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From Free Banking to Bank Bailouts

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Abstract

This paper builds on the work of Diamond (1984, 1996) to examine the benefits and costs of government guarantees on deposits in a simple, but rigorous, model of banking based on monitoring costs and portfolio diversification. Government monitoring of banks combined with guarantees to depositors can potentially lower financial distress costs in the model. At the same time, however, government guarantees create incentives for banks not to monitor, thereby raising financial distress costs. The two effects make the net welfare effect of guarantees ambiguous. The model provides the starting point for a discussion of a commonly-observed pattern in which instability in lightly regulated banks leads to the introduction of deposit insurance which, in turn, leads to bank bailouts a number of years later.

Many emerging market economies are small and relatively undiversified. These characteristics pose problems for the stability of banks in regions such as Latin America, Asia, and elsewhere. Indeed, it is now taken for granted that government guarantees on the operation of banks are needed to prevent banking instability in such economies. In the last eighteen years thirty countries have adopted deposit insurance programs in response to concerns regarding financial instability.[1] Since the widespread adoption of deposit insurance is a recent phenomenon, a research and policy concern is to determine whether, and under what circumstances, government deposit guarantees can really stabilize banking systems in these economies. The recent experience of countries in Southeast Asia, Latin America, and Eastern Europe with bank failures and government bailouts suggests that deposit insurance is not a panacea.

This paper builds on the work of Diamond (1984, 1996) to examine the benefits and costs of government guarantees on deposits in a simple, but rigorous, model of banking based on monitoring costs and portfolio diversification. Government monitoring of banks combined with guarantees to depositors can potentially lower financial distress costs in the model. At the same time, however, government guarantees create incentives for banks not to monitor, thereby raising financial distress costs. The two effects make the net welfare effect of guarantees ambiguous.

The model provides the starting point for a discussion of a commonly-observed pattern in which instability in lightly regulated banks leads to the introduction of deposit insurance which, in turn, leads to large-scale bank bailouts a number of years later. The paper concludes with some observations regarding alternatives to deposit insurance.

[1] See Lindgren, Garcia, and Saal (1996) for discussion of many issues raised by the regulatory response to over 130 episodes world-wide of bank failure during the 1980s and 1990s.

1. Diamond's Model

This paper's model is an extension of Diamond (1984, 1996) in which banks serve as delegated monitors for the outcomes of investment projects. In Diamond's (1996) paper projects yield returns that can only be observed by the owner of the project. With limited capital, the owner must obtain outside financing. Equity financing does not work because the project owner has no incentive to be truthful about the project's return when distributing dividends. Debt financing with liquidation costs in the case of default will induce truth telling because the project owner faces a financial penalty (liquidation of the project) if he claims a low return.

Diamond (1996) is built around a numerical example, which this paper extends. The first stage of his example derives optimal debt contracts with direct borrowing. The second stage then introduces a delegated monitor (bank). There are risk-neutral lenders and borrowers. Borrowers have no capital of their own, but need to raise 1 unit (where 1 unit = \$1 million). Each investor has $1/m$ units to invest, where m = 10,000. Therefore, each lender has 1/10,000 = .0001 (\$100). Monitoring the borrower to determine whether the borrower is telling the truth costs K = .0002 (\$200), which exceeds any individual lender's capital. If all m lenders were to monitor, duplicated monitoring would require a prohibitively large expenditure of mK = 2 (\$2 million).

The project's return is a random variable V with a return H = 1.4 with probability p = 0.8 and a return L = 1 with a probability p = 0.2. Investors require a return of 5 percent (r = .05). The firm can appropriate any part of the return not paid to the investors, and only the firm can observe the project's return. If the firm declares the low

return, the investor must impose a penalty to induce the firm to pay when the good state occurs. In Diamond's example the penalty is liquidation of the project, so that the project yields nothing to borrowers and lenders.

The face value (f) of the optimal debt contract solves the following equation: $(0.8)f = 1.05$. The face value of the debt contract is therefore $f = 1.3125$, with a corresponding interest rate of 31.25 percent. A lower interest rate on the debt would give an expected return that is less than the required 5 percent return. The threat of liquidation of the project induces the borrower to repay in high states of the world.

In this first stage of the example the financial distress costs, which are real resource costs associated with liquidation, amount to $S = (0.2)(1) = 0.2$ ($200,000). If any outside agent had the incentive to monitor the project, then liquidation could be avoided in the low states of the world. Unfortunately, as already noted, monitoring costs .0002 ($200). If one agent attempted to become a banker (taking deposits from investors and lending to the firm) there would be no way to recoup the monitoring costs, because the depositors would still need to liquidate the banker in low states in order to induce the banker to repay in high states of the world.

Although a one-loan bank would not be viable, Diamond shows that a two-loan bank may succeed. The success of the two-loan bank comes from the banker's ability to avoid liquidation of projects by investing in monitoring. By monitoring the banker can cross-subsidize loan returns, taking advantage of risk sharing offered by a diversified portfolio.

With two loans the banker must collect 2 ($2 million) in deposits from 20,000 investors. The returns on the two loans are uncorrelated and have the same distribution

of returns (H = 1.4 with p = 0.8 and H = 1 with p = 0.2). The bank receives the face value (F) on a loan when the project's return is 1.4. The loan portfolio has the following distribution of returns: $2F$ with p = (0.8)(0.8) = 0.64, $1+F$ with p= 2(0.8)(0.2) = 0.32 and 2 with p = (0.2)(0.2) = 0.04.

In order for monitoring to make sense, the bank must survive when one at least one loan pays F. If the bank is to avoid liquidation with a probability of 0.96, the face value on deposits (f) must satisfy: (0.96)(2)f = (1.05)(2), or $2f$ = 2.1875, so that the interest rate on deposits is .1875/2 = .09375. If the bank is to avoid liquidation when one loan pays 1 and the other loan pays the face value F, then the face value must satisfy $1+F$ = 2.1875, so that the loan rate must be at least .1875.

Monitoring has no value to the bank when both projects have high returns or when both projects have low returns. Monitoring has value to the bank when the high returns from one loan can be used to subsidize the low returns on the other loan. In order for the bank to have the incentive to monitor, the banker must be able to recover the costs of monitoring when the return on the portfolio is $1+F$. This implies the following: (0.32)($1+F$-2.1875) = .0004, or F = 1.18875. The loan rate must be slightly in excess of 18.75 percent for the banker the incentive to monitor the loans. The cross-subsidization of loans allows the bank to pay off depositors (2.1875) and to cover the cost of monitoring .0004 = (0.32)(2.18875 - 2.1875).

The bank keeps all returns from its loans that exceed the amount promised to depositors. These returns amount to (0.64)(2.3775-2.1875) + (0.32)(2.18875-2.1875) = .1216 +.0004 = .122 ($122,000). The return .0004 covers the cost of monitoring, so the remaining expected return .1216 is a control rent that goes to the bank This rent, which

amounts to 6.08 percent per loan, is the residual return that the bank gets as a result of monitoring the two loans. As long as banks can only make two loans, this control rent cannot be competed away.

Relative to directly placed debt, which involved financial distress costs of 0.2 per loan, the two-loan diversified bank lowers the distress costs to 0.04 at a cost of .0002 per loan in monitoring expense. The total real resource saving per loan is .1598 (.2 - .04 - .0002) relative to unmonitored debt. This saving goes to the banker in the form of .0608 in control rents and to the firm by reducing the cost of borrowing in the amount (1.3125-1.18875)(.8) = .0990 (where .1598 = .0608 + .0990).

2. Government Guarantees on Deposits

This section extends Diamond's (1996) example to include an outside monitor, which will be called the government. The government's objective is to minimize the costs (S) of financial distress, to which it can contribute by monitoring the bank on behalf of the depositors. If the government could commit itself always to monitor and release that information to depositors there would be no financial distress costs, since deposit contracts could have state-contingent payoffs. The government would prefer not to spend resources on monitoring, however, and would like simply to rubber stamp the bank's declarations regarding loan payoffs because that would lower the government's costs. Since the government cannot commit itself to monitor, depositors are no better off with the government and must still liquidate the bank when it cannot pay. In order to create the incentive to monitor, the government must tie its hands by guaranteeing depositors a

certain return of .05 on bank deposits. The deposit guarantee effectively penalizes the government when it does not monitor by raising the fiscal cost of the guarantee.[2]

I start the analysis of the government guarantee with the one-loan bank. This bank is not viable in Diamond's (1996) model, but a government guarantee on deposits enables the bank to pay depositors 5 percent, instead of 31.25 percent. The expected gain to the firm and the bank relative to directly placed debt would be (1.3125-1.05)(0.8) = .21. As long as the bank can charge a face value greater than or equal to 1.05 on its loan, the bank will be viable due to the government guarantee.

If the government does not monitor the loan, the project would be liquidated whenever its return is 1 (20 percent of the time). The expected fiscal cost of the guarantee to the government would be (1.05)(0.2) = .21. By monitoring, the government lowers the expected fiscal cost of the guarantee to (1.05-1)(0.2) = 0.01. I will assume that the government is not as efficient at monitoring as the bank, and that it incurs an ex-post cost of .05 ($50,000) with a 20 percent probability to verify that the project return is 1. Summing the expected real expenditure on monitoring with the expected transfer to prevent default on deposits, the expected cost to the government of providing the guarantee is 0.02. Relative to directly placed debt, the cost of financial distress is reduced by 0.19 (0.2 - 0.01, where .01 is the expected cost of monitoring). The total value of monitoring accrues to the government, so that the benefit to the bank and firm is 0.21 whether or not the government monitors the bank.

[2] Alternatively, the government could create a monitoring agency that monitors the banks on behalf of the depositors. If the government cannot count on the monitoring agency to monitor on its own, it can guarantee depositors a return of .05 on bank deposits while simultaneously creating a guarantee fund for the agency to administer. The deposit guarantee effectively penalizes the monitoring agency when it does not monitor by reducing the size of the guarantee fund. There remain other commitment issues, such as the government's commitment not to suspend the guarantee, which I do not address in this paper.

Two-Loan Bank with Deposit Guarantee

Now consider how a deposit guarantee without government monitoring alters the two-loan bank. I will refer to the bank without the guarantee as a "free bank", while the bank with the guarantee will be the "government-guaranteed bank."[3] The government-guaranteed bank will be able to attract deposits by offering a return of 5 percent instead of the 9.375 percent return that the free bank must offer. To avoid liquidation when one loan pays 1 and one loan pays the face value (which occurs with a probability of 0.32), the loan rate must be at least 10 percent instead of 18.75 percent without the guarantee. In order for the government-guaranteed bank to have the incentive to monitor, the banker must be able to recover the costs of monitoring when the return on the portfolio is $1+F$. This implies the following: $(0.32)(1+F-2.1) = .0004$, or $F = 1.10125$.

With a loan rate of 10.125 percent, the bank earns control rents when both projects have high returns. The expected value of these control rents is (0.64)(2.2025-2.1) = .0656, or 3.28 percent per loan. In comparison with the control rents of 6.08 percent per loan earned by the free bank, the government guarantee lowers the rents by 2.8 percentage points.

The cost to the government of providing the guarantee (without government monitoring) is (1.05)(.04) = .042. The expected gain to the borrower relative to directly placed debt is (1.3125-1.10125)(.8) = .1690. The gain to the borrower from a two-loan

[3] Free banks historically issued bank notes and were either subject to unlimited liability (as in Scotland) or limited liability (as in the United States). These banks were generally lightly regulated by the government, and their notes were not guaranteed. My usage here is a shorthand for banks that operate without government guarantees.

government-guaranteed bank is 7 percentage points relative to a two-loan free bank. This gain comes from the reduced control rents of 2.8 percentage points plus the 4.2 percentage point expected subsidy from the government's guarantee.

The net resource saving of the government guarantee relative to directly placed debt is 0.2-0.04-0.0002 = 0.1598, which is the same as the saving produced by the two-loan free bank. But relative to the free bank, the guarantee has a redistributive impact which benefits the firm at the expense of the bank and the government.

As with the one-loan guaranteed bank, the government can lower the cost of its guarantee by monitoring the bank's loan. As before, I assume that the government incurs an ex-post monitoring cost of .05 per loan when the bank defaults. The expected cost of monitoring is therefore (.05)(.04) = .002. By monitoring the government can reduce the fiscal cost of its guarantee from .042 to .004 = (.04)(1.05 - 1) + (.05)(.04), or .002 per loan. The resource saving per loan relative to directly-placed debt by the firm is .20 - .002 - .0002 = .1978, where .20 is the financial distress cost associated with directly-placed debt, .002 is the expected cost per loan of ex-post government monitoring, and .0002 is the cost per loan of the bank's monitoring.

Will the Bank Monitor When the Government Guarantees Deposits?

A diversified two-loan bank with bank monitoring of loans and *ex-post* government monitoring of the bank offers the prospect of eliminating financial distress costs at a low cost in terms of monitoring expenditure by the bank and the government. But is this banking arrangement viable? A two-loan banker monitors in order to cross-

subsidize loan returns when one loan pays high and the other one pays low. This monitoring by the banker lowers the cost of monitoring by the government because it lowers the probability of bank default. However, in order for a two-loan government-guaranteed bank to have the incentive to monitor, it must charge a loan rate of 10.125 percent. A one-loan guaranteed bank, on the other hand, does not need to monitor and can lend at a rate under 10.125 percent (as long as the rate exceeds 5 percent). Competition from one-loan guaranteed banks will consequently drive out diversified two-loan guaranteed banks.

Even if a diversified two-loan bank decides not to monitor, it will avoid default with a probability of only (.8)(.8) = .64. On the other hand, a nondiversified one-loan bank making two loans with perfectly correlated returns will avoid default with a probability of 0.8. The apparent superiority of a two-loan diversified bank with *ex-post* government monitoring of the bank is therefore an incentive-incompatible institutional arrangement.

Even though the two-loan guaranteed bank is not viable, it is still the case that a one-loan bank with government monitoring generates a resource gain (.19) greater than a two-loan free bank (.1598). But this advantage is eliminated by allowing the free bank to add a third loan whose returns are uncorrelated with the first two. With three loans, if the bank only must default when all three have a return of 1, then the interest rate that must be promised to depositors is 5.85 percent and the loan rate that must be charged to borrowers is 17.96 percent. The resource saving relative to directly placed debt by the firm is .20 - .008 - .0004 = .1916, where .008 = (.2)(.2)(.2) is the probability of all three loans simultaneously having a low return (which results in the liquidation of the bank)

and .0004 is the cost of monitoring two loans when only the third pays the face value. This resource saving per loan exceeds that of a one-loan guaranteed bank (.19).[4]

In this model, the government guarantee redistributes control rents and fiscal subsidies associated with the guarantee toward firms. The government guarantee also makes monitoring a diversified portfolio less profitable to the banker than specializing, so that one-loan guaranteed banks will drive two-loan (or multi-loan) banks out of business by offering a lower loan rate to the firm. Even though a one-loan guaranteed bank will drive free banks out of business, a free bank with three loans will outperform a one-loan guaranteed bank in terms of resource cost.

Portfolio Monitoring

The numerical example highlights the limits of government deposit guarantees when the government confines itself to monitoring the outcomes of banks' loans. This type of monitoring, which allows the government to avoid liquidating banks when returns are low, does not provide incentives for the bank to diversify. Just the opposite occurs since specialization in one type of loan dominates a diversified portfolio. A second type of monitoring, which requires all banks to diversify and which threatens a bank with liquidation if it does not diversify, is needed to make two-loan guaranteed banks viable.

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[4] With three loans, the portfolio pays $3F$ with p=(.8)(.8)(.8)=.512, $2F$+1 with p=3(.8)(.8)(.2)=.384, F+2 with p=3(.8)(.2)(.2)=.096, and 3 with p=(.2)(.2)(.2)=.008. If the bank does not default as long as one loan pays F, the payment on deposits must satisfy 3(1.05)=.992(3)B, or 3B=3.1754, or B=1.0585. For the bank to have the incentive to monitor when two loans default, the face value on loans must satisfy .096(2+F-3.1754)≥.0004, or F≥1.1796. The resource saving of .1916 per loan can be divided into the gain to the firm from a lower borrowing rate of (1.3125-1.1796)(.8)=.1063 and the bank's control rent of .0853=[.512(3F-3B) + .384(2F+1-3B)]/3. Both the firm and banker gain relative to the two-loan free bank.

In the numerical example if the cost of enforcing a diversified portfolio for the two-loan bank is .0062, the two-loan government-guaranteed bank will be identical to the three-loan free bank in terms of resource saving (.1916) relative to directly-placed debt by the firm. But the two banking arrangements will have different distributive implications. The loan rate of the three-loan free bank will be 17.96 percent while the loan rate of the two-loan guaranteed bank will be 10.125. The deposit rate paid by the three-loan free bank will be 5.85 percent while the deposit rate paid by the two-loan guaranteed bank will be 5 percent. For the free banking arrangement the resource saving is divided into a .1063 saving in borrowing costs to the firm and a control rent of .0863 to the bank. For the two-loan government-guaranteed bank, the resource saving is divided into a .1690 saving in borrowing costs to the firm, a control rent of .0328 to the bank, and .0102 in monitoring costs by the government (.1916=.1690+.0328-.0102, where the government's monitoring costs include .004 for *ex-post* monitoring of the individual returns on loans and .0062 for enforcing the diversification of the bank's loan portfolio).

3. From Free Banking to Bank Bailouts

Since 1981 the number of countries with explicit deposit insurance programs has risen from fifteen to forty-five. These programs represent a significant, but untested, institutional innovation in the adopting countries. While none of the thirty countries previously had anything resembling a free banking arrangement, deposit insurance represents an explicit government guarantee that probably has removed an incentive for banks to monitor loans and to maintain a diversified loan portfolio.

This paper's one-period model is a useful starting point for discussion of a commonly observed pattern of banking sector behavior. The pattern is one in which lightly regulated banks in small economies at some point (often in response to an external shock) exhibit instability which leads to a broad government guarantee on deposits. The guarantee, which is often accompanied by weak attempts to supervise bank operations, apparently stabilizes the banking system for a number of years, only eventually to result in a massive government bailout that entails large-scale fiscal and real resource costs.

One example of this pattern is Thailand in the 1980s and 1990s prior to the eruption of the Asian financial crisis. In the mid-1980s Thailand's banking sector experienced instability tied to the LDC debt crisis. In response, the government intervened in five banks and 50 finance companies whose combined assets were about one quarter of total financial assets (see Johnston 1991). In 1985 the government created a "lifeboat" rescue plan to recapitalize financial institutions. This was followed in 1988 with the creation of a deposit insurance fund. But in the decade following the creation of the fund there was little government oversight of the operations of banks. Following the eruption of the banking crisis in 1996, problem loans of the banking system would eventually represent 40 percent of total loans by the end of 1998.

Another example is Colombia. Colombia in mid-1980s had banking problems that resulted in the intervention in seven banks which held about one quarter of the banking system's assets (see Montés-Negret 1996). In 1985 the government established a deposit insurance scheme, but did not implement extensive supervision of banks. Following a lending boom in the mid-1990s, the Colombian financial system has shown

increasing signs of strain, including the government's intervention in the savings and loan system and several banks during the past year.

As a third example, Chile in 1976 tried to establish a lightly regulated banking system. The collapse of a medium-sized bank in early 1977 led to the rescue of depositors and foreign lenders and the establishment of an implicit guarantee for banks. But there was little attempt to provide more than light supervision of the banks between 1977 and 1981. Between 1981 and 1983 there was a massive collapse of the banking system and government intervention to protect domestic and foreign depositors (see De la Cuadra and Valdés 1992).

These three examples are cases where an initial banking arrangement with some depositor discipline proves to be unstable, threatening large financial distress costs. Government intervention that guarantees deposits promises to restore stability and to lower distress costs, but at the same time sets in motion a process that effectively penalizes banks that cross-subsidize loan losses with diversified loan portfolios. The model suggests that in all three countries the guarantees reduced the banks' incentive to monitor their loans, resulting either in the expansion of "one-loan" banks or in the reduction of diversification in existing banks. This result occurred because less diversified banks could offer lower loan rates than banks that had to monitor their loan portfolios (and which, consequently, required control rents). The apparent benefit of lower loan rates resulting from the introduction of deposit insurance came at the eventual cost of a government bailout.

Free Banking in Nineteenth Century Chile

The hypothesis that government guarantees lead to bank bailouts by altering bank behavior is difficult to prove because of long lags between the implementation of the guarantee and the initiation of the government bailout. If the lag is five or ten years, many other events occur in between that may be regarded as proximate causes of the bailout and which obscure the gradual, but persistent influence of the guarantee.

Two examples from Chile in the 1850s, 1860s, and 1870s are important because of the novelty and relative transparency of the paths taken to bank bailouts.[5] The first example involves the creation of a government-guaranteed one loan bank. In 1855 the Chilean Congress created the Chilean Mortgage Bank to assist landowners in using their land as collateral for agricultural loans. The Mortgage Bank was essentially a "one-loan" bank because of the high dependence of landowners on the export market for wheat that the California and Australian gold rushes had opened up. The Mortgage Bank could not have existed without the government's extensive involvement (Chile's president appointed the head of the bank and members of Congress formed its administrative council) and explicit guarantee on funds lent to the bank. During the five years between 1855 and 1860 landowners borrowed about 5 million pesos from the Mortgage Bank, an amount equal to about 20 percent of the annual value of exports. In 1859 and 1860 grain prices fell, the economy suffered a severe recession, and the government proceeded to secretly transfer unutilized funds from an 1858 railway construction bond to landowners in order to prevent them from declaring insolvency on their mortgage loans. This

[5] These examples are based on material in Brock (1993).

government bailout was one of the earliest explicit bailouts in nineteenth century Latin America.

A second example involves the series of events that transformed Chile's free banks into government-guaranteed banks. In 1860 the Chilean government passed a law creating note-issuing free banks whose owners were subject to unlimited liability. In 1866, amid general economic instability provoked by a short-lived war involving Chile and Peru against Spain over the Chincha guano islands, the Chilean government granted a guarantee on bank notes for five banks. The guarantee stated that the bank notes would be redeemable at par at government fiscal offices. Three of the banks subsequently sold their guarantees to the remaining two, so that by the early 1870s two banks had guarantees while the remaining banks did not.

Beginning in 1873 the Chilean economy began to suffer from the effects of the world-wide recession. During the period between 1873 and 1878, the largest of the non-guaranteed banks (*Banco Valparaiso*) cut its dividends so that the dividend rates between 1873 and 1878 were 8, 4, 8, 8, 9, and 6 percent. During the same period the largest of the guaranteed banks (the *Banco Nacional de Chile*) paid its stockholders dividends of 22, 19, 20, 20, 17 and 10 percent. Although this evidence does not directly address the portfolio diversification issue, it does suggest that guaranteed banks responded differently to adverse economic conditions and in a way that would raise the probability of a bank bailout by the government. That bailout finally took place in July 1878, when the Chilean congress met in secret session to suspend the convertibility of bank notes into silver (Chile was on a *de facto* silver standard at the time of the suspension of

convertibility). It was later revealed that the *Banco Nacional de Chile* had petitioned the government for the declaration of inconvertibility.[6]

Suspension of convertibility not only eliminated the possibility of a bank run, it also caused a depreciation of the exchange rate and rise in the price level that reduced the real value of banks' liabilities, thereby improving the banks' solvency. For at least the next two decades the 1878 abrogation of banking contracts--contracts that had originally been specified in terms of the silver peso and that were then changed by the government to the paper peso--was a contentious issue in Chilean politics. It was this abrogation that marks the first deposit bank bailout and the end of free banking in nineteenth century Chile.[7]

4. Conclusion

Diamond's (1984) model of banks as delegated monitors is a compelling model of banks in their role as intermediaries between small depositors and large borrowers. This paper has extended Diamond's (1996) numerical example of delegated monitoring with financial distress costs. The extension involves incorporating a government which attempts to monitor banks in order to reduce the costs to the economy associated with financial distress. Within this framework, the paper shows that a government guarantee on deposits commits the government to bear the cost of failure to monitor.

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[6] One deputy--reminding the Chamber of Deputies that the Minister of Finance, who had negotiated the bill of nonconvertibility, owned shares of *Banco Nacional* stock—proposed giving the Minister a badge of honor for patriotism.

[7] Note that this bailout involved a supension of the guaranteed convertibility of the peso into silver rather than the explicit transfer of funds that occurred with the Mortgage Bank's bailout in 1860. See also footnote 2.

The very process of guaranteeing deposits, however, takes away banks' incentive to diversify their loan portfolios. As a result, a government guarantee on a two-loan diversified bank, which would entail an expected fiscal cost of .002 (.002 = (.2)(.2) default probability on two diversified loans times a fiscal cost of .05), actually turns into an expected fiscal cost ten times larger (.02) as the guarantee induces the bank to transform its loan portfolio into two perfectly correlated loans (.02 = 2 loans times .2 default probability times .05 fiscal cost). Because of this two-edged aspect to government guarantees, a three-loan free bank outperforms a one-loan guaranteed bank (with three perfectly correlated loans) in terms of resource costs associated with intermediation.

The general problem is that the government is insuring banks against default. This insurance creates an incentive (a moral hazard) that encourages banks to take steps that increase the likelihood and cost of default. Verification of loan returns by the government does nothing to eliminate this incentive. In order to offset this moral hazard, the government needs to create a mechanism that causes guaranteed banks to have diversified loans—loans whose returns are not highly correlated. Assuming that the correlations of the bank's loans are private information, this means that the government either has to liquidate the bank when the bank says it cannot pay, or it has to incur monitoring expenses beyond those needed to check whether individual loan returns are low when the bank states they are low. The first alternative is no improvement over free banking. The second alternative involves government monitoring of the bank's portfolio as a whole and enforcing (*ex ante*) loan diversification by the bank.

Portfolio monitoring of banks is generally more difficult for a government to do than examination of loans after a bank declares the inability to pay depositors. Options such as risk-weighted capital requirements do not address overall portfolio risk. Dewatripont and Tirole (1994, pp. 162-63) suggest that peer groups can be used to establish norms for portfolio allocations. But the example of this paper suggests that government guarantees will push all banks toward portfolios that lower the amount of delegated monitoring and thereby increase the expected costs of the guarantee.

The alternative to greater government monitoring is to create financial structures in which there are other large private agents that have the incentive to monitor the banks. These agents could be private pension funds or other types of debt holders whose debt is subordinated to other depositors. Calomiris (1997) for example, has written a detailed proposal for the use of subordinated debt as an integral part of banking regulation in emerging market economies.[8] It is clear that unless some debt holders hold risky claims on the bank, the private sector will not exert pressures on banks to maintain diversified portfolios.

The paper's model provides a starting point for thinking about the frequently-observed sequence of financial distress in lightly regulated banks followed by the implementation of government deposit guarantees followed some years later by a government bailout of the banking system. Accounts of the events leading to government bailouts of banks generally emphasize bad supervision, macroeconomic instability, and

[8] An open question regarding reliance on subordinated debt is whether subordinated debt holders would really eliminate the incentive toward less portfolio diversification. There are two reasons why they may not. First, macroeconomic shocks may wipe out enough of the value of banks to turn subordinated debt holders into *de facto* equity holders, whose incentive would be to have the bank take greater risks rather than to curtail the bank's operations. Second, if subordinated debt holders can successfully argue that poor bank performance is due to external shocks that affect all banks equally, they may press the argument that they should be treated equally with other depositors.

fraud. Little attention has been placed on the gradual process by which government guarantees make a banking system's loan portfolio less diversified, less monitored, and more subject to systematic failure, even in the absence of fraud or high-risk loans. Because the initial gains from adopting deposit insurance are seductively easy, the path from free banking to government bailouts is an easy one to take.

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