INFORMATION DISCLOSURE AND BANK RUNS

by

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May 1987

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ABSTRACT

A simple model is constructed to analyze the effects of a "market discipline" strategy which ends de facto government insurance of legally uninsured depositors. This strategy can induce behavioral responses by bank managers and depositors which mitigate the amount of liability being shifted to uninsured depositors. Specifically, bank managers may adopt a policy of disclosing information regarding the bank's probability of default. This policy would enable uninsured depositors to withdraw when the probability of default rose, thereby avoiding liability for the negative net worth of the failed bank.

MARKET DISCIPLINE, INFORMATION DISCLOSURE, AND UNINSURED DEPOSITS

I. Introduction

Federal deposit insurance can be credited with helping eliminate the widespread banking and monetary crises experienced in the United States during the 1930's and earlier. However, recent increased competition and deregulation in banks' financial environment have created new concern for the stability of the banking system, leading some [e.g., Kane (1985)] to propose reform in deposit insurance and bank regulation. There currently exists a serious debate regarding the feasibility of measuring the risk that individual banks place on deposit insurers, and hence whether a risk-sensitive insurance pricing or capital requirement scheme can be workable or effective.[1] Other policies have been proposed as alternative or complementary arrangements to risk-sensitive systems. The goal of one set of policies is to encourage "market discipline" over banks' behavior rather than rely on direct regulatory restrictions which bank innovations have a tendency to weaken.[2]

It has been suggested that greater market discipline can be developed by ending the policy of de facto insurance of legally uninsured deposits which typically occurs when the FDIC or FSLIC arranges a merger between a failed and a solvent bank. When deposit insurers carry out a merger or "purchase and assumption transaction" following a bank closing, the solvent acquiring bank assumes all the liabilities of the failed bank, including those large deposits not legally insured by the government insuring agency.[3] Instead, it is proposed that a "modified" purchase and assumption transaction should be implemented, whereby uninsured deposits would not be assumed by the acquiring bank. Rather, uninsured depositors would be made liable for a portion of the negative net worth of the failed bank. Under this new policy, it is hoped that a bank's uninsured creditors will take an expanded interest in its financial condition, forcing a riskier bank to pay a higher interest rate on uninsured deposits, just as a non-financial firm is forced to pay a higher yield on new corporate debt the riskier is its capital structure. This would result in a reduction of the bank's risk taking incentives and thus its probability of bankruptcy.

Complementary to this policy of increasing uninsured depositors' liability from bank failures, greater disclosure of individual bank financial information is advocated. With more public information regarding a bank's financial structure, uninsured bank creditors will be in a better position to evaluate proper risk premia to charge banks.[4]

However, one of the prominent features of banks' uninsured deposits is the tendency for a large proportion of these liabilities to be of relatively short maturity compared to the uninsured liabilities (debt) of non-financial firms.[5] This makes banks particularly susceptible to a withdrawal of funds by uninsured depositors (a bank run) if depositors fear the bank's probability of failure has increased significantly. The potential for bank runs is likely to be highly dependent on policy decisions which place uninsured depositors at risk and increase the level of information disclosure. Guttentag and Herring (1983) is one of the few papers which considers the possibly serious consequences of bank information disclosure.

In March of 1984, the FDIC did in fact announce the start of a new experimental policy which would end the de facto insurance of uninsured deposits by administering "modified" purchase and assumption transactions following bank failures. A few days following the announcement, this policy was carried out when the Seminale State National Bank of Seminale, Texas failed. The failed bank was purchased by West Texas Bancshares, Inc., but its large depositors lost a major portion of their uninsured funds. The experiment appears to have been short-lived, or at least, not applied uniformly to all banks. By June of 1984, while major institutional depositors were withdrawing funds from Continental Illinois Bank and Trust Co. on a large scale, the FDIC made an unprecedented announcement that it would guarantee to protect the bank's uninsured deposits. The FDIC may have come to realize that the change in its insurance policy had a greater effect on depositor behavior than it had anticipated.

In this paper, bank and depositor behavior is analyzed for the case in which uninsured depositors share risk from the possibility of a bank failure. The focal point of the study concerns how behavioral reactions by bank managers, such as changing the level of information disclosed by their bank, might affect the actions of uninsured depositors. Our model assumes banks issue both insured and uninsured deposits and invest these funds in a risky asset. Banks are also periodically audited by a federal government deposit insuring agency, hereafter referred to as the FDIC. If during an audit, the FDIC finds the bank to have negative net worth, then the bank is closed and uninsured depositors and the FDIC share in the bank's losses.

In addition, the model allows for the possibility that some uninsured depositors may choose to withdraw their funds, i.e., begin a run on the bank, prior to the bank's audit. Bank managers receive information concerning the return on the bank's investments and may choose whether or not to have a policy of reporting this financial information to the public. If a bank decides to disclose this information, it may affect uninsured depositors' decisions regarding whether or not to withdraw their funds.

The major result of our analysis is that under a market discipline strategy, banks may voluntarily choose a policy of publicly disclosing information even though it can result in a greater probability of bank runs by uninsured depositors. By disclosing information, the bank may find its required rate of interest paid on uninsured deposits to be lower. This occurs because uninsured depositors may be able to withdraw their funds when the probability of a bank default rises, thereby avoiding liability for the negative net worth of the failed bank. These results suggest that implementing a "market discipline" strategy, which leaves uninsured depositors unprotected, can induce behavioral responses by bank managers which impose adverse consequences on the FDIC.

II. The Model

Consider the following one period model.[6] Banks issue an amount of insured deposits, D_i, and uninsured deposits, D_u, at the beginning of the period. At this time they also pay a deposit insurance premium to the FDIC, equal to h times D_i. Insured deposits are paid the riskless rate of interest, where one plus the rate of interest is denoted as $r > 1$. The promised rate of return on uninsured deposits held to the end of the period is r_u. Assuming the bank to be a price taker in its deposit markets, the bank takes the riskless rate, r, as given, while the required promised return on uninsured deposits, r_u, will be solved as a function of the bank's policy choices.

At the end of the period, the bank is audited by the FDIC. If the bank has positive net worth, depositors are paid their promised rates of interest with the bank owners (shareholders) receiving the residual. However, if the bank's net worth is negative,[7] uninsured depositors and the FDIC divide proportionally the bank's assets, insured depositors are paid in full, rD_i, by the FDIC and shareholders receiving nothing.[8]

There are two states of nature at the end of the period. In one state, the good state, the return on the bank's assets is high, equal in value to V_g. In the alternative bad state, the return on the bank's assets is low, equal to V_b. Prior to the end of the period, bank managers receive interim information concerning the relative probabilities of the good or bad state. This interim information, which we will refer to as a (noisy) "signal," has the effect of changing the conditional probability of the good and bad state occurring at the end of the period. It is assumed that there are simply two kinds of signals; a good signal which reflects an increased probability of the good state occurring, or a bad signal which denotes that the probability of the bad state is now augmented. Depositors do not receive any interim information concerning the end of period state, except via possible bank disclosure.

The following notation is defined:

p_i = beginning of period (unconditional) probability of state i occurring at end of period. i = g, b,

$p_{i,j}$ = conditional probability of state i occurring given that a state j signal was observed. i = g, b. j = g, b.

p(gs) = probability of receiving a good signal.

p(bs) = 1 - p(gs) = probability of receiving a bad signal.

Uninsured depositors, besides waiting until the end of the period to realize the value of their uncertain claim on the bank, may choose to withdraw their deposits early. The bank incurs a non-negative asset liquidation cost, k, in proportion to the dollar amount of uninsured deposits withdrawn. This cost reflects a lower rate of return on assets liquidated (sold) early, which can simply reflect lost interest on bank assets sold early, or "fire-sale" costs of liquidating these assets. Therefore, we will assume the bank pays uninsured depositors who withdraw early the rate of return r_w which is less than r, i.e., there is a penalty for early withdrawal. For simplicity, uninsured depositors who withdraw early are assumed to earn a zero rate of return for the rest of the period.[9]

The withdrawal of funds by uninsured depositors may not go completely unnoticed by the bank and FDIC. It is possible that not all uninsured deposits may escape the bank, as this "bank run" by uninsured depositors may induce the FDIC to close the bank prior to the end of the period, so that only a proportion of uninsured deposits, w, $0 \le w \le 1$, are expected to be withdrawn before the bank is closed. In this circumstance, the FDIC is assumed to then follow this bank closing with the usual audit at the end of the period.[10] As before, if the bank has positive net worth at the end of the period, the remaining $(1 - w)$ proportion of uninsured depositors are paid their full promised return, while if the bank's net worth is negative, the remaining uninsured depositors and the FDIC proportionally split the bank's assets.[11]

The bank is interested in maximizing expected end of period profits, and faces competitive insured and uninsured deposit markets. Insured depositors are paid the riskless rate of interest, while risk neutral uninsured depositors require a promised return on deposits such that their expected return is equal to the riskless rate, r. We also assume that at the beginning of the period, banks can choose an irrevocable policy of either revealing the interim information on conditional probabilities of the end of period state, or choose not to disclose information before the end of the period.[12] One plausible type of contract for a bank which chooses to reveal information would be to agree at the beginning of the period to submit to a private monitor, e.g., a Certificate of Deposit rating agency or an accounting firm.[13] This monitor would internally audit and disclose information concerning the bank's safety prior to the end of the period. The decision whether to contract to disclose information will likely affect the possibility of a bank run and also the risk premium on uninsured deposits, as shown below.

Our analysis begins by first restricting the space of the model's parameters in order to study what might be argued as one of the more interesting or plausible environments in which the bank would operate. These restrictions also make the following analysis of the effects of information disclosure more manageable. Appendix A outlines restrictions on the values of asset payoffs and probabilities (V_i's, p_{ij}'s), levels of insured and uninsured deposits (D_i, D_u), interest rates (r_w, r), as well as liquidation costs and proportion of deposits that can escape during a bank run before it is closed (k, w). These parametric assumptions are sufficient constraints such that the following conditions hold:

(A) If the good state occurs, the bank's asset returns are such that the bank never defaults, while if the bad state occurs, the bank will always default.

(B) If banks choose to disclose information, and the signal is good, it is never in the interest of any uninsured depositor to withdraw early.

(C) If banks choose to disclose information, and the signal is bad, it is always in the interest of any uninsured depositor to withdraw early.

(D) If the bank chooses not to disclose information, it is never in the interest of any depositor to withdraw early.

Condition (A) simplifies the following analysis, as deposits remaining in the bank at the end of the period are paid their promised return if the good state occurs regardless of whether a bank run by uninsured depositors has taken place. This implicitly assumes a sufficient level of capital in the good state to absorb any liquidation costs deriving from a run by uninsured depositors. While this neglects the possibility, pointed out by Diamond and Dybvig (1983) among others, that the liquidation costs from bank runs may by themselves cause insolvencies, the focus of this paper is somewhat different from standard models of bank runs. First, a run by uninsured depositors at a bank where some deposits are insured is probably less costly than a run occurring at a bank where all deposits are uninsured, the case usually analyzed by other models of bank runs. Second, if in the modern era, banks have access to borrowing from the Fed Discount Window to handle unexpected withdrawals, as well as increasingly developed secondary markets in what were historically illiquid assets of the bank, liquidation costs may again be minimal.

Conditions (B), (C), and (D) are assumptions concerning the type of signals and the probability distributions of the good and bad state. Intuitively, conditions (B) and (C), that under a disclosure policy depositors will not run when receiving a good signal and will run when receiving a bad signal, would likely hold if these signals are fairly good predictors of the end of period state, i.e., the conditional probabilities p_{gg} and p_{bb} are relatively high.

Condition (D), that it will not be optimal for depositors to run if no information is disclosed, will be more likely to hold if the bad state is a low probability event. Therefore, one might think of the good state as the "normal" outcome, with the bad state denoting an unusual loss, e.g., unexpected loan defaults.

When a bank chooses a policy of not revealing information, the equilibrium promised return on uninsured deposits, r_u^{nd} can now be determined. Equating the risk neutral uninsured depositors' expected return to the risk free rate, it is straightforward to show

$$r_u^{nd} = [r - p_b V_b/(D_u + D_i)]/p_g \tag{1}$$

where $V_b/(D_u + D_i) < 1$ is the return on a dollar of uninsured deposits in the bad state.

Similarly, if a bank's policy is that of disclosing information, one can show that the promised return on uninsured deposits must equal:

$$(2) \qquad r_u^d = \{r - p_{bg}p(gs)\frac{V_b}{(D_u + D_i)} - wp(bs)r_w - (1 - w)p(bs)p_{bb}\frac{[V_b - (r_w + k)wD_u]}{[D_u(1 - w) + D_i]}\}/\phi$$

where $\phi = p_{gg}p(gs) + (1 - w)p_{gb}p(bs)$ and $[V_b - (r_w + k)wD_u]/(D_u(1 - w) + D_i)$ is the return on a dollar of uninsured deposits left in the bank in the bad state after a run occurred.

A bank's expected end of period profit can then be calculated. In the case of a policy of no information disclosure, expected profits equal;

$$(3) \qquad E[\pi^{nd}] = (V_g - r_u^{nd}D_u - rD_i)p_g - rh^{nd}D_i$$

where h^{nd} is the deposit insurance premium charged by the FDIC in this case.

Expected end of period profit for a policy of information disclosure can also be shown to equal;

$$(4) \qquad E[\pi^d] = (V_g - rD_i - r_u^dD_u)p_{gg}p(gs) + [V_g - rD_i - w(r_w + k)D_u - (1 - w)r_u^dD_u]p_{gb} - rh^dD_i$$

where h^d is the deposit insurance premium charged by the FDIC in this case. The first term on the right-hand side of (4) represents expected bank profits when the good state follows a good signal, while the second term is expected profits when the good state follows a bad signal and a run on the bank.

The bank's incentive to disclose information voluntarily can now be examined by comparing expected end of period profits for each case. The promised returns to uninsured deposits, equations (1) and (2), are substituted into the expected profit equations (3) and (4). The difference between expected profits under the two policies must therefore be;

$$(5) \quad E[\pi^{d}] - E[\pi^{nd}] \equiv \psi = (h^{nd} - h^{d})rD_{i} + D_{u}p_{bb}p(bs)\Big\{-wkp_{gb}/p_{bb} + wr_{w} + (1 - w)\frac{\left(V_{b} - (r_{w} + k)wD_{u}\right)}{\left(D_{u}(1 - w) + D_{i}\right)} - \frac{V_{b}}{(D_{u} + D_{i})}\Big\} .$$

If the FDIC does not discriminate between whether banks disclose information or not, let alone distinguish between other characteristics of risk in banks' financial structure, then $h^{nd} = h^{d}$. A bank's decision whether or not to reveal information then depends on the sign of the terms in brackets "{ }."

The first term within the brackets, $-wkp_{gb}/p_{bb}$, is necessarily non-positive, and represents the expected liquidation costs from bank runs that might occur if the bank turns out not to default even though the interim information signalled the bad state. The last three terms within the brackets represent the difference in the expected rate of return to uninsured depositors who attempt to withdraw deposits versus not withdrawing deposits given the bad state occurs. Condition (B) above implies that the sum of these terms is non-negative. Therefore, for sufficiently small liquidation costs and/or probability that the bad signal is "incorrect," the bank will prefer to disclose information rather than not, and hence ex-ante, prefer an equilibrium where bank runs can occur, over one in which they cannot.

The intuition behind this result may now be apparent to the reader. By agreeing to inform uninsured depositors of an increased possibility failure, uninsured depositors are able to receive a higher return on at least a portion of their deposits (those withdrawn early) relative to the return they would receive in the bad state in which they have to share the remaining bank assets with the FDIC. In a sense, those deposits withdrawn early are being de facto insured by the FDIC, and therefore the overall risk premium demanded by uninsured depositors will be less, leading to higher expected bank profits. If the FDIC does not take into consideration the liability from additional insurance by charging a higher insurance premium to those banks which choose to disclose information, as might realistically be the case, banks may well choose to disclose information, even though it results in a positive probability of bank runs. The one factor that may offset this incentive to disclose information is the liquidation costs that occur when a run follows a bad signal but the bank turns out to be solvent. In this case, shareholders absorb the costs of liquidation rather than the FDIC.

Examining in more detail the incentive for a bank to disclose information, it is easy to show the following comparative statics relations:

(6) $$d\psi/dk \leq 0$$

(7) $$d\psi/dp_{gb} \leq 0 \ , \quad d\psi/dp_{bb} \geq 0$$

(8) $$d\psi/dr_w \geq 0$$

(9) $$d\psi/dw \geq 0 \ , \quad \text{if } \psi \geq 0$$

(10) $$d\psi/dV_b \leq 0 \ .$$

As mentioned previously, from (6) and (7) banks will be more inclined to prefer disclosure the lower are the costs of liquidation and the more accurate is the bad signal an indicator of the bad state at the end of the period.

Relation (8) indicates that higher returns to depositors who withdraw early also results in favoring a disclosure policy, which suggests that banks may not set penalties for early withdrawals at excessive levels. Similarly, result (9) points out that it will be in the interest of banks and uninsured depositors to set contractual arrangements which enable deposits to be withdrawn quickly and at low cost, such as negotiating shorter maturities on uninsured deposits. Conversely, the more rapidly the FDIC acts to close banks once a bank run starts, the less incentive banks will have to disclose information. Another way to interpret this condition is that if the FDIC can observe the content of the bank's disclosure of information to depositors, and quickly proceed to close the bank if the signal is bad, the initial incentive for information disclosure is diminished.

Notice from in equation (5), ψ does not depend explicitly on the bank's asset return in the good state, V_g, but only the asset value in the bad state, V_b, as long as condition (D), the requirement that the bank cannot default if the good state occurs. Relation (10) then provides two insights. First, for a given level of initial capital contributed by the shareholders of the bank, the bank will have more incentive toward disclosure the greater is the variance (risk) of the bank's assets, i.e., the smaller is the payoff in the bad state relative to the payoff in the good state. Second, for a given variance of asset returns, banks will be more likely to prefer information disclosure the more highly levered (smaller level of initial capital) is the bank.

These results, of course, are comparative statics that can be derived from option pricing theory. By disclosing information, uninsured depositors are given a valuable option in being able to withdraw deposits early, deposits which in fact become de facto insured by the FDIC.[14] The greater the possibility of default by the bank (from either greater asset variance or leverage), the more valuable is this option. Depositors pay the bank for this option via a lower risk premium on uninsured deposits. If banks are not similarly charged by the FDIC in the form of a higher deposit insurance premium, expected bank profits increase.

If the FDIC can account for whether a bank chooses to disclose information, and charges a sufficiently higher premium in this event, any incentive toward disclosure is eliminated. Note that for a policy of no disclosure, the premium which equates the FDIC's expected net liability to zero is given by:

$$h^{nd} = p_b[1 - V_b/(r(D_u + D_i))] \tag{11}$$

which would leave expected bank profits equal to:

$$E[\pi^{nd}|h^{nd} = h^*] = V_g + V_b - r(D_u + D_i) \ . \tag{12}$$

Observe that in this case banks are indifferent between issuing insured or uninsured deposits.

Alternatively, if banks choose a disclosure policy, the FDIC's fair premium would be:

$$h^d = p_{bg}p(gs)[1 - \frac{V_b}{(r(D_u + D_i))}] + \tag{13}$$

$$p_{bb}p(bs)[1 - \frac{(V_b - (r_w + k)wD_u)}{(r(D_u(1 - w) + D_i))}] \geq h^{nd}$$

given conditions (A) to (D). If banks are charged this premium, expected profits then equal:

$$E[\pi^d|h^d = h^*] = V_g p_g + V_b p_b - r(D_u + D_i) - D_u wkp(bs) \leq E[\pi^{nd}|h^{nd} = h^*] \ . \tag{14}$$

In the event that the FDIC can account for a bank's disclosure policy, the shareholders of the bank can be forced to "pay" for any potential liquidation costs, as well as the de facto insurance of uninsured depositors who withdraw early. In order to avoid potential liquidation costs from bank runs, the bank will refrain from information disclosure. However, in practice it may be quite difficult for the FDIC to monitor each bank's disclosure policy.

Ceteris paribus, an FDIC policy of leaving uninsured depositors unprotected would naturally create a gain to the FDIC by lessening its liability relative to its practice of de facto insuring all deposits. Our analysis has shown that institutional changes, such as banks increasing their level of information disclosure, may partially offset the initial gain by the FDIC. Further, under some perhaps unlikely conditions, this initial gain could be totally offset.[15] In any case, it should be recognized that the benefits of terminating de facto insurance may be smaller than first thought.

III. Conclusions and Caveats

A simple model was constructed to analyze the effects of a market discipline strategy which ends de facto government insurance of legally uninsured deposits. This strategy is shown to induce behavioral responses by bank managers and depositors which can mitigate the amount of liability being shifted to uninsured depositors. Increased information disclosure would enable uninsured depositors to withdraw their funds when the probability of default rose, thereby avoiding liability for the negative net worth of the failed bank. Related responses would be a reduction in penalties for early withdrawal of deposits and a shortening of deposit maturity.

Our model considered the situation in which withdrawals of deposits were non-optimal for the case of no information disclosure. Alternatively, a different beginning of period equilibrium could be assumed in which withdrawals of deposits would be optimal under no information, but that a bank run could be averted by an announcement of a "good" signal. This is certainly a feasible, though perhaps less interesting case, since banks will always choose a policy of information disclosure to avoid the cost of liquidating assets when good information is announced. Bank runs will always result whether bad news or no news is disclosed.

Additionally, only one type of interim information was assumed. More complicated behavior might result from private information being received by each of the uninsured depositors, the bank, or the FDIC at non-synchronous points in time. However, it would appear that if banks received a much larger quantity of reliable information than either depositors or the FDIC, the findings of this analysis would remain robust.

Increasing the amount of other bank liabilities that bear risk from failures may prove to be a superior market discipline strategy to that of removing the de facto government insurance of deposits. The FDIC has proposed requirements that would increase banks' level of subordinated debt.[16] Unlike uninsured deposits, this longer maturity debt would not give its holders the option to withdraw their funds if the bank's condition suddenly deteriorates. They would be unable to avoid liability for the negative net worth of the failed bank. However, longer maturity debt possesses another characteristic that can make it an inefficient vehicle for imposing market discipline. With longer debt maturities and hence a longer time between new debt issues, Myers (1977, p. 158) and Jensen and Meckling (1976) show that firms may be induced to make sub-optimal risky investment decisions. The current requirement that subordinated debt must have a minimum seven year initial maturity to be counted as secondary bank capital is probably objectionable from this point of view. Greater market discipline may be achieved through a shorter maturity (one to three years, perhaps) subordinated debt requirement.

APPENDIX A

This appendix gives a set of sufficient parameter restrictions such that conditions (A) to (D) of the text hold.

Condition (A) requires that banks always have positive net worth if the good state occurs and always have negative net worth if the bad state results. Hence the end of period value of bank assets must exceed the value of non-ownership liabilities, whether or not a bank run has occurred, if the good state results.

$$V_g \geq rD_i + \max\{r_u D_u, \ [(1 - w)r_u + (r_w + k)w]D_u\} \qquad \text{(A.1)}$$

where r_u is the maximum of r_u^d or r_u^{nd} given by equations (1) and (2) in the text. Similarly to have the bank default in the bad state,

$$V_b \leq rD_i + \min\{r_u D_u, \ [(1 - w)r_u + (r_w + k)w]D_u\} \qquad \text{(A.2)}$$

where r_u is the minimum of r_u^d or r_u^{nd}.

Conditions (B) and (C) relate to the policy of information disclosure. If a good signal occurs, for an individual to optimally not withdraw uninsured deposits, a worst case scenario is considered. The expected return to not withdrawing deposits is compared to the expected return to withdrawing deposits, given that all other uninsured depositors attempt to withdraw. For withdraw to be non-optimal, this will imply:

$$r_u^d p_{gg} + \frac{[V_b - (r_w + k)wD_u]}{D_u(1 - w) + D_i} p_{bg} > r_w \qquad \text{(A.3)}$$

where r_u^d is given by equation (2). Note as p_{bg} becomes small, one only needs $r_u^d > r_w$ for condition (B) to hold.

In the event that the signal is bad, for early withdrawal to be optimal, condition (C), the worst case scenario is again considered. If all other depositors do not withdraw, for an individual to wish to withdraw early, it must be that:

$$r_u^d p_{gb} + \frac{V_b}{D_u + D_i} p_{bb} < r_w . \qquad (A.4)$$

Finally, condition (D) relates to a no disclosure policy. Taking once again the worst possible case, consider the decision of an individual depositor not to withdraw, given all other uninsured depositors attempt to withdraw. In this instance, for withdrawal to be non-optimal:

$$r_u^{nd} p_g + \frac{\left(V_b - (r_w + k)wD_u\right)}{D_u(1 - w) + D_u} p_b > r_w \qquad (A.5)$$

where r_u^{nd} is given by equation (1).

Footnotes

[1]Pyle (1983) presents arguments against the feasibility of risk-sensitive deposit insurance pricing.

[2]See Federal Deposit Insurance Corporation (1983) and Federal Home Loan Bank Board (1983) for proposed reforms to the deposit insurance system. Eisenbeis and Gilbert (1985) reviews mechanisms for imposing greater market discipline on banks.

[3]In cases in which the FDIC handles a bank failure by making direct payments to insured depositors rather than merging the bank, uninsured depositors are left unprotected. This direct payoff method has generally only been used with relatively small bank failures, though it was implemented in the 1982 Penn Square Bank failure, which was a medium-sized bank.

[4]While not the focus of this paper, it can be argued that greater information disclosure can provide benefits to borrowers and lenders by eliminating the type of adverse selection problem described by Stiglitz and Weiss (1981). If lenders (depositors) cannot distinguish between high and low risk borrowers (banks), an equilibrium involving lower risk banks being driven from the market could result.

[5]Ibbotson and Fall (1979) estimate that the ratio of aggregate corporate long and intermediate bonds to corporate commercial paper to be 3.29 in 1978, the last year of their study. For the same year, the ratio of aggregate commercial bank subordinated notes and debentures and all "other" liabilities, including mortgage indebtedness to time and certificates of deposits in amounts of $100,000 or more was .33. (See Annual Report, FDIC, 1978, Table 107). Admittedly, these ratios are very crude measures of the relative proportions of long term to short term uninsured liabilities in corporations

versus commercial banks, however, it appears unlikely that more sophisticated measures would overcome the large disparity in these ratios.

[6]A somewhat similar model can be found in Kane (1986), though the possibility of bank runs and the effects of imperfect information are not considered in his model.

[7]There is not a clear consensus concerning whether the FDIC's bank closure rule depends on the market value of net worth or the book value of banks' net worth. Pyle (1986) argues that regulators' propensity to rely on book value measures results in banks remaining open following audits in which they may be economically insolvent. While the FDIC's type of closure rule may significantly affect its liability, it would not qualitatively affect this model's results, save that bank's runs may induce the FDIC to close banks somewhat sooner than it normally would.

[8]For the sake of analytical simplicity, it is assumed that claims on a failed bank's assets are divided according to initial share values of insured and uninsured deposits, not final promised shares. For example, uninsured depositors' share of bank assets is $V_b D_u/(D_i + D_u)$ rather than $V_b r_u D_u/(D_i r + D_u r_u)$. This difference is of little qualitative significance.

[9]Allowing uninsured depositors who withdraw early to reinvest the proceeds is similar to the model studied here but with r_w larger and the total cost to the bank $(r_w + k)$ being the same as before. No substantial changes would result from this alternate modelling choice.

[10]Alternatively, one can think of only a proportion, w, of deposits leaving the bank before the end of period FDIC audit because some deposits are of longer maturity and cannot be withdrawn before the period's end. Guttentag and Herring (1983) note that large creditors tend to withdraw deposits

gradually as they mature, a process better described as a "walk" rather than "run."

[11]As before, assets are split according to initial claim values, so uninsured deposits remaining in the bank equal $(1 - w)D_u[V_b - (r_w + k)wD_u]/((1 - w)D_u + D_i)$.

[12]In this model, given the parametric restrictions to be assumed, the bank will always choose to commit to reveal information at the beginning of the period if its information disclosure policy is to have any different effects on depositor behavior relative to a policy of no information disclosure. Since the interest rate on uninsured deposits is negotiated at the beginning of the period, in order to gain a possibly lower interest rate, the bank must be able to guarantee to depositors that bad (and hence all) information will be disclosed if received in the future. The only way to assure depositors of this is to commit initially to disclose. A policy of deciding to disclose (good) information only after the bank has received its signal will turn out to be no different from a policy of no information disclosure.

[13]Many large institutional depositors subscribe to services such as Keefe, Bruyette & Woods' Bank Watch service and Standard and Poors, which rate the risk of individual bank's deposits and debt. It is not unusual for high level bank officials to meet with these firms concerning their bank's rating. See "Bank-Rating Service's Influence Grows," The Wall Street Journal, August 6, 1985. Other private firms which analyze and rank banks include Sheshunoff & Co. and Veribanc, Inc.

[14]Merton (1977) illustrates the analogy between the value of deposit insurance and the pricing of put options.

[15]Consider the FDIC's liability, $E[L_1]$, if uninsured depositors are de facto insured (and the depositors realize this), and no information is disclosed.

$$E[L_1], = \left[r(D_i + D_u) - V_b\right]p_b$$

Compare this to the polar case in which the FDIC leaves uninsured depositors unprotected, but that all uninsured deposits can escape the bank given a bad signal, i.e. $w = 1$. Also assume that the bad signal is a perfect indicator of the bad state, $p_{gb} = 0$, which will insure the optimality of a policy of disclosure. The FDIC's expected liability, $E[L_2]$, is then

$$E[L_2] = \left[rD_i - \left(V_b - (r_w + k)D_u\right)\right]p_b$$

which exceeds $E[L_1]$ for $(r_w + k) > r$.

[16]FDIC News Release PR-57-85, May 6, 1985.

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