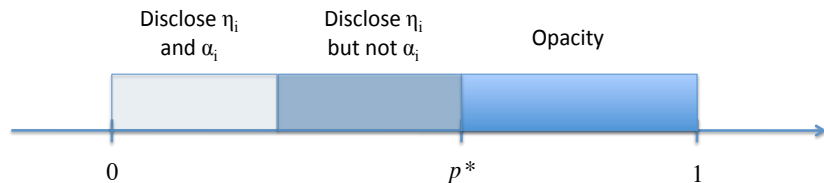
- mass q of banks with $\alpha_i = \alpha > 0$, mass $1 - q$ with $\alpha_i = 0$.
- The regulator can choose to disclose α_i on top of η_i . (N.B. p symmetric information.)

Cross exposures: Remarks

$$\tilde{\mu} + \eta_i - c \left[(1 - \alpha_i)l_i + \alpha_i \int_{z \neq i} \frac{\alpha_z}{\int_{j \neq i} \alpha_j dj} l_z dz \right]$$

- α_i parametrizes the strength of liquidity externalities between bank i and other banks in the system.
 - Strength of strategic complementarities is “constant” in α_j : shift from within banks to across banks.
- ⇒ Feedback effects can be stabilizing or destabilizing.

Cross exposures: Results



- Contamination effects: bad banks that fail drag down good banks with exposure to the system ($\alpha_j > 0$)
- ⇒ Disclosing cross-exposure for intermediate p s would contaminate the good banks with cross-exposures
- ⇒ After large shock, uncertainty about cross-exposures can create a systematic run.

Conclusion

- Key findings
 - ▶ Optimal transparency policy is contingent on the state of the financial system: transparency increases following negative aggregate shocks.
 - ▶ Asymmetric information about aggregate shocks + lack commitment power \Rightarrow tendency to keep the system opaque more often than is ex-ante optimal \Rightarrow increases instability of the system.
 - ▶ Disclosing cross-exposures can trigger contamination effects on a subset of high-quality banks, but uncertainty about cross-exposures can create systematic runs \Rightarrow disclosure of cross-exposures only after large negative shocks
- Future Research: interaction between transparency policy and provision of liquidity by central bank/government