

Collective Strategic Defaults: Bailouts and Repayment Incentives

Razvan Vlahu

University of Amsterdam

The European Banking Symposium

May 29-30, 2008

Discussant: Iulian Obreja (University of Colorado at Boulder)

Main Questions and Results

- The paper addresses two main questions:
 1. Can strategic default induce bank runs even when bank fundamentals are sound?
 2. Should lenders of last resort (central banks) intervene to prevent such a strategic behavior on the part of the debtors?
- Results:
 - Coordination problems among debtors can amplify the negative impact of the bad loans on banks' profitability. A solvent firm may choose to default strategically if it expects the lending bank to lose its enforcement ability through a bank run.
 - In the presence of a lender of last resort, bank runs are less likely. In particular, the incentives of a debtor firm to default strategically will be reduced.

Model setup

- The model has 3 periods: 0, 1, and 2.
- Commercial banks

At time $t = 0$:

- Bank accumulates uninsured deposits in the amount of q
- Bank invests these funds in risky loans with maturity of 1 period and a gross return of D
- Bank announces publicly the level of effort, e , it plans to exert in monitoring the risky loans. The cost associated with the monitoring effort is $c(e) = \frac{1}{2}e^2D$

At time $t = 1$

- Solvent risky loans returns $D > 1$, for every dollar of principal
- The proportion of bad loans, d , is drawn from a trimmed normal distribution with support in the interval $[0, 1]$, mean $\mu - e$ and variance $\frac{1}{\alpha}$. The realization of d is not public information.
- The bad loans have 0 liquidation value
- The nominal value of the deposits becomes $1 > Q > q$

Model setup (Con't)

- Firms:

- Cash flows at time $t = 1$: $C > D$ or 0
- If $C > 0$, the firm can take any of the following two actions:
 - Pay the debt
 - Misreport its cash flows to the bank and declare strategic default

- Central Banks:

At time $t = 1$:

- Commercial banks inform the central bank on the proportion of bad loans
- Central bank decides whether to bail out the bank at time $t = 2$

At time $t = 2$:

- Central bank collects $X < D$ from all mimicking firms, if the bank defaults

Methodology

- If the prior distribution of d is common knowledge, the model admits pooled equilibria.
- If the prior distribution of d is not common knowledge and firms get a private signal about d , the model can admit unique equilibria (using global games techniques)

Describing the Unique Equilibrium

- Private signals about d have the following form: $x_i = d + \epsilon_i$, with $\epsilon_i = N(0, \frac{1}{\beta})$.
- Firms' decide whether to default or not:

$$\max \left\{ P(\text{BankSurvives}|x_i)(-F) + P(\text{BankFails}|x_i)(D - X), \right. \\ \left. P(\text{BankSurvives}|x_i)V + P(\text{BankFails}|x_i)0 \right\}$$

- The bank's choice of the level of effort:

$$\max_e \left\{ P(\text{BankSurvives}|d)DE[(1 - d)(1 - n(d))|d] + \right. \\ P(\text{BankSurvives}|d)(F + D)E[(1 - d)n(d)|d] + \\ \left. P(\text{BankSurvives}|d)(-Q - c(e)) + P(\text{BankFails}|d)(-c(e)) \right\}$$

Describing the Unique Equilibrium (Con't)

- Global games \rightarrow threshold strategies.
- Suppose firms default if $x > x^*$. Suppose also that the bank fails if $d > d^*$.
- Substituting in the above program we can solve for these two thresholds:

$$d^* + \frac{Q}{D} = \Phi\left(\frac{\alpha}{\sqrt{\beta}}\left(d^* - (\mu - e) - \frac{\sqrt{\alpha + \beta}}{\alpha} \Phi^{-1}\left(\frac{D - X}{V + F + D - X}\right)\right)\right)$$

- The last equation admits a unique solution (leading to a unique equilibrium) if and only if $\frac{\alpha}{\sqrt{\beta}} \leq \sqrt{2\pi}$

Describing the Unique Equilibrium (Con't)

- Special case: Suppose the precision of the private signal is very large ($\beta \rightarrow \infty$)
- Then the optimal threshold for strategic default becomes:

$$x^* = d^* = -\frac{Q}{D} + \frac{1}{1 + \frac{D-X}{V+F}}$$

- This result shows that the decision to default or not strategically depends on the bank's fundamentals, the benefits of the on-going relation with the bank and the penalty for shirking.
- If the deposits-to-assets ratio is high the threshold x^* is lower and the likelihood of strategic default is higher.
- If the benefits from an on-going relationship with the bank, V , or if the penalties for shirking, F , are large then the likelihood of strategic default is small.

Some comments

- In this model both the bank liabilities, Q , as well as the face value of the bank assets, D , are exogenous.
- If D is endogenous, D will reflect the strategic behavior of the debtor firms. Everything equal, a larger threat of strategic default induces banks to demand a larger D .
- A higher D could increase the likelihood of technical default among debtors and banks might need to adjust Q to lower the likelihood of failure
- If firms maximize shareholders' value and D is endogenous, firms might refrain from their strategic behavior, especially when Q is endogenous.

Some comments

- Firm's Cash Flows:

	Firm repays loan	Firm does not repay
Bank Survives	$V > C - D$	$C - D - F$
Bank Fails	$C - D$	$C - X$

- Firms' decide whether to default or not:

$$\max \left\{ P(\text{BankSurvives}|x_i)(C - D - F) + P(\text{BankFails}|x_i)(C - X), \right. \\ \left. P(\text{BankSurvives}|x_i)V(D) + P(\text{BankFails}|x_i)(C - D) \right\}$$

- If banks adjust Q so that the risk of failure is contained, a higher D lowers the objective function in the above maximization problem.
- Thus, a higher threat of strategic default \rightarrow higher $D \rightarrow$ firms are worse off \rightarrow the endogeneity of D and Q can act as a deterrent against strategic default

Some comments

- Under these cash flows, the equilibrium condition for the thresholds d^* and x^* becomes:

$$x^* = d^* = -\frac{Q}{D} + \frac{V + D - C + F}{V + 2D + F - C - X}$$

The FOC w. r. t. D becomes:

$$FOC(D) = \frac{Q}{D^2} + \frac{C - V - F - X}{(V + 2D + F - C - X)^2}$$

- If $C \gg 0$, then $FOC(D) > 0$. Thus, increasing D effectively lowers the likelihood of both strategic default (x^* is larger) and bank failure (d^* is larger).

Conclusion

- Debtor firms can coordinate in using strategic default to accelerate a bank run and suppress the enforcement ability of the lending bank
- In the absence of a lender of last resort, this can happen even when the bank fundamentals are relatively sound
- A lender of last resort might diminish this strategic behavior if it threatens to intervene to bailout the insolvent bank
- These results point to the collective strategic default as a novel channel to erode into the lending bank's enforcement ability
- However, the result might be weakened if we allow the lending banks to set their savings and lending rates endogenously, or if the lending banks set their lending policy as well as monitoring efforts so as to induce debtors to satisfy incentive compatibility constraints (which prevent shirking)