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Stigma, Free-Riding, and Bank Instability

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Abstract

This paper presents a simple model of depositors' behavior when their bank faces a bankruptcy risk due to delinquent loans. It is shown that the delinquent loans could have a destabilizing effect, causing the depositors to avoid association with the bank and giving rise to a socially inefficient bank run. Possible remedies to such stigmatization (e. g. informational regulation, bail-out, and the formation of a group of "stable depositors") are also discussed.

I Introduction

For long time, particularly since an influential work of Erving Goffman [1963], the notion of stigma has attracted a great deal of attention in sociology and social psychology. A basic thesis of this sociological literature is that individuals who have failed to conform to social norms can be persistently denied full acceptance to society ; those who once deviate from social norms could be forced to remain deviant, since the stigma attached to their past could prohibit them from returning to the norms. This idea has been applied to various social problems, a classical example of which is the formation of career criminals ; individuals with known criminal records are often denied employment by potential employers, who fear that the ex-convict may go back to crime on the job ; being jobless and unable to support themselves, the ex-convicts will be forced to live on welfare, or even worse, become career criminals. Each employer avoids a *potential* loss from getting involved

with a crime ; yet, this will cause the ex-convict to remain jobless and give rise to an *actual* loss to the society.

The purpose of this paper is to show that the essence of the sociological literature on stigma (represented by the ex-convict example in the above) can be also applied to the problem of bank instability. When a bank makes bad loans and finds itself with a *possibility* of bankruptcy, it could suffer from a massive loss of deposits, which makes it fail with *certainty*. Just as a criminal record could preclude an ex-convict from rehabilitating himself by gaining a job, the stigma attached to a deteriorated balance sheet could cause a bank run and eliminate the chance of its survival. Each depositor of the bank, informed of the delinquent loans, decides to withdraw from the bank in order to avoid the *potential* inconvenience of being involved in bankruptcy ; yet, if everyone transfers his or her deposit, the bank will really go bankrupt, and an *actual* social loss (e. g. liquidation cost) will be incurred.

The troubled bank may be able to retain its depositors by offering a higher interest rate. However, such price adjustment may not always work if information is not perfectly symmetric between the bank and depositors ; a higher interest rate may cause the depositors to believe that the bank is riskier than what they have judged from the available information ; in this case, an increase in the interest rate could end up reducing the supply of deposits. In such a pathological case, a corrective policy intervention (such as a bail-out of the troubling loans) might be warranted.

The rest of this paper is organized as follows : the next section develops a model to formally describe the connection between stigma and bank instability sketched above. The third section discusses the policy implication of the model. The relevance of the model to banking crises in Japan (before and after World War II) is also briefly discussed. The final section concludes the paper.

Ⅱ The Model

The economy consists of a bank and N identical depositors. The bank has previously made loans to lenders outside of this economy, some of which have turned sour. The bank is subject to a disclosure requirement and has to inform its depositors of the market value of its assets net of the loan loss. The bank offers the depositors a gross interest rate of R. After receiving information about the bank's asset value W and the deposit rate R, each depositor forms an expectation of the probability of bankruptcy h, which depends on W, R, and the total amount of deposits D. With other things being equal, the perceived bankruptcy probability h will be higher when the total amount of deposits D is lower and the asset value W is lower, namely,

$$h = h(D, W, R)$$
$$\partial h/\partial D < 0, \quad \partial h/\partial W < 0 \qquad \cdots\cdots (1)$$

Given h and R, each depositor decides whether to adhere to the same bank or shift his or her money to another safer bank outside of the economy, which pays the risk-free interest rate R_f.

When all N depositors shift their deposits, the bank will go out of business with certainty :

$$h(D, W, R) = 1 \qquad \cdots\cdots (2)$$

Figure 1 Payoff Matrix of Depositors

		Depositor 2	
		Stick	Withdraw
Depositor 1	Stick	u_{cc}, u_{cc}	u_{cn}, u_{nc}
	Withdraw	u_{nc}, u_{cn}	u_{nn}, u_{nn}

Assuming risk neutrality, the payoff to each depositor when all of them shift their deposits can be written as

$$u_{nn} = R_f d - (C/N) \quad \cdots\cdots (3)$$

where d is the amount of deposit each depositor holds. When not all the depositors shift their deposits but the bank still goes out of business, it will cause each of the remaining depositors a monetary value z of loss in addition to the social cost C.[1] Thus, the expected payoff to each depositor when all of them adhere to the bank can be written as

$$\begin{aligned} u_{cc} &= (1-h_{cc})Rd + h_{cc}[Rd - z - (C/N)] \\ &= Rd - h_{cc}z - h_{cc}(C/N) \end{aligned} \quad \cdots\cdots (4)$$

where h_{cc} is the perceived bankruptcy probability when everybody adheres to the bank, which is given by

$$h_{cc} = h(Nd, W, R) \quad \cdots\cdots (5)$$

Likewise, the expected payoff to single depositor who remains with the bank when all other depositors have left is given by

$$u_{cn} = Rd - h_{cn}z - h_{cn}(C/N) \quad \cdots\cdots (6)$$

where h_{cn} is given by

$$h_{cn} = h(d, W, R) \quad \cdots\cdots (7)$$

Finally, the payoff to a marginal depositor who switches to another bank when all the other depositors are adhering to the bank is given by

$$u_{nc} = Rd - h_{nc}(C/N) \quad \cdots\cdots (8)$$

where h_{nc} is given by

$$h_{nc} = h[(N-1)d, W, R] \quad \cdots\cdots (9)$$

Using the above expressions, we can write the level of welfare (measured by the

[1] Due to the presence of deposit insurance, all the deposits in the failed bank will be refunded to the depositors. The depositor-specific cost, z, can be thus interpreted as coming from a temporary loss of access to the deposit until it is paid off by the insurance.

sum of depositors' payoffs) when all the depositors abandon the bank as

$$W^n = Nu_{nn} = NR_f d - C \quad \cdots\cdots (10)$$

and the welfare level when all the depositors remain in the bank as

$$W^c = Nu_{cc} = N(Rd - h_{cc}z) - h_{cc}C \quad \cdots\cdots (11)$$

Figure 1 presents the payoff matrix when the number of depositors $N=2$. The economy will fall into a sub-optimal outcome (Withdraw, Withdraw) if the payoffs satisfy the following relationship :

$$u_{nc} > u_{cc} > u_{nn} > u_{cn} \quad \cdots\cdots (12)$$

When the above condition (12) holds, everybody would be better-off by adhering to the bank than by shifting the money to another bank only to let the original bank go out of business. In other words, the above condition implies that the level of welfare in the cooperative outcome (where all the depositors are adhering to the bank) will be greater than that in the non-cooperative outcome (where all the depositors are withdrawing from the bank) :

$$\Delta W \equiv W^c - W^n = N(R - R_f) + (1 - h_{cc})C + h_{cc}z > 0 \quad \cdots\cdots (13)$$

Yet, since everybody has an incentive to free-ride on other depositors' efforts to preserve the bank given that everyone else is cooperating, and since nobody would wish to adhere to the bank given that everybody else has switched, all depositors end up shifting their deposits, forcing an otherwise solvent bank to go bankrupt.

At this point, it is instructive to compare the above case with the case analyzed by Douglas Diamond and Philip Dybvig [1983]. In the Diamond-Dybvig model, the depositors have nowhere to transfer their deposits. Thus, a depositor would be better-off by not withdrawing his or her money given that everyone else is keeping their money in the bank. This is as if the payoffs in Figure 1 satisfy

$$u_{cc} > u_{nc} > u_{nn} > u_{cn} \quad \cdots\cdots (14)$$

There will be two Nash equilibria (Stick, Stick) and (Withdraw, Withdraw), the latter of which represents a bank run.

So far, we have treated the deposit rate as given. When can go up to compensate

the potential inconvenience in the case of bankruptcy, the bank may be able to retain the depositors. More formally, the bankruptcy can be avoided if an increase in R can make the marginal depositor indifferent between adhering to the bank and switching to another, or equivalently, if an increase in R can cause the following condition to hold with equality :

$$\begin{aligned} Z(R) &\equiv u_{cn} - u_{nm} \\ &= (R - R_f)d + [1 - h_{cn}(R)](C/N) - h_{cn}(R)z \geq 0 \end{aligned} \quad \cdots\cdots (15)$$

where h_{cn} is defined by (7)[2]. It is possible, however, that the above condition (15) can never hold for any $R \geq R_f$, sufficient conditions for which are

$$Z(R_f) \Leftrightarrow [1 - h_{cn}(R_f)](C/N) - h_{cn}(R_f)z < 0 \quad \cdots\cdots (16)$$

and

$$Z'(R_f) < 0 \Leftrightarrow \frac{\partial}{\partial R} - h_{cn}(R_f) > \frac{d}{z + (C/N)} \quad \cdots\cdots (17)$$

Condition (17) is likely to hold when the depositors are very nervous about the low value of bank assets W and greatly revise their subjective bankruptcy probability in response to the bank's offers of higher deposit rates (i. e. when $\partial h_{cn}/\partial R$ (>0) is very large). An increase in the deposit rate will increase the return from the deposit (given h_{cn}), thereby making the bank more attractive, but it will also cause the depositors to revise their perceptions of bankruptcy probability upward, thereby making the bank less attractive. When condition (17) holds, the latter effect will dominate the former. Thus, if conditions (16) and (17) hold, the bank will not be able to stop the outflow of the deposits even if it keeps raising the deposit rate above the one offered by the safer competitor, R_f.

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[2] We can easily check the payoff matrix in Figure 1 to see that condition (15) brings the cooperative outcome (Stick, Stick).

Ⅲ Discussion

Let us now consider the possible solutions when the adjustment of the deposit rate cannot prevent a socially inefficient bankruptcy. In the model, the depositors forsake their bank in response to the information about the bank's delinquent loans. One may thus advocate limiting depositors' access to the information about the bank's assets on the condition that the regulating authority closely monitors the banks on behalf of depositors. However, such a solution has three obvious problems. First, banks with a superior portfolio may voluntarily disclose the information about their assets, putting those which cannot do so under suspicion.[3] Second, even if all the banks are refraining from disclosing their exact financial conditions, the depositors may be able to "smell" the troubles of unhealthy banks in one way or another. The depositors may thus start shifting their deposits based on inaccurate conjectures, which may be more destabilizing than the information that could have been disclosed. Third, and most importantly, exemption from disclosure may cause moral hazard on the part of banks. This problem will be particularly serious if the regulators fail to detect disastrous operations of the troubling banks, or even worse, if the regulators themselves are not immune to corruption.

A more efficient solution than the above informational regulation is to enforce or induce cooperation among depositors. One such solution is to bail out the troubled bank with tax revenues, solving the free-rider problem with tax enforcement. If a large amount of delinquent loans (and the resulting low asset value W) is causing the depositors' pessimism (i. e. a very high perceived bankruptcy probability h as well as a high interest sensitivity $\partial h/\partial R$) which could cause socially inefficient deposit flights, then bailing out a part of delinquent loans with public money may re-

[3] See (among others) Milgrom [1981] on this possibility.

store the depositors' confidence and prevent the outflow of deposits. If the savings of the social costs derived from preventing a socially inefficient bankruptcy is greater than the amount of tax revenues required for the bailout, then such an intervention may be warranted.[4]

Another, more indirect solution than public bail-outs would be to institutionalize cooperation among depositors. Organizing a depository institution on the community or occupational level may reduce the temptation of each depositor to avoid potential inconveniences of bankruptcy at the expense of other depositors' efforts to preserve the bank. Enterprise groups in Japan, each of which consists of financial institutions and firms from different industries, could be regarded as another example of institutions which reinforce cooperation among depositors. Firms belonging to an enterprise group often hold their business accounts in banks in the same group. Sometimes, they also induce their employees to hold accounts in the group banks by connecting the banks with employees' benefits. One possible purpose of these customs is to establish a group of stable depositors who will adhere to the banks and reduce the probability of bankruptcy in case of perverse deposit flights.[5]

The model developed above captures an aspect of the 1927 Depression of Japan, one of the most severe financial crises in modern Japanese history. During this depression, the two corporate giants of that period-Suzuki Merchandising Company (*Suzuki Shoten*), the onetime largest trading company in the world, and the Bank of Taiwan, Suzuki's largest creditor and one of the largest quasi-governmental banks in pre-war Japan-were forced to terminate their operations, as infor-

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[4] Caution has to be taken in carrying out such a bailout too frequently, since it may cause the banks to make excessively risky loans.

[5] Thus, the assistance between banks and firms in an enterprise group may be reciprocal. The group banks reduce the costs of financial distress of the group firms, as shown by Hoshi, Kashyap, and Scharfstein [1990]. In return, the group firms, by serving as the "depositors of the last resort", reduce the vulnerability of the group banks to opportunistic outflows of deposits.

mation regarding Suzuki's non-performing notes were revealed in a session of the Diet.[6]

The origin of these unprecedented business failures dates back to 1923, when a great earthquake hit Tokyo, devastating many businesses (including Suzuki) and making them unable to pay their notes. The Bank of Japan thus designated these un-payable notes as the Earthquake Notes (*Shinsai Tegata*) and granted the affected businesses a moratorium. As of the end of 1926, three years after the moratorium was called off, nearly half of these Earthquake Notes still remained delinquent, seriously threatening the creditor banks who owned these delinquent notes.[7] Concerned about the deadly impacts of disclosure on the creditor banks, the monetary authorities kept the names of debtors and creditors (as well as the amount of uncollectible notes) secret.

However, the opposition party of the time, Seiyukai, detected that at the very top of the debtor list was Suzuki Merchandising Company, a political ally of the ruling party, Kenseikai. As the Kenseikai government sent bills to the Diet in the early 1927 to bail out the troubled banks which were holding the delinquent Earthquake Notes, the opposition party bombarded the Finance Minister with questions about the legitimacy of the bail-out, urging him to disclose the lists of the depositors and creditor banks. During heated arguments between the Finance Minister and the questioners, Suzuki, the Bank of Japan, and another bank on the secret list (Watanabe Bank) were referred to by name. Watanabe Bank, whose name was mentioned by the Finance Minister in a slip of tongue, had a bank run on the same day of the Minister's comment (March 14, 1927) and went bankrupt the next day (March 15, 1927).

The failure of Watanabe Bank triggered a sequence of bank runs, which culmi-

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[6] The following historical episodes are based on Tamaki [1995] and Sataka [1992].

[7] The total outstanding Earthquake Notes at the end of 1926 was ¥207 million, 1.2 % of the GDP of the same year.

nated in the closing of the Bank of Taiwan on April 18 (with a loss of 40 % of its deposits) and the announcement of a three-week moratorium of all the note payments. During the period from the bankruptcy of Watanabe Bank (March 15) to the announcement of the moratorium (April 22), over 300 branches of 34 banks were forced to halt their operations, and 5.4 % of the total bank deposits in Japan was withdrawn. Interestingly, the amount of deposits held by the traditional leading banks (*Zaibatsu* banks such as Mitsubishi, Mitsui, and Sumitomo) and by the Postal Deposit increased substantially immediately after the moratorium, suggesting that the deposits withdrawn during the bank runs were shifted to those depository institutions which were considered to be safer.

In the middle of the waves of bank runs, there was a case in which the behavior of a loyal depositor stopped the outflows of deposits and saved a bank. The president of a well-known clothier, Isetan, heard that a branch of Kawasaki Saving Bank, with which he had a long business relationship, was having a bank run. The president ordered the bookkeeper to bring all the cash in the store to the branch and make deposits as conspicuously as possible in front of other panicked depositors, identifying himself as a person from Isetan. Seeing that the well-known store was making deposits, the other depositors who had rushed to the bank to withdraw their deposits regained confidence about the solvency of the bank, and the branch escaped the bankruptcy [Sataka, 1992, p.162].

One possible interpretation of the above episode of bank runs is that the disclosure of the information about the uncollectible loans (i. e. Earthquake Notes) held by troubled banks (e. g. the Bank of Taiwan) caused the depositors to shift their money to safer banks (i. e. Zaibatsu banks and the Postal Deposit). The episode on Kawasaki Saving Bank and Isetan can be interpreted as an example of the cooperative equilibrium made possible by an initiative of a loyal depositor ; other depositors revised their perception of bankruptcy probability and decided to adhere to the bank.

So far, we have seen the possible relevance of the model to episodes in the pre-war Japan. The model can also give some insight into a popular debate in the contemporary Japan. Since 1990, when a series of financial scandals broke out and balance sheets of many banks deteriorated substantially due to the collapse of asset prices, there has been increasing demand for extensive disclosure of bank assets. It has been argued-particularly by critics of the banking industry and the Ministry of Finance such as Okumura and Sataka [1991]-that banks should disclose the details of all the delinquent loans as well as the market values of their assets and collateral.[8] The banking industry has been reluctant to meet such demands, arguing that disclosure could amplify the financial instability of troubled banks [Nikkei, Dec. 3, 1992, p.7 ; Dec. 8, 1994, p.7 ; Apr. 21, 1995, p.7]. The Ministry of Finance, while admitting the necessity of disclosure in the long run, was cautious about immediate implementation. It allowed banks to limit the scope of disclosure and delay the timing [Nikkei, Dec. 3, 1992, p.7 ; Jan. 6, 1995, p.7].[9] The model indicates that the fear and caution of the banking industry and the Ministry of Finance might not be totally groundless. According to the model, disclosure could trigger massive shifts of deposits, causing failures of otherwise solvent banks. Society might be better-off by delegating to the monetary authorities the task of monitoring and inspecting the banks without knowing the details of their portfolios.

However, information asymmetry created by such a bank secrecy policy may cause serious moral hazard, especially if the monetary authorities have a limited capacity for monitoring the banks. The very fact that a series of serious bank failures took place in the early 1990s after years of unsound operations is the evidence

[8] The value of assets reported in financial statements of Japanese banks is based on acquisition costs, which could be substantially different from the market value [Federation of Bankers Association of Japan, 1994].

[9] The banks were allowed to postpone until the spring of 1996 disclosing the amount of outstanding

of the limitations of governmental monitoring. Discipline through public disclosure may be needed to overcome moral hazard problems, despite the possible adverse side effects.

Furthermore, disclosure does not necessarily lead to an inefficient equilibrium. The inconveniences in the case of bankruptcy (z in the model) might be so negligible that the depositors might not shift their money. Also, even if disclosure does cause outflows of deposits and the failure of a bank, such an outcome may not be socially inefficient. As we saw in condition (13) in the model, inefficiency arises only if the social cost of bankruptcy C is large relative to the expected depositor-specific loss, hz, and the probability of bankruptcy when all the depositors retain their deposits, h_{cc}, is small. Whether these conditions are satisfied or not has to be examined empirically before advocating bank secrecy or bailing out troubling banks.

Ⅳ Conclusion

Just as stigmatized individual (e. g. ex-convicts or welfare dependents) who could potentially conform to the social norm are discouraged by persistent discrimination against them, banks with delinquent loans could be hit by bank runs and forced to go bankrupt even if it might have survived in the absence of the bank runs. If liquidation of failed banks requires a large social cost, then the bank runs could lead to a socially inefficient equilibrium. Each depositor who adheres to the troubled bank will be increasing other people's welfare (expected utility) by reducing the probability of bankruptcy. If this spill-over effect is not internalized in each depositor's action, the resulting equilibrium could be sub-optimal. The problem here, however, is that each depositor could have an incentive to free-ride on

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loans whose interest payments were reduced. As of July 1996, the market values of bank assets or collateral have not been disclosed.

other depositors efforts to sustain their bank. In this case, bailing-out the bank by injecting public funds could be warranted.

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