Discussion

Comment on: “Predatory trading, stigma, and the Fed’s term auction facility” by Jennifer La'o

Richard Lowery*

Department of Finance, Red McCombs School of Business, 1 University Station B6600, Austin, TX 78712, United States

A R T I C L E   I N F O

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The Federal Reserve and other financial regulators often express concern about stigma associated with extending credit to distressed financial institutions (see, for example, Armantier et al., 2011). This concern seems perhaps odd as “stigma” maps more or less to information, and it is not clear why the Federal Reserve should withhold from the market legitimate information about the condition of certain institutions. Market participants should be able to use such stigma to refine their beliefs about which financial institutions are solvent and which are not.

This paper provides a rationale for the Fed to view stigma as a problem and then presents a justification for the Term Auction Facility (TAF) program based on this concern. Briefly, the stigma associated with seeking liquidity in this model is bad because a strategic investor may learn about the liquidity position of a distressed institution and may attack that institution. The resulting liquidation is inefficient. The motivation for the model comes from Brunnermeier and Pedersen (2005), in which irrational traders sell, instead of buy, when a predator’s action pushes prices below fundamentals. Predatory trading is not actually modeled in the paper, but it motivates the claim that a strategic actor can attack a solvent institution and destroy it for profit.

The model itself is quite simple. There are three types of potentially distressed banks who must decide whether to seek additional liquidity from a non-strategic lender. All banks have the same fundamental value but have received different amounts of liquidity from some other non-strategic lender. By assumption, the worst type and the best type have strictly dominant actions and thus can be treated as entirely mechanical. Good banks are so healthy that they have no need to seek additional temporary liquidity; failure is impossible unless they actually do seek liquidity. Bad banks, on the other hand, are doomed to failure if they do not seek out liquidity. There is no fate worse than failure, so they always search. As such, only the middle bank type is of interest.

With effectively exogenous, and opposite, actions by each of the extreme types, there are no off-equilibrium-path beliefs to worry about. If the middle type searches, he reveals himself as either a middle type or a low type. When the middle type’s search is likely to succeed, the predator refrains from attacking at all. When the search is less likely to be successful, the predator will attack even if he expects that some of the searchers are middle types who successfully obtained extra liquidity. In this case, and this is the crux of the analysis, the middle type may prefer to pool with the good types by not searching, thus avoiding an attack. Not searching is costly. Without additional liquidity an exogenous shock may lead to liquidation.
even without an attack. Seeking liquidity and facing the attack, however, is worse. There will, of course, be cases where two equilibria are possible. If the attacker expects only low types to search he has a greater incentive to attack, while if he expects middle types also to search he has a weaker incentive to attack.

The paper completes this analysis by solving for the pure strategy perfect Bayesian equilibria of the extensive form game. This approach to the analysis turns out to be unnecessarily complicated. Solving for all Nash equilibrium of the game gives the same equilibria; the game does not admit the sort of incredible threats that require a perfection refinement. This fact can be seen by expressing the game in strategic form. In this form, the set of strategies for the distressed bank is a mapping from each possible type to a decision to search or not (8 total strategies). For the predator, the strategies map an observation of search or no search to a decision to predate or not to predate (4 total strategies). Regardless of what the predator does, there will always be a profitable deviation from any strategy that calls for search by the high type or lack of search by the low type; each such strategy is strictly dominated by the strategy that has the same action for the middle type but the appropriate action for the high and low types. As a result, the game, after deleting strictly dominated strategies, can be expressed in strategic form as the 2 × 4 game shown in Table 1.

The variable \(X_p\) gives the value that accrues to the predator when choosing to predate and facing a non-strategic (either low or high) bank, while \(X_m\) gives the value that accrues for preying and facing a strategic (middle) type who searches. These quantities are given by

\[
X_p = \frac{1}{2} (\pi_m L + (1 - \pi_m)(m + w)) + \frac{1}{2} L
\]

\[
X_m = \frac{1}{2} (\pi_m L + (1 - \pi_m)(m + w)).
\]

Table 1
Strategic form of the game: The middle type distressed bank is the row player and chooses whether to search (S) or not to search (DS) for liquidity. The predator is the column player. He chooses among the strategies of preying regardless of whether he observes search (Always P), preying only after observing search (P Search), never preying (NP), or preying only when the distressed bank chooses not to search (P NS). \(L\) is the liquidation payoff, \(\pi_m\) is the probability of a medium type who does not search surviving the liquidity shock without predate, \(\hat{p}\) is the probability of a medium type who searched surviving the liquidity shock without predate (or if the predator fails), \(w\) is fundamental value of the portfolio, \(m\) is the profits from successful predation, \(\pi_m\) is the probability that the medium type successfully improves his type, and \(\Delta = w - L\).

<table>
<thead>
<tr>
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<th>Always P</th>
<th>P Search</th>
<th>NP</th>
<th>P NS</th>
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<tbody>
<tr>
<td>S</td>
<td>(L + \pi_m \Delta, X_p + X_m)</td>
<td>(L + \pi_m \Delta, X_p + X_m + \frac{1}{2} \Delta)</td>
<td>(L + \hat{p} \Delta, w)</td>
<td>(L + \hat{p} \Delta, w - \frac{1}{2} \Delta)</td>
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<tr>
<td>DS</td>
<td>(L, X_p + \frac{1}{2} (w + m))</td>
<td>(L + \hat{p} \Delta, X_p + \frac{1}{2} \Delta)</td>
<td>(L + \hat{p} \Delta, w)</td>
<td>(L + \frac{1}{2} w + \frac{1}{2} L + \frac{1}{2} m)</td>
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1. Role of irrational behavior

To justify concern about stigma, the model leans heavily on behavioral assumptions and irrational actions by market participants. Explicitly, although only for the purpose of motivation, the marginal trader of a financial asset is irrational and trades against his own interests by selling when prices fall below fundamentals. In effect, there is very limited capital in vulture funds, and what capital there is can coordinate on attacking, rather than rescuing, illiquid but insolvent firms; all other traders behave mechanically.

This motivation leads to the desired inefficiency result and policy recommendations a little too directly. Fundamentally, Brunnermeier and Pedersen (2005) assume that potential liquidity providers trade in the opposite direction to what would be in their own interest, thus giving smart money a chance to start a stampede against a weakened but still solvent player. In the present paper taking the irrational behavior of the marginal trader as given is quite problematic. First, once such behavior is assumed, the strategic analysis becomes a little too easy. Second, the policy analysis is predicated on the
assumption that the policy maker can see perfectly that all institutions are solvent. By assumption, the price process fails to aggregate information about the solvency of institutions, but the government has all of this information.

This is not to suggest that the scenario described might not reflect reality. Certainly, market participants may have irrationally panicked during the financial crisis, while the government was able to coolly observe that all institutions were in fact healthy from a fundamental perspective. Then, rescue would have been efficient. The question is instead how much is learned from analyzing policies under these assumptions.

Several other assumptions of irrational behavior are also essential, though less explicit, for motivating the payoff structure. First, the potential for liquidation, which is present even without the predator, arises from some irrational unwillingness to provide liquidity to certain institutions, where such institutions are not fundamentally different from those who could obtain such support. That is, conditional on surviving, there is no difference in the payoff to a low type, middle type, or high type, so the very fact that there is a difference in survival probability implies irrational action by some market participant. Closely related to this friction, the market for private sector loans operates in a way that could not readily be rationalized with profit maximizing lenders. A distressed borrower may or may not be able to find credit, and the probability of successfully finding credit depends on a type that is not related to the fundamentals of the firm. Further, despite sharp credit rationing, the interest rate on a loan that is successfully obtained is zero. This assumption turns out to be more than just a simplification as it plays an important role in the policy analysis. Additionally, the size of the loan available to a player is inversely correlated with the perceived quality of the borrower. Thus, the supply and the pricing of credit are implicitly set by fundamentally irrational players.

Finally, the capital structure of the potentially distressed firm is unlikely to be optimal if the risk of the liquidity shortage is high. Unlike the other more explicitly behavioral assumptions, this capital structure could arise from structural frictions such as tax benefits or moral hazard concerns. The results still highlight how important exogenous assumptions on behavior are to the results. A financial institution expecting the combination of irrational and predatory behavior posited in the paper would presumably select a less fragile capital structure, unless the benefits of fragility outweigh this risk. As an aside, the model also does not entertain the possibility that financial fragility itself could have a benefit as in Calomiris and Kahn (1991) or Diamond and Rajan (2001).

It is interesting to see how much behavior must be assumed in order for the paper to deliver socially inefficient stigma. The assumptions are certainly very strong and seem somewhat unrealistic. If these assumptions really are needed to conclude that stigma has a negative effect from the social welfare perspective, perhaps the paper does a service in highlighting how difficult it is to justify the Fed’s view that it should assist solvent but illiquid firms to hide their “temporary” problems from the market. The paper may very well capture the thinking of regulators, while at the same time being unpersuasive as a model of behavior in financial markets.

Still, there are some aspects of the paper that would call into question the applicability of the model even in the limited sense of capturing the thinking of regulators about stigma. First, the link between the value of the attack on the distressed trader and the predatory trading motivation is somewhat weak. Second, the results from the analysis of TAF seem to arise from examining only certain extreme cases, and the value of TAF, which in any case is easily dominated by an alternative policy described below, arises mostly due to the unrealistic modeling of the private loan model.

2. Predatory trading

Predatory trading does not really play a role in the model in any way that is relevant to the strategic interaction studied. The gain from attacking is described as arising from the predation war, but in fact even the distressed trader, who is modeled as strategic in the search game, is not permitted to behave strategically in the predation game. The assumption is that a distressed trader who wins the predation war gains nothing from the victory, which would not hold for generic payoffs. This simplification does matter. Permitting the distressed trader to profit from winning the predation war would give the high type an incentive to in effect pretend to search, which would in turn partially correct the inefficiency from predation.\footnote{Of course, in the model the exogenous cost to searching could be set very high for the high type, but such a parameterization would be highly unrealistic.} A predator who predated too frequently would draw the high type in to the pool of searchers, which would in turn drive away the predator.

Also, the predator is excluded from the TAF auction. Thus, the policy analysis implicitly assumes that the Federal Reserve can identify distressed institutions separately from institutions that might prey on distressed institutions. This assumption raises two issues. First, if the assumption is relaxed the predator will have a strong incentive to bid for a loan, particularly if the value of winning the predation war is high. Successfully obtaining a large enough loan will allow the predator to successfully attack even the high type. Of course, now all distressed types have an incentive to bid for loans to deprive the predator of the loan, and the equilibrium of the TAF auction will end up resembling the auction with externalities as studied in Jehiel et al. (1996). In particular, when low and middle types are unlikely to succeed in their search, the high distressed type and the predator will bid up the price of the loan, with the ultimate victor depending on the gap between the high type’s liabilities and the predator’s liabilities, and on the relative magnitude of profits from winning the predation war.
versus the liquidation payoff. Here, TAF can become destabilizing because the potentially inflated interest rate could move either the predator or the high distressed type into a region where he might have to liquidate.

The second issue is that, since the Federal Reserve can, by assumption, discriminate between distressed banks and predators, a superior policy suggests itself. The optimal policy would be to simply extend unlimited credit at zero interest to all banks, following Bagehot’s rule (Bagehot, 1873) without the penalty rate. This policy eliminates the risk of costly liquidation and is free for the Federal Reserve as all financial firms will survive against predation, there is therefore no predation, and the liquid assets held by the institutions will simply be carried through to the last period. This perhaps excessively reductive analysis of policy highlights one of the issues that limits the scope of the paper for policy analysis. By assumption, from an efficiency perspective all financial firms should survive, and thus there is a limitation to the costs of a policy that allows some banks to avoid stigma. In the model, the only drawback of the TAF policy is that it may expose low types to attack when they were previously able to pool with medium types and survive. Realistically, any policy designed to allow financial institutions to avoid stigma must balance the benefit of preventing inefficient runs against the cost of allowing insolvent institutions to delay inevitable failure. The history of banking and financial regulation in the post-war era might suggest that various regulators are too willing to help financial firms hide difficulties and continue to operate, rather than the reverse.

Finally, taking the irrational behavior of market participants as given, the policy analysis still comes across as somewhat artificial. The key for TAF to separate the middle distressed type from the worst distressed type is that the worst distressed type requires a larger loan to survive than does the middle type. Thus, the total cost for the loan, given the market clearing interest rate, is higher for the lower type. In contrast, in the private loan market the interest rate on the loan is zero; the size of the private sector loan available is random and negatively correlated with the health of the institution, but conditional on getting the loan the interest rate is zero. Coupled with the assumption that the low type will exogenously fail if it does not find a loan, this guarantees that the low type will have at least a weakly stronger incentive to look for the private loan. For TAF, however, the cost of the loan increases with the size of the loan needed, and both propositions about TAF are proved for the case where the gap between the size of the loan needed by the middle and low type is arbitrarily large. Note that the size of this gap required for the result depends on how much the middle type can improve its chances of surviving the exogenous shock \((\hat{p} - p_m)\); when \(p_m \rightarrow \hat{p}\), the threshold required for \(v_m - v_l\) goes to infinity. Thus, separation through TAF comes from the assumption that winning the auction is sufficiently more valuable to middle types than to low types. Increasing the gap far enough makes TAF a bad deal for the low type, regardless of what the predator does.

To conclude, the policy analysis takes place under the assumption that behavioral biases plague market participants, but upon entry into the regulatory sector these biases disappear. This paradigm seems questionable, particularly since the costs of such a bias to a market participant will be higher than the cost to a regulator, who will not in general have the same degree of skin in the game as an investor. Even accepting these biases, the characteristics of the private market and the TAF auction that drive the results are artificial and do not do a good job of capturing distinctions that would likely arise in a more realistic setting.

References


