Private prices, public insurance: The pricing of federal deposit insurance

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In *Garn-St Germain,* the U.S. Congress called on each deposit insurance agency to produce a blueprint for deposit insurance reform.[1] This article discusses the problems associated with one aspect of the reforms proposed by these reports: the price paid by banks and other institutions to their respective federal insurance agencies.

Under the current system, all banks pay the same fee per dollar of deposit, despite the fact that some banks are more likely to experience the kind of failure that is costly to the FDIC. This approach to deposit insurance is called a flat fee system. Flat fees create incentives for banks to increase the riskiness of their portfolios.[2] The insurance authorities, in their reports, hoped to reduce or eliminate this incentive by linking the insurance fee to the riskiness of each bank's portfolio. Less risky banks would pay lower fees, more risky banks would pay higher fees.

It is important to understand the nature of the risk faced by the deposit insurers. If monitoring of bank asset values is perfect and costless, neither depositors nor insurers need suffer a loss. When the value of assets declines to the point where they are just sufficient to pay off depositors' future claims, the bank can be closed and depositors paid off. No premium is needed since no risk is incurred. But monitoring is neither costless nor perfect.

Consequently, as pointed out by Paul Horvitz, George Kaufman, and Gerald Bierwag, deposit insurance premiums are designed to price the risk that regulators will fail to detect an insolvent bank.[3] These risks have more to do with monitoring costs than with the sorts of risks with which we normally deal.

Thus, mispricing of deposit insurance does not encourage banks to load up on any and all types of risk; rather, it encourages banks to take risks where the value of the underlying asset is difficult for regulators to monitor.

After discussing various proposals for the public and private pricing of deposit insurance, I describe here a proposal that would permit government insurers to use financial markets to price deposit insurance contracts. The operation of this plan is discussed and compared with recent proposals to require banks to increase their reliance on subordinated debentures.

Background

Under the system of deposit insurance developed in the 1930s, small depositors were protected from loss while larger depositors were left largely uninsured. This type of limited coverage has two consequences. First, in the event of a bank failure, uninsured depositors would be able to help the FDIC absorb any losses. Second, this exposure to loss would give uninsured depositors an incentive to closely monitor the banks, making risky behavior, and hence failure, less likely.

As long as regulators act in a quick fashion to close economically insolvent banks, such a system can be relatively without cost. However, as Table 1 illustrates, the two components of uninsured deposits—time deposits over $100,000 and foreign deposits—make up a relatively small portion of deposits at all but the largest banks. Thus uninsured deposits provide little cushion to absorb losses and provide banks with little market discipline to control risk.

More importantly, regulators, perhaps for valid reasons, have shown a great reluctance to impose losses on uninsured depositors, particularly in larger institutions. This reluctance was a matter for speculation prior to the failure of United States National Bank of San Diego in 1973 and Franklin National Bank in 1974. Subsequent treatment of First Pennsylvania and Continental Bank of Illinois have reinforced this conclusion. The policy of protecting *uninsured depositors has severely reduced* market-imposed constraints on risk-taking.

The current system of deposit insurance produces two undesirable consequences. Neither the price of the deposit insurance nor the

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Table 1
The importance of large time deposits and foreign deposits

Bank asset size	As a % of deposits
Less than $100 million	13.2%
$100 million to $1 billion	19.9%
$1 billion to $10 billion	33.3%
Over $10 billion	61.0%

SOURCE: September 30, 1984 Report of Condition

rate on insured deposits varies greatly with the monitoring risk of the underlying assets. Insured depositors are not at risk and the government insurer does not choose to vary the premium. Banks holding relatively riskless portfolios will be paying too much for deposit insurance, while banks holding relatively risky portfolios will be paying too little. Banks thus will have an incentive to increase the riskiness of their asset portfolios. This is the fundamental problem with a flat fee insurance system.

This mispricing of deposit insurance has a second consequence. In a deregulated environment some banks will attempt to take advantage of the mispricing by increasing their holdings of risky assets. In an attempt to attract the necessary funds, they will drive up deposit rates and draw deposits away from more conservative insured institutions without compensating the FDIC. The complete removal of interest rate ceilings mandated by DIDMCA in 1980 made it easier for risky institutions to attract funds from less risky institutions. Brokered deposits provide the most obvious example of this sort of behavior, but it is also occurring in less dramatic ways all across the country.[4] Flat fee deposit insurance will also permit insured institutions as a group to grow at the expense of uninsured financial intermediaries.[5] The real culprit here is mispriced deposit insurance, not deregulation.

Criteria for evaluating deposit insurance schemes

Despite the recent attention paid to deposit insurance, little research has been devoted to establishing why deposit insurance should be provided by the federal government or what the system should be trying to prevent. Do all depositors need to be insured or only small depositors? Is deposit insurance even necessary? Is a Federal Reserve policy of accommodating a flight to currency sufficient, or do flights to quality and asset recycling also pose problems?[6]

Given that some form of deposit insurance is optimal, how do we price it? In order to evaluate possible pricing methods, it is first necessary to accept a set of criteria describing the goals of deposit insurance. Of course, the success of a system depends not only on its ability to mimic an ideal system, but also on the costs of operating the system.

The ideal deposit insurance system should have three characteristics. First, it should eliminate bank runs. The elimination of runs would avoid most of the negative consequences associated with bank insolvency, including flights to quality and asset recycling, and remaining incentives for flights to currency.

Second, the ideal system should cause banks to be declared insolvent and recapitalized as soon as the expected present value of assets exceeds the promised present value of liabilities. Closer links between the bank's net worth calculated on a present value basis and decisions to recapitalize a bank will limit the losses borne by insurers and uninsured depositors. This will keep insurance costs to a minimum and discourage the development of uninsured substitutes for insured accounts.

Finally, the ideal system should set relative premiums that do not differ significantly from those that would be set by a free market. If these premiums are too low the market will encourage financial institutions to take too much risk. If the premiums are too high, banks will find themselves at a disadvantage against uninsured intermediaries.

It would be presumptuous to claim that these criteria are universally accepted. Nevertheless they provide a useful yardstick for measuring various reform proposals.

Problems with public sector pricing

Most participants in the deposit insurance debate presume that the insurance premiums will be set by the governmental insurers. Eugenie Short and Gerald O'Driscoll have argued that there are several problems with this proposal.[7] First, the federal insurer will possess

a monopoly which will be enforced by governmental powers. In free markets, prices are the result of bargaining between sellers and buyers. But, as Short and O'Driscoll point out, governments tend to order and enforce, not bargain. This makes it difficult for a government insurance system to create relative premiums that correspond to the relative premiums that would be set by the private market.

Second, because the buyers would have no recourse if displeased with the government's terms, Short and O'Driscoll argue, the government insurer would be overly sensitive to the overpricing of risk.[8] This sensitivity would be reinforced by industry pressures to keep premiums as low as possible. But, an overt bias against overpricing will inevitably lead to underpricing of insurance, undermining the rationale for introducing variable insurance premiums. Third, even if the government insurer is not excessively sensitive to overpricing, how will it judge whether deposit insurance is priced correctly.

Examples of government mispricing are numerous. Federal Crop Insurance, which is based on average county yields rather than individual farm yields, has created incentives to bring low quality land into production. Publicly operated water projects in the Southwest and Northeast have traditionally underpriced water, leading to excess demand, water shortages, rationing, and overproduction of certain agricultural products. Before the introduction of competitive bidding for Treasury bonds and notes, it was not unusual for the announced coupon to attract total bids that were three or four times the actual amount of bonds for sale. As a final example, many countries find it difficult to choose and maintain fixed exchange rates that are consistent with their monetary policies. When the exchange rate is set too high, the inevitable result is a massive capital outflow. Once the central bank has exhausted its reserves, it is compelled to lower the exchange rate until the capital outflows cease.[9]

With the exception of crop insurance, most of these products are homogeneous and hence, by comparison to deposit insurance, relatively simple to price. One wonders how federal insurers could ever successfully price a heterogeneous product like deposit insurance.

The private sector solution

Short and O'Driscoll propose private deposit insurance as an alternative to federal deposit insurance. In their world, all deposits would be insured competitively, with all terms of the contract determined solely by the banks and the private insurer. Slightly different proposals have been made by Bert Ely, Katherine England, and Art Rolnick and Evelyn Carroll, among others.[10] Most of the evidence on the efficiency of private insurance comes from the experience of state-sponsored insurance schemes. While there are exceptions, these "private" systems have generally failed to charge risk-related premiums, have been under-capitalized, and have exercised little supervisory control. Also, while historical evidence suggests that the "private" insurance schemes generated by the market do a good job protecting against isolated instances of fraud, they have done a poor job of protecting depositors against systemwide catastrophes. The Depression destroyed the eight state-sponsored schemes then in existence. More recently, deposit insurance schemes in Ohio and Maryland have also been bankrupted.[11] As long as private insurance funds are subject to failure in a crisis, they will not serve to prevent runs to currency or flights to quality.

100 percent reserves as a solution

Constant monitoring excepted, the only way that private insurers could provide truly failure-proof insurance would be to hold riskless securities of the same value as the deposits that were being insured. In the last half of the 19th century the United States came close to adopting this sort of system. National banks could issue bank notes by pledging Treasury securities as collateral. These securities were held by the Treasury and used to pay off a bank's national bank notes if it failed.

In 1867 these 100 percent insured "deposits" accounted for 21 percent of the total money stock (currency plus bank deposits). Another 25 percent of the total money stock was made up of notes issued directly by the Treasury. In this period, the supply of Treasury securities placed no effective limit on the issuance of national bank notes. In 1867, national bank note issues consumed only 20 per-

cent of available collateral. However, the relative importance of these notes fell over time, and by 1914 they accounted for only 3.5 percent of the money stock while all currency held by the public accounted for 9 percent of the money stock. However outstanding issues consumed 80 percent of available collateral.[12]

Many monetarists have long argued that all deposits making up the monetary aggregate should be subject to a system of 100 percent reserve requirements.[13] However, the experience in the Greenback period suggests that individuals will not voluntarily create a monetary aggregate completely composed of riskless non-interest bearing instruments. Even when these deposits bear interest, the existence of externalities guarantees that under a 100 percent reserve system the quantity of riskless deposits demanded by the market will be less than the amount that is socially optimal. Moreover, if only transaction accounts, savings deposits, and money market deposit accounts were insured, the implied increase in the demand for Treasury securities would exceed the existing stock of Treasury bills by a factor of three and would just equal the total supply of marketable securities. Thus, imposition of a system of 100 percent reserve or full collateralization would drive up the price of Treasury securities and create incentives for individuals to find uninsured alternatives, destroying the integrity of the monetary aggregate.

Reassessing the insurance problem

In the previous section we examined three forms of deposit insurance—risk-rated government-priced insurance, risk-rated private insurance, and 100 percent reserves—all of which were found wanting. The preceding analysis suggests that a government insurance system that sets its own prices is likely to underprice insurance and create a serious moral hazard problem. If history is any indication, a private insurance system will generally be subject to failure. It can reduce its exposure to failure by pledging government securities, but there is still no guarantee that the insurer would be able to protect itself against changes in the market value of the collateral. Systems employing either private insurance or 100 percent reserves will tend to ignore externalities in setting the relative returns on uninsured deposits. This will cause society to hold suboptimal amounts of deposit insurance. Finally, given current supplies of Treasury securities, it would only be possible to insure a portion of existing bank liabilities under a system of 100 percent reserves.

There is one alternative which we have not explored—a system in which the government provides most of the insurance, but at prices determined by the private market. Using such a system, it might be possible to create premiums that reflected both private market risk assessments and the government's estimate of the externalities. Such a system could also take advantage of the government's ability to conserve on capital by using its powers of taxation and seignorage. Such a separation of pricing from production is not unprecedented. Once again the Treasury auction provides an example.

Many individuals wish to purchase Treasury securities at the "market" rate of interest. However, they find it difficult to make accurate predictions concerning the rate that will be revealed in the auction. Rather than forego the purchase of these securities, these individuals have the option of submitting a noncompetitive bid and accepting the average of the bids needed to sell the remaining securities. In this way, an individual with little knowledge about the value of Treasury securities can assure himself a fair rate of return. The system would break down only if the government began bribing competitive bidders to make their bids artificially low.

There is a clear analogy between the position of the noncompetitive bidder at the Treasury auction and the position of a government insurer in the market for deposit insurance. Like the noncompetitive bidder, the government insurer's major concern is coming up with a price that is not dramatically at odds with the market price. Also like the noncompetitive bidder, the government insurer encounters certain difficulties in setting accurate prices. However, there are also some differences. The problems of the noncompetitive bidder are a result of a lack of information; the problems of the government insurer have less to do with information availability than with the need to interpret the information in an objective fashion. The relative importance of noncompetitive bidders also differs. Noncompetitive bids account for 20 to 25 percent of Treasury bill sales; the government's role in the

larger; it would back perhaps 90 percent of the insurance.

While the government insurer finds itself in a position that is similar to a noncompetitive bidder, the solution to the insurer's problems is more difficult and less obvious. In order to use the price generated by the private insurer, he must make sure that the private insurer faces the same losses and incentives. There have, in fact, been some proposals that the government insurer should simply use the risk assessments embodied in existing stock, bond, or deposit market data.

There are, however, two problems with these proposals. First, the interests of shareholders and subordinated bondholders differ from the interests of a government insurer. Under the current system, losses are imposed in a serial fashion. Shareholders cover losses until their equity is eliminated. Additional losses are then covered by subordinated bondholders until their positions are wiped out. Only then does the deposit insurer—and perhaps the uninsured depositor—begin to suffer losses. The deposit insurer and uninsured depositors share the remaining losses on a *pro rata* basis. But, if the uninsured depositors believe that they will be exposed to losses, they will react by exercising withdrawal options or by taking out loans with the troubled bank. The ability to evade losses, together with the short maturity of uninsured bank deposits, also gives uninsured depositors a risk structure which differs radically from that of the FDIC.[14]

Under these circumstances, shareholders, bondholders, and uninsured depositors will misprice the risks borne by the government insurer. Shareholders and bondholders do not care whether the FDIC pays out 10 cents on the dollar or 20 cents on the dollar. What matters is that the FDIC only begins making payouts after the positions of the shareholders and bond holders have been eliminated. Uninsured depositors do care about FDIC payouts, but their concern is tempered both by their ability to flee a troubled bank and by the possibility that the insurer will choose purchase and assumption over payout. If the FDIC frequently uses purchase and assumption transactions, then uninsured depositors are at even less risk. This will be reflected in lower deposit risk premiums. If depositors believe that the FDIC will always use purchase and assumption transactions, then risk premiums will completely disappear. But, if the FDIC frequently employs P & A transactions, it is at greater risk although market risk premiums are reduced. Thus, the market's assessment of the risk associated with the use of purchase and assumption is in direct conflict with the reality of the FDIC's financial position.

An alternative proposal

These considerations suggest that in attempting to develop a system where the government insurer can rely on the private market to set insurance premiums, care must be taken to ensure that the structure of private insurance contracts is consistent with the government insurer's actions and true risk position. The provisions of such a public-private scheme are summarized in the adjacent box. Each of these provisions plays an important role in forcing private markets to generate deposit insurance premiums that can be used by the government insurer. These provisions are compatible with profit maximizing behavior of perfectly competitive firms. In fact, the ability of perfectly competitive markets to eliminate excess profits is used to reduce the possibility of mispricing deposit insurance.

What is insured?

As the first step in designing the public-private coinsurance scheme, the government insurer must decide what types of deposits it wants to be insured. Given the goal of stopping runs, the logical decision would be to insure any short-term deposit plus those long-term deposits with provisions for early withdrawal.[15] Of course, given different goals, different types of deposits would be subject to insurance.

The allocation of losses

The provisions for sharing losses between the various insurers is addressed in the second point. Under the public-private scheme, private insurers write policies for banks to pay for X percent of their depositors' losses, while the public insurer writes a matching policy to pay for 100 *minus* X percent of the losses. The governmental insurer sets its premium equal to the premium charged by the private insurer, taking a position analogous to the noncompet-

itive bidder in a Treasury bill auction. This sharing of all losses on a *pro rata* basis helps ensure that the private insurer is taking into account all the losses to which the public insurer will be exposed.

There is an important difference between this *pro rata* approach to insurance and the usual proposals involving higher equity capital, increased used of subordinated debentures, or private insurance. These latter proposals simply increase the losses by the stockholders and bondholders before the government insurer begins to pay out money. Under these schemes, market discipline only serves to limit losses of private funds. The private participants are indifferent between outcomes in which the value of their securities is just exhausted and outcomes where, in addition, the governmental insurer suffers significant losses. Under the public-private scheme, private insurers care about *all* possible losses. Each percentage increase in losses for the public insurer generates an equal percentage increase in losses for the private insurer. Because private insurers and government insurers face an identical pattern of risks, the private insurance premiums will accurately reflect the value of the government insurance.

The different properties of these contracts are illustrated in Figures 1, 2, 3, and 4 for a bank with A dollars of assets, and E dollars of equity capital. All deposits, F, are assumed to be insured—for which the insurer charges an arbitrary premium p. The following discussion assumes that p is set *below* the correct rate. Figure 1 shows the wealth position of shareholders and the changes in the FDIC's wealth position, assuming no other form of capital is held.[16] The solid black line shows the relationship between bank losses and shareholder wealth. Every dollar lost reduces equity by one dollar until losses reach E. At this point the bank is bankrupt and shareholders are indifferent to additional losses.

The solid red line in Figure 1 shows the relationship between bank losses and the change in FDIC wealth. The FDIC does not begin suffering losses until the shareholders are wiped out. Thereafter, every dollar lost comes out of the FDIC's pocket. Initial FDIC losses are covered by the premium pF. However, when bank losses rise above $E + pF$, the FDIC is forced to draw on other funds.

Provisions of the public-private coinsurance scheme

1. The government insurer decides which classes of deposits will be insured and which will not.

2. Private insurers cover X percent of depositor losses while public insurers cover 100-X percent of depositor losses. The public insurer sets its premium equal to that charged by the private insurer.

3. Private insurers fully collateralize their maximum loss exposure with short-term Treasury securities.

4. The private insurer can alter its premiums at any time. When a private insurer alters its premium, the government insurer follows.

5. A bank's private insurance contract can only be cancelled if the bank can find a new insurer. If the bank fails to find a new insurer, it is declared insolvent and its insurers take control.

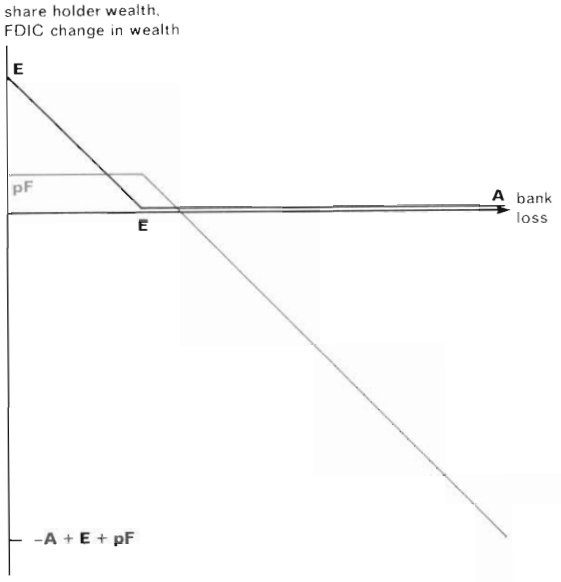
6. After the insurers take control, the bank is sold off in open auction to the highest bidder.

7. The private insurer must permit other investors to take short positions against its insurance contracts. All possible losses that can occur in such transactions must also be fully collateralized.

Shareholders lose control of the firm when losses equal or exceed equity. But, they are indifferent between situations in which the bank fails and the FDIC pays nothing, and situations where the bank fails and the FDIC suffers significant losses. Because FDIC premiums do not accurately reflect its true risk exposure, market discipline will only encourage managers to take advantage of the mispricing. While shareholder wealth is maximized, FDIC losses will not be minimized.

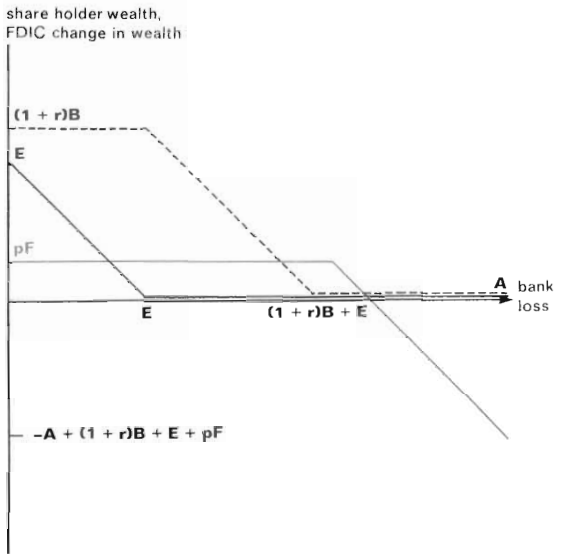
In liquidation, holders of subordinated bonds only receive payment after all depositors' claims have been met. Some observers have argued that subordinated bonds would reduce the risk position of the FDIC. Figure 2 illus-

Figure 1
FDIC loss exposure with equity capital only



trates the risk profiles of shareholders, bond holders, and the government deposit insurer after the introduction of subordinated bonds with face value of B and interest rate r. The broken black line shows the risk profile of the bondholders. Bondholder wealth is flat unless losses exceed E. After the shareholders are wiped out, bondholders suffer losses until bank losses fall below $(1 + r)B + E$. At this point the FDIC begins to suffer losses. The introduction of subordinated bonds reduces the FDIC's maximum exposure from $-A + E + pF$ to $-A + (1 + r)B + E + pF$.

Figure 2
FDIC loss exposure with subordinated debt



Of course, banks that take greater risk will have to compensate subordinated bondholders by offering a higher coupon. This obviously makes it more difficult for shareholders to engage in risky behavior. After all, concerned bondholders are being substituted for an unconcerned insurer. However, shareholders will have strong incentives to compensate bondholders in order to continue taking advantage of the mispricing of federal deposit insurance. And since bondholders are indifferent to losses which more than bankrupt them, bond rates do not provide the insurer with the right kind of information for setting its own deposit premiums.

The addition of a private *pro rata* insurance contract is more useful than additional equity capital or subordinated debt. Figure 3 substitutes a private *pro rata* insurance contract with value I (equal to X F) and a premium i for conventional bonds of equal value (X is the proportion of deposits covered by the private insurers). The dotted black line depicts the wealth position of the private insurers while the dotted red line depicts the wealth position of the FDIC, assuming that it continues to charge the arbitrary premium p. Both insurers begin suffering losses once shareholders are wiped out. Comparing the two lines, it should be apparent that for every additional loss borne by the FDIC, there is a corresponding additional loss for the private insurer. This makes the position of the private insurer less risky than the position of the bondholder in the previous example, but it also ensures that private insurers will price exactly those risks that are faced by the government insurer. In this situation, market discipline will work to minimize FDIC losses.

However, as shown in Figure 4, if the FDIC continues to charge the arbitrary premium p, substitution of the *pro rata* insurance contract (dotted red line) for the subordinated bond (solid red line) actually increases the possible FDIC loss associated with any level of bank losses. This results not from an absence or misdirection of market discipline by private

Figure 3
FDIC loss exposure with public-private insurance

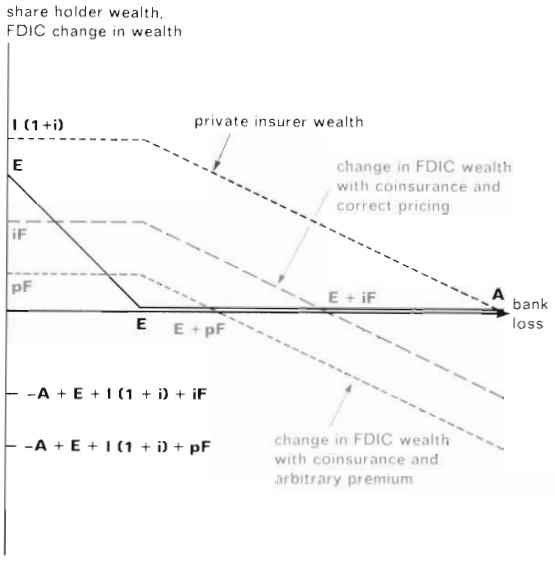
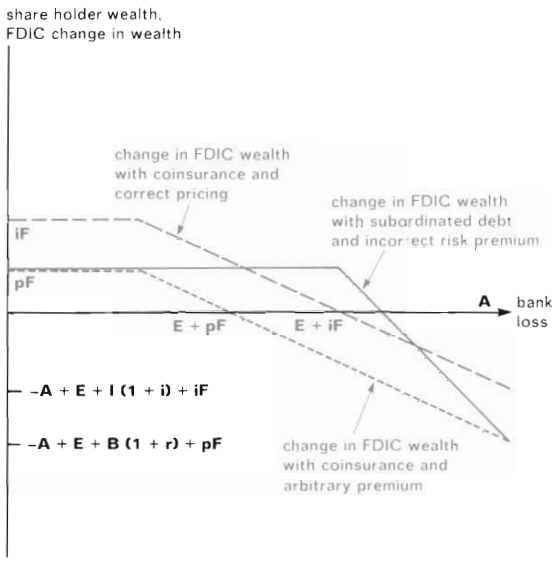


Figure 4
FDIC loss exposures compared



insurers, but from the failure of the FDIC to protect its own position by charging an appropriate premium. While market participants are trying to limit FDIC losses, the FDIC is doing nothing. However, since the market now bears the same type of risk as the FDIC, the market-generated premium i will now be an appropriate one for the FDIC policy.

If the FDIC were to charge this correct, presumably higher premium i, its change in wealth would be shown by the red broken line. Comparing the broken red and the solid red lines, we see that the private-public insurance scheme is preferable to subordinated bonds in both the best and the worst outcomes. The only time when payouts are larger is when losses are moderate. However, because the market sets premiums on the basis of expected loss, when the FDIC charges the private premium, its *expected* losses under the public-private scheme would *always* be less than under a scheme with a flat premium.

Full collateralization of policies

The third provision of the public-private scheme requires all private insurers to post collateral in the form of short-term Treasury securities capable of completely covering the private insurer's exposure. The amount of collateral would vary with the size of the bank being insured and the proportion of losses that the private insurer is guaranteeing. If a private insurer were picking up 10 percent of depositor losses for a bank with $100 million in insured deposits, the private insurer would post $10 million dollars in collateral. Thus, from the private insurer's viewpoint, the public-private scheme is in fact a 100 percent reserve system. But, from society's point of view it requires fewer Treasury securities to implement. The private insurer would have two sources of income, the interest on the Treasury securities and the premiums on its insurance policies.

The posting of collateral plays three important roles in the structure of the scheme. First, together with the *pro rata* loss sharing, it guarantees that the private insurer cannot go bankrupt. Hence insured depositors will never have an incentive to run. Second, because it is fully collateralized, the private insurer will be exposed to the same losses as the government insurer. Finally, the inability of the private insurer to bankrupt itself means that it has little incentive to gamble on the recovery of a client. Because the insurer can never escape its losses and always has sufficient funds to meet its obligations, it will never engage in end-of-game play.

The mix of public and private capital

So far, little has been said about the factors determining X, the proportion of insurance that should be provided by the private sector. Assuming that the elasticity of substitution between Treasury securities and other securities is not infinite, increased demand for Treasury securities will raise their price. Increases in X will leave the relative rankings of premiums unchanged but will affect their absolute value. Thus, the public sector indirectly determines the level of premiums by choosing X while the private sector sets the relative premiums.

The mix of public and private insurance will be determined in part by the magnitude of the externalities associated with the provision of deposit insurance. These externalities are associated with the prevention of runs, asset recycling, and reduced need for the public to monitor an individual bank's behavior. If policymakers feel that these externalities are small, the government should provide only a small part of the insurance. In this case, average premiums will probably be close to the current level. These higher premiums would cause funds to flow from depository institutions to other financial market participants. If the government feels that the externalities are very important, the government ought to provide most of the insurance. In this case, average premiums would probably be below the current level, reflecting both the government's desire to encourage the use of insured deposits and the decreased losses due to reduced incentives for risktaking.

The choice of X will also be governed by other factors. In particular, increases in X will lead to deeper markets which will in turn lead to more accurate pricing. On the other hand, there are very clear limits to the aggregate amount of private insurance because all private insurance policies must be fully collateralized with riskless securities.

Price changes and policy cancellation

Because the insurance could not be cancelled, it is likely that the price would be quoted in terms of the expected value of the policy. Changes in bank risk would lead to changes in expected policy cost, and hence to increases or decreases in the amount of money owed the private insurer. If the insurer feels that the expected value of the contract has declined, he would reduce the lump sum fee by returning a portion of the funds held. If the policy were cancelled by the bank it would receive all moneys currently on deposit with the private insurer. Under the fourth provision of the scheme, the private insurer would be permitted to alter its fee at any time. This reduces the chances that the bank will alter its behavior once the terms of the insurance contract are set.

The fifth provision makes it impossible for a private insurer to escape liability by cancelling a contract, unless the bank manages to find a new insurer. Failure to find a new insurer would be cause for its previous insurers to take control of the bank. This provision is important for two reasons.

First, it makes it impossible for an insurer to run from a bank. Thus the private insurer will face the same risks faced by the government insurer. This identity of interest is the major difference between the public-private scheme and a system based on penalizing subordinated bondholders.

Second, by giving the private insurers the power to close the bank when they want, it would be possible to implement a policy which comes close to the Horvitz-Bierwag-Kaufman proposal that the insurer take control of the banks as soon as the market value of assets is less than the present value of promised liabilities. Such an approach would greatly reduce the size of the premiums demanded by the private insurer.

Such a policy is also more easily implemented in a competitive market. Under regulatory directed market accounting there would always be opportunities for litigation. Under the public-private scheme, failure to get new private insurance from a new insurer would be *prima facie* evidence that the current private insurer's evaluation was correct.

Disposal of insolvent banks

The sixth provision is that all insolvent banks be sold at open auction. This provision is important for several reasons. First, it minimizes the losses to the insurers. FDIC data indicate that the costs of a purchase and assumption decrease as the number of bidders increases.[17] The best way to maximize the number of bidders is to permit all solvent fi-

nancial institutions to participate in the auction. This approach also helps avoid the inconveniences associated with liquidation. Credit relationships are not destroyed and the possibility that the community is deprived of an independent supplier of financial services is reduced.

Fraud prevention

It may seem that the preceding provisions are sufficient to ensure the accurate pricing of deposit insurance. Unfortunately, as it now stands, there can be significant incentives for the private insurer and the bank to engage in fraud. If the bank could secretly bribe its insurer to lower the premium, payments to the government insurer would also decline. The bank and the private insurer would both be better off while the government insurer would be worse off. The incentives to engage in this sort of behavior increase as the proportion of insurance provided by the private sector, X, decreases. There are three possible reasons why X might remain relatively small. First, sufficient Treasury securities may not be available. Second, in the beginning, insurers may be reluctant to commit large quantities of funds to an untried product. Third, the premium demanded for coverage would be above the social optimum.

This fraud problem is the same sort of problem that would arise if homeowners were asked to value their own homes for the purposes of real estate assessment. Inevitably, homeowners would attempt to reduce their tax payments by reporting artificially low property values. However, there is a way to induce these homeowners to properly value their houses. The assessor could require them to sell the house to the assessor at the price reported by the homeowner. This would force owners to quote something approximating a true market value, eliminating the problem.

A similar approach can be used to eliminate the potential for fraudulent mispricing of deposit insurance. Private insurers would be required to sell contracts promising to pay the holder one dollar for every dollar paid out to the bank's insured depositors. These contingent contracts would also have to be fully collateralized with riskless securities. The price of this contingent contract would be identical to the bank's insurance fee. These contracts could be redeemed at any time for the fee currently being quoted by the private insurer.

The private insurer would find itself behaving much like a central bank trying to maintain a misvalued exchange rate. If a private insurer sets an artificially low fee, perhaps in return for secret compensation, other market participants would find it profitable to purchase the claims.

The private insurer, forced to accept the unprofitable contingent claims, would have to raise more capital to provide the needed collateral. As this became more difficult he would be forced to raise his premiums. Speculators would begin cashing in their contracts as the price rose. This sort of behavior would make it impossible for the private insurer to retain the profits from his fraudulent activities. Hence, it would have no incentive to engage in such activities.

There are two other solutions to this problem. One solution would have the governmental insurer retaining the right to set a higher price on its share of the insurance. In this case, the market price would simply provide a floor.[18] Another solution would permit the governmental insurer to penalize private insurers guilty of fraud. However, the first solution presumes that the government insurer can recognize the problem while it is occurring, while the second requires a standard of proof which might be difficult to sustain in a court of law.

The operation of the public-private scheme

The proposed scheme has several interesting properties. First, it operates as if it were a 100 percent reserve system. There is no question of the private insurer failing. Thus, if all short term deposits are covered by this insurance, the threat of runs should be completely eliminated.

Because runs are eliminated, market discipline must exert its influence in one of two ways. First, the prospect of a premium schedule which is sensitive to changes in risk will dissuade managers or shareholders from taking risks that the market believes unwarranted.

While runs would be eliminated, this type of market discipline could still lead to deposit outflows. The increase in insurance premiums brought on by changes in the market's opinion

about a bank would affect the bank much like a tax. Unless the supply of funds were perfectly elastic, some of the burden would be borne by shareholders in the form of lower profits and some would be passed on to depositors in the form of lower rates. This decline in deposit rates would precipitate a limited outflow of funds. But, unlike a run, not all depositors would have an incentive to withdraw their funds. Since all deposits are insured, withdrawals would only be made by customers who valued higher interest rates more than the inconvenience of changing banks. In addition to instilling market discipline, those premium changes could also be used as a trigger for more intense regulatory scrutiny.

Market discipline would also be exerted through a market enforced version of the Horvitz-Bierwag-Kaufman proposal to eliminate shareholder control of the bank as soon as the bank becomes insolvent. However, the market-enforced version has one advantage. Market value determination by regulators would inevitably be subject to litigation. Under the public-private scheme, insurers would not be forced to provide objective methods of asset valuation. They would be free to use all available information. If they used this information in a capricious manner, banks would be able to search out other insurers. Insurers that developed a reputation for closing banks too quickly would soon find their customers fleeing to more reasonable competitors.

The existence of competition also means that a bank will not have to worry about its insurance being overpriced. If a bank believes that its premiums are being unfairly set, it is free to search out more favorable terms from other insurers.

This system of insurance pricing will also benefit the government insurer. Because the premiums will reflect the market's assessment of risk, the incentives for bank managers to engage in unwarranted risk-taking will be greatly diminished. This, in turn, will reduce both the amount of cross-subsidization within the banking industry and the amount of wealth transferred from taxpayers to bank depositors and shareholders.

While any statements concerning the structure of the premiums would be purely speculative, estimates by Robert Avery, Gerald Hanweck, and Myron Kwast provide an upper bound for the premium estimates.[19] Under their system of risk-related premiums, 84 percent of banks would pay premiums below those currently paid. However, their estimates are likely to overstate premium levels in a private-public scheme. First, six and a half basis points were added to all premium estimates to raise revenues to their current level, of this only four basis points represent actual examination costs. Second, their estimates are based on losses incurred when insolvency is determined using accounting data, not market data. Private insurers would use something closer to market value in valuing a troubled bank. This would tend to eliminate end-of-game play and reduce the total exposure of the insurer. Third, Avery, Hanweck, and Kwast have restricted themselves to using balance sheet data. Private insurers might encourage banks to develop better reporting schemes in exchange for lower premiums.

Implications for proposals to increase use of subordinated debentures

The scheme developed in the previous sections also sheds some light on the impact of the FDIC's recent proposal to have banks increase their capital by issuing subordinated debentures.[20] Under the current FDIC proposal, banks would be encouraged to issue subordinated debentures with maturities of 1 to 3 years. The relatively long maturities of these securities would make it possible to impose losses without fear of starting a run. However, the securities would need to be rolled over on a regular basis. This would force banks to take into account market valuations of their risk.

As it now stands, the FDIC proposal will increase the FDIC's cushion. But, as discussed above, under a tiered payout structure, the risks priced by the bond market will differ from the FDIC's risk. Thus market discipline will not be complete. Moreover, there is the danger that, in the absence of risk-based insurance premiums, banks may actually take more risks, exposing the FDIC to even greater losses.[21] Finally, such a scheme is only useful if regulators are willing to close insolvent institutions. However, with several changes, the FDIC proposal could closely approximate the public-private scheme outlined in the preceding pages.

Two important changes would be needed. First the payout structure would have to be changed from a tiered structure, in which debenture holders are junior to the FDIC, to the *pro rata* structure laid out in this paper. This would insure that market discipline will enforce actions that are beneficial to the FDIC. Second, the FDIC would need to charge some sort of risk-rated premium. If the premium were based on the secondary market yield on the subordinated debentures, the system would come close to approximating the public-private scheme outlined in the previous section. Failure to charge a premium would create a continual tug-of-war between banks and the FDIC. Banks would invent new ways to economize on capital in an attempt to get the full benefits of the mispriced deposit insurance.

Troubled banks would find themselves unable to raise new debentures. This would force a bank to shrink in order to continue meeting its capital requirement. Under this modified system, closure would be under the control of the regulator. If this were to result in deviations from the market value closure rule, losses and hence premiums would be higher. Private debenture holders would also be at greater risk since they would not be able to extract higher premiums for changes in risk that occurred after the issuance of the debentures.

Conclusions

Financial markets provide a powerful mechanism for developing a consensus evaluation of a firm's riskiness. As it is currently formulated, deposit insurance eliminates the need for depositors to make such assessments but substitutes no other source of discipline. The preceding pages have outlined a coinsurance scheme to remedy this problem. It permits prices to be set in the private sector while most of the insurance is provided by the public sector. Such a scheme combines a financial market's advantage in information processing with the government's superior access to capital, both through the printing press and through contingent claims on taxpayers. In such a scheme moral hazard is reduced, private insurers are unable to go bankrupt, and insured depositors have no incentive to run. Though much of the discussion presumes that private sector exposure takes the form of an insurance contract, it is argued that similar results can be achieved through the issuance of a particular type of subordinated debenture. Thus, the FDIC's proposal to increase the issuance of subordinated debentures represents a possible first step in adopting a public-private approach to deposit insurance.

Some observers have argued that there would be no market for either the insurance contract or the debentures. However, neither the insurance contract nor the modified debenture is inherently more risky than current bank equity, conventional debt, or, prior to the creation of the FDIC, uninsured deposits.

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[1] See Federal Deposit Insurance Corporation, *Deposit Insurance in a Changing Environment*, (Washington, D.C.: Federal Deposit Insurance Corporation, 1983), Federal Home Loan Bank Board, *Agenda for Reform* (Washington, D.C.: Federal Home Loan Bank Board, 1983); and National Credit Union Administration, *Credit Union Share Issuance* (Washington, D.C.: National Credit Union Administration, 1983). For a summary of the three reports on deposit insurance see Larry Wall, "Deposit Insurance Reform: The Insuring Agencies' Proposals," *Economic Review*, Federal Reserve Bank of Atlanta, 69 (January, 1984) pp. 43-57 and "The Future of Deposit Insurance: An Analysis of the Insuring Agencies Proposals," *Economic Review*, Federal Reserve Bank of Atlanta, 69 (March 1984) pp. 26-39.

[2] For a brief but informative discussion of the incentive problems created by flat fee deposit insurance see Mark J. Flannery, "Deposit Insurance Creates a Need for Bank Regulation," *Business Review*, Federal Reserve Bank of Philadelphia, (January/February 1982) pp. 17-27.

[3] See Paul M. Horvitz, "A Reconsideration of the Role of Bank Examination," *Journal of Money, Credit and Banking*, 12 (November 1980) pp. 654-59. G.O. Bierwag and George G. Kaufman, "A Proposal for Federal Deposit Insurance with Risk Sensitive Premiums" in *Proceedings of a Conference on Bank Structure and Competition* (Chicago: Federal Reserve Banks of Chicago, 1983), pp. 223-242. This proposal is also made in George G. Kaufman, "Implications of Large Bank Problems and Insolvencies for the Banking System and Economic Policy," *Issues in Bank Regulation* 8 (Winter 1985).

[4] Regular features such as "Top Savings Deposit Yields." in *Barron's* suggest that small investors are extremely interested in earning supernominal returns on riskless deposits.

[5] The banking industry's increasing share of total credit to nonfinancial corporations may reflect this phenomenon.

[6] See Ben S. Bernanke, "Nonmonetary Effects of the Financial Crises in the Propagation of the Great Depression," *American Economic Review* 73 (June 1983), pp. 257-276.

[7] See Eugenie Dudding Short and Gerald P. O'Driscoll, "Deregulation and Deposit Insurance," *Economic Review*, Federal Reserve Bank of Dallas (September 1983), pp. 11-22.

[8] This problem could be lessened by introducing competing government insurers. It will create alternative sources of supply; however it will not solve the mispricing problem since none of the government insurers will have an incentive to minimize losses.

[9] For a discussion of the impact of inappropriate pricing of water projects see U.S. Congressional Budget Office, *Efficient Investments in Water Resources: Issues and Options* (Washington, D.C.: Congress of the United States, 1983), pp. 27-43 and Jennifer Zamora, Allen V. Kneese, and Erick Erickson, "Pricing Urban Water: Theory and Practice in Three Southwestern Cities," RFF Reprint No. 199 (Washington D.C.: Resources for the Future, 1982).

[10] See Evelyn Carroll and Arthur Rolnick, "After Penn Square: The Insurance Dilemma" in *Proceedings of a Conference on Bank Structure and Competition*, (Chicago: Federal Reserve Bank of Chicago, 1983), pp. 243-267. Bert Ely, "Yes—Private Sector Depositor Protection is a Viable Alternative to Federal Deposit Insurance" and Catherine England, "A Proposal for Introducing Private Deposit Insurance," both forthcoming in *Proceedings of a Conference on Bank Structure and Competition* (Chicago: Federal Reserve Bank of Chicago, 1985).

[11] Five antebellum insurance schemes were successfully terminated in 1866 with the passage of the National Banking Act. However, the oldest of these schemes had only been in operation for 37 years. For a summary see "Insurance of Bank Obligations Prior to Federal Deposit Insurance," *Annual Report of the Federal Deposit Insurance Corporation, 1952* (Washington, D.C.: Federal Deposit Insurance Corporation, 1952).

[12] Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton: Princeton University Press, 1963), pp. 20-25.

[13] See Albert G. Hart, "The 'Chicago Plan' of Banking Reform" *The Review of Economic Studies* (1935), pp. 104-116; Milton Friedman, *A Program for Monetary Stability*, (New York: Fordham University Press, 1960), Chapter 3; Arthur Rolnick, "Bank Regulation: Strengthening Friedman's Case for Reform," *Federal Reserve Bank of Minneapolis Quarterly Review*, 1 (Summer 1977), pp. 11-14.

[14] For a detailed description of procedures for dealing with creditors of failed banks see Chayim Herzig-Marx, "Bank Failures," *Economic Perspectives*, Federal Reserve Bank of Chicago, 2 (March/April 1978), pp. 22-31.

[15] For the purposes of deposit insurance a deposit should be considered "short term" if its minimum maturity is less than the length of time required for the insurer to accurately value the bank's portfolio.

[16] Given the possible existence of full backing by the U.S. government, it is not clear what the FDIC's wealth is, hence the focus on changes in wealth.

[17] See Christopher James and Peggy Wier, "Bidder Eligibility and the Wealth Effects of FDIC Auctions" forthcoming in *Proceedings of a Conference on Bank Structure and Competition*, (Chicago: Federal Reserve Bank of Chicago, 1985).

[18] The government insurer would then have to use a statistical model of losses similar to that proposed by Robert Avery, Gerald Hanweck, and Myron Kwast in "An Analysis of Risk-Based Deposit Insurance for Commercial Banks," forthcoming in Federal Reserve Bank of Chicago, ibid.

[19] Ibid.

[20] For an early version of this proposal see Chapter 3 of *Deposit Insurance in a Changing Environment* (Washington, D.C.: Federal Deposit Insurance Corporation, 1983).

[21] See Michael Koehn and Anthony M. Santomero, "Regulation of Bank Capital and Portfolio Risk," *Journal of Finance*, 35 (December 1980) pp. 1235-1244, and Chun H. Lam and Andrew H. Chen, "Joint Effects of Interest Rate Deregulation and Capital Requirements on Optimal Bank Portfolio Adjustment." *The Journal of Finance*, 40 (June 1985), pp. 563-576.