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Resolution Costs of Bank Failures

page 1

by John F. Bovenzi and Arthur J. Murton

The FDIC's failure-resolution costs for small banks that failed in 1985 and 1986 are estimated to be roughly 30 percent of total failed-bank assets. Around that average there is a wide variance, ranging from a low of two percent to a high of 64 percent. This study presents a formula used by the FDIC to estimate the FDIC's failure-resolution costs for individual banks, based primarily on the banks' asset-quality characteristics. These costs reflect the FDIC's liquidation experience. The analysis does not address the issue of determining what those assets would be worth in an ongoing institution. It is shown that geographic differences play an important role in determining the FDIC's failure-resolution costs. However, after accounting for differences in asset quality and location, other factors, such as the presence of fraud or insider abuse, bank size (up to about \$500 million in total assets), a dependence on agricultural lending, and different chartering authorities (state vs. national) are not important factors in determining differences in failure-resolution costs. Deposit payoffs were more costly than purchase-and-assumption agreements in 1985 and 1986 due to the relatively poorer asset quality of the banks that were handled as payoffs. The paper concludes with a general overview of how the FDIC uses this information to determine acceptable bids on different types of failure-resolution transactions.

Measuring the Interest-Rate Exposure of Financial Intermediaries

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by George E. French

This article explains the gap and duration methods of measuring the interest-rate exposure of financial intermediaries, and discusses the uncertainties surrounding the measurement of interest-rate exposure given the limited financial information regularly provided to regulators. Gap and duration estimates of interest-rate exposure for FDIC-insured commercial banks, savings banks and FSLIC-insured thrift institutions also are presented. These estimates indicate considerable interest-rate exposure at some institutions, particularly thrift institutions; this indicates the need for continued offsite regulatory monitoring of interest-rate exposure despite the inherent difficulties.

"Derivative" Mortgage Securities and Their Risk/Return Characteristics

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by Panos Konstas

The majority of residential mortgage loans originated in 1988 will be transformed into mortgage-backed securities, a large part of which subsequently will be turned into "derivative" mortgage instruments such as "strips," "REMICS," and "CMOs." In derivative products, cash flows from the mortgage-backed securities are rearranged to suit the risk and maturity preferences of investors. Some have viewed this process as not unlike the one in a supermarket where chickens are cut up and packaged into pieces—a practice that not only satisfies the customer, but often brings in more revenue than if the chickens had been sold whole. This article analyzes the risks and rewards embodied in these new instruments under changing market and economic conditions.

Recent Developments Affecting Depository Institutions

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by Benjamin B. Christopher

Resolution Costs of Bank Failures

by John F. Bovenzi and Arthur J. Murton*

Will Rogers once said: "The business of government is to keep the government out of business—that is, unless business needs government aid." While this statement was made with tongue in cheek, there is little doubt that as it relates to the federal deposit insurance agencies and our nation's banking system, government is involved in business in a big way. It is commonplace to see headlines such as the ones indicating a rescue operation for First City Bancorporation involving nearly \$1 billion in FDIC aid. Or the headlines indicating a \$4 billion cash outlay from the FDIC to facilitate the closing and sale of the banking subsidiaries of another large Texas banking organization, First RepublicBank Corporation. Fortunately, most failing banks are not the size of the First City and First Republic banking organizations, which have \$12 billion and \$28 billion in total assets. Nevertheless, even if the costs of most bank failures are measured in the millions of dollars rather than in the billions, we still are talking about significant amounts of money.

Last year 203 banks failed or required FDIC assistance. This year again over 200 failures are anticipated. In each case, decisions must be made regarding the appropriate and least costly way of handling the situation. In order to make such decisions the FDIC must have a reasonably good idea of what the costs of a particular

bank failure are likely to be and how those costs may change depending on how the situation is handled. The purpose of this article is: (1) to describe some of the work being done at the FDIC to estimate bank-failure costs; (2) to ascertain which individual bank characteristics help to explain variations in costs among failed banks; and (3) to explain how this information is used to determine minimum acceptable bids on various types of failure-resolution transactions.¹

There are several important benefits that may arise from studying resolution costs of bank failures. First, the FDIC can better reduce its failure-resolution costs the more it understands about the factors that influence those costs. Second, an understanding of bank-failure costs may help provide a clearer picture of the adequacy of the FDIC fund. Third, the ability to provide more detailed information to the general public on bank-failure costs may eliminate some uncertainty in the minds of possible acquirors of failed or failing banks, thereby reducing the risk premium they may require to engage in such a transaction, which, in turn, reduces the FDIC's costs. Additionally, this information may have implications for bank-closure policies and the allocation and appropriate uses of bank supervisory forces.

The paper is structured as follows. The first section provides background information on the FDIC's objectives and the various options available to

the FDIC for handling bank failures. The second section discusses the data used in this study. Section three provides general information on bank-failure costs and discusses the relevant factors that help determine bank-failure costs. In this section we describe a model that we developed that can be used to estimate bank-failure costs based on individual bank characteristics. The fourth section describes FDIC procedures for determining acceptable bids on various types of failure-resolution transactions based on its "cost test." The final section discusses some of the implications of the results of this analysis and prospects for future research.

Background on FDIC Failure-Resolution Policies and Procedures

The FDIC does not have the power to close a bank. That power resides with the chartering authority—either the state banking commissioner if the

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¹For readers interested in bidding on failed banks, we should note that while the models presented in this report are used in the FDIC's decision-making process, final decisions on asset sales are based primarily on reviews conducted by the FDIC's Division of Liquidation. Given the substantial variance in bank-failure costs that is not explained by the model, these onsite evaluations often diverge significantly from the cost estimates presented in this report.

bank has a state charter, or the Office of the Comptroller of the Currency (OCC) if the bank has a national charter. After a bank is closed the FDIC is appointed receiver and is responsible for settling the affairs of the bank; that is, balancing accounts, collecting on the bank's assets and satisfying the claims against those assets.

There are several primary objectives the FDIC seeks to achieve in determining the most appropriate failure-resolution method. First and foremost, there is the need to maintain public confidence and stability in the banking system. The FDIC must be cognizant of the possibility that how it handles a particular failure may have adverse implications for other banks, and it will seek to avoid failure-resolution methods that unnecessarily risk destabilizing the banking system. Second, the agency should try to be as equitable as possible in its failure-resolution policies. In recent years, the equity issue has become most prominent with respect to the treatment of uninsured depositors and creditors in large versus small banks. Third, there is a need to maintain market discipline against risk-taking. How the FDIC handles a particular bank failure may have significant implications for the amount of discipline that will be exerted by the market against risk-taking by other banks. Fourth, the failure-resolution procedure should be cost-effective. By law, the FDIC is required to meet a "cost test" in which it must be reasonably satisfied that the alternative it is choosing will be one that is likely to be less costly than a deposit payoff.

There are at least two secondary objectives in handling bank failures. The first is to minimize disruption to the community. This requires transactions that can be implemented swiftly and smoothly. The second goal is to minimize the government's role in owning, financing, and managing financial institutions. This is achieved by selecting private-sector resolution of bank problems whenever possible.

The objectives outlined above are not always mutually compatible. Satisfying one objective may mean abandoning to some degree another objective, and decisions must be made regarding how to balance these tradeoffs in any given situation.

There are several alternatives available to the FDIC in handling the affairs of a failed or failing bank. The following five major alternatives will be discussed: (1) deposit payoffs, (2) purchase-and-assumption transactions, (3) insured-deposit transfers, (4) open-bank assistance, and (5) bridge banks. There also are variations on each of these basic alternatives. Some of these will be briefly discussed as well.

In a *deposit payoff*, as soon as the bank is closed by the chartering authority, the FDIC is appointed receiver and steps in to pay all depositors the full amount of their insured claims and begins to liquidate the assets of the failed bank. Uninsured depositors and other general creditors of the bank generally do not receive either immediate or full reimbursement on their claims. Soon after the bank is closed they receive what are called receiver's certificates which entitle the holders to their proportionate share of the collections received on the failed bank's assets.² The FDIC also is entitled to a share of these collections since it stands in the place of the insured depositors.

As receiver, the FDIC has a responsibility to creditors to maximize collections on the failed bank's assets. Typically, this is achieved by selling all marketable assets to the highest bidders, generally other financial institutions. Nonmarketable assets are subject to liquidation procedures. The proceeds first go toward covering expenses incurred by the FDIC in its collection efforts. The remaining proceeds are distributed *pro rata* to the FDIC and other uninsured creditors in the form of dividend payments on the receiver's certificates. Rarely do the FDIC and the uninsured creditors receive the full amount of their claims since the market value of a failed bank's assets

generally is less than the book value. This means owners of subordinated debt and stockholders usually receive nothing since their claims are subordinate to those of depositors and other general creditors.³

A second method used by the FDIC to handle bank failures is referred to as a "*purchase-and-assumption*" or "P&A" transaction. Under this approach a buyer steps forward to "purchase" all or some of the failed bank's assets and "assume" its liabilities. The usual procedure is for the FDIC to invite a number of possible acquirors to a bidders' meeting. A transaction is consummated with the highest acceptable bidder. An important difference between a purchase-and-assumption transaction and a payoff is that in a P&A all depositors, uninsured as well as insured, receive full payment on their claims since their claims are "assumed" by the acquiring institution.⁴

Generally, a purchase-and-assumption transaction is preferable to a deposit payoff. Oftentimes it is less costly to the FDIC, particularly if the volume of uninsured liabilities is not high. A P&A transaction also is less disruptive to a community since it ensures that many of the failed bank's former borrowers and lenders will have another institution with which to conduct business. In fact, the failed bank's deposit customers rarely notice any inconvenience whatsoever. The bank may be closed on an afternoon after the close of business and

²At times in the past the FDIC has paid uninsured creditors a portion of their claims at the time of failure. Cash outlays to uninsured creditors have been based on conservative estimates of what they ultimately would be entitled to. This variation of a payoff has been called a "modified payoff."

³Some states have depositor preference statutes which elevate depositor claims over those of other general creditors in state-chartered banks.

⁴If a depositor preference statute is not applicable then all general creditors receive full payment on their claims in a P&A transaction. However, subordinated debt and capital are not transferred to an acquiring institution. The holders of such debt and bank capital generally receive no value on their claims.

reopened the following morning at its regularly scheduled time. The only difference from the viewpoint of most customers is that there is a new name on the building.

Traditionally, in a purchase-and-assumption transaction only a small portion of the failed bank's assets have been transferred to the acquiring institution. Generally, these include the best of those assets: government securities that are marked-to-market, cash, fed funds sold and perhaps the installment loan portfolio. The remaining difference between assets acquired and liabilities assumed is covered by a cash transfer from the FDIC to the acquiring institution. It then falls to the FDIC to collect as much as it can on the balance of the assets it retains in order to reimburse itself for some portion of its cash outlay.

More recently the FDIC has attempted whenever possible to pass a larger portion of a failed bank's assets to acquiring institutions in P&A transactions. In many cases all, or substantially all, of the failed bank's assets are now sold at a discount from book value to the acquiring institution. These are often referred to as "whole-bank" transactions or, more technically, as total-asset purchase-and-assumption transactions. The first such transaction was completed in April of 1987. Altogether, 19 whole-bank P&As were completed in 1987, 38 during the first half of 1988.

Whole-bank transactions reduce the need for the FDIC to advance as much cash to the acquiror and minimize the FDIC's involvement in the liquidation of the failed bank's assets. Such transactions can be cost-effective for the FDIC and, compared to the more traditional P&A, further reduce any disruption to local economic activity by ensuring that a greater portion of the failed bank's customers continue to have access to banking services and their loans are not placed in a "liquidation." However, since the aggregate market value of a failed bank's assets gener-

ally is considerably less than book value, estimating the loss on assets becomes a critical factor in determining the terms of such a transaction and even whether such a transaction can be completed.

A third type of failure-resolution transaction is called an *insured-deposit transfer*. In an insured-deposit transfer only the insured deposits and secured liabilities are transferred to another institution. Uninsured and unsecured liabilities remain in receivership. Sufficient cash is paid by the FDIC to the institution accepting the failed bank's insured and secured liabilities to equal the amount of those liabilities. Generally, the acquiring institution will use some of its cash to purchase certain of the failed bank's assets. An insured-deposit transfer is generally viewed as a variation of a deposit payoff because uninsured creditors are not protected and they usually suffer some loss. However, the transaction has some of the characteristics of a P&A in the sense that another institution assumes certain liabilities and, in recent years, usually acquires some of the assets of the failed bank. Often, when a bank has high-cost, volatile funds, bidders will opt for an insured-deposit transfer because, unlike in a P&A, they have the ability to renegotiate the terms on debt instruments.

The fourth type of transaction is called *open-bank assistance*. In many respects open-bank assistance has the same effects as a purchase-and-assumption transaction. The major difference between a P&A and open-bank assistance is that with open-bank assistance a transaction occurs before the failing bank is technically declared insolvent and closed. Generally, the FDIC provides enough assistance to cover the difference between the estimated market value of the bank's assets and its liabilities (the bank's negative net worth). New capital is injected by private investors. As in a P&A, all depositors and, if there is no depositor preference, all general creditors are protected

against loss. And, as with a P&A (and each of the other alternatives as well), management is usually replaced, bank stockholders are virtually wiped out, and, if a holding company is involved, its creditors are not protected by the FDIC (although shareholders and junior creditors must agree to the transaction if the bank remains open).⁵

A fifth type of transaction is a *bridge bank*. As its name implies, this solution is temporary: it merely provides a "bridge" until a more permanent solution can be arranged. The idea is that when a bank fails, it may be advantageous for the FDIC to keep it operating for a brief period until prospective purchasers have enough time to assess the institution's condition and they can make a reasonable offer for the bank. If kept operational, the bank can retain much of its value. Moreover, there is likely to be less disruption to the local community if the bank is kept operational until the situation is resolved through a more permanent solution. The FDIC received authority to operate bridge banks just last year and as of August 15, 1988 had used its new authority on two occasions.⁶

There are many possible variations of these five basic options, but essentially deposit payoffs, purchase-and-assumption transactions, insured-deposit payoffs, open-bank assistance, and bridge banks are the alternative types of transactions available to the FDIC for handling bank

⁵The FDIC's objective is to see that the federal "safety net" does not extend to bank holding companies and that holding company creditors receive no more than what they would be entitled to if the failed bank's assets were liquidated via a deposit payoff. While the FDIC has not always adhered to this policy, it has been fairly standard practice in recent years.

⁶Capital Bank & Trust Co., National Association was formed on October 30, 1987 as a bridge bank following the closing of Capital Bank & Trust Co. of Baton Rouge, Louisiana. On April 6, 1988 the bank was sold to Grenada Sunburst Systems Corporation of Grenada, Mississippi. On July 29, 1988, a bridge bank was established as part of the FDIC-assisted restructuring of First Republic Bank Corporation in Dallas, Texas.

failures. Which of these transactions the FDIC engages in for any particular failed or failing bank, while dependent on possible bidders' interests, also depends on the public-policy considerations enumerated earlier and the estimated costs associated with each alternative.

The FDIC's cost test for a purchase-and-assumption transaction where the acquiror does not assume many of the failed bank's assets (this is often referred to as a "clean-bank" P&A) hinges largely on the following determination: Does the premium the acquiror is willing to pay meet or exceed the loss that would be borne by uninsured creditors in a payoff? If so, the P&A generally is cheaper. For example, in a truly clean P&A, the FDIC retains all the risk assets (and essentially pays book value for them). Thus, the FDIC bears all of the loss on assets, save for the portion that is offset by the premium paid by the purchaser. In a payoff, the FDIC bears all the loss on assets (because it retains all of the assets), except for the portion of the loss that is borne by the uninsured creditors. Thus, the greater of the two offsets determines the least costly transaction.

With respect to the amount of risk assets acquired by the purchaser, the totally clean-bank deal lies at one end of the (P&A) spectrum. At the other end lies the whole-bank transaction, in which the purchaser acquires all, or substantially all, of the assets. In between these extremes lie a variety of asset-sharing arrangements.⁷ As more assets are acquired by the purchaser, the loss on assets is transferred from the FDIC to the acquiror, and the acquiror will lower its bid (premium) to reflect this. The FDIC will be willing to accept a lower premium in recognition of the reduced loss it faces. Under some arrangements the purchaser will acquire enough assets to make the acceptable premium negative and the FDIC, in effect, will pay the purchasing bank for its role in the transaction. This is the case in virtually all whole-bank deals.

Given that the premium should adjust to reflect the shifting of the loss on assets, is there any reason why the attractiveness of a P&A would depend on the volume of assets acquired by the purchaser? From the FDIC's perspective, there are several reasons for preferring that more assets go to the purchaser: the desire to keep assets in the private sector rather than in a government liquidation; the potential for cost savings; and, the needs of the community are better served as the acquiring institution has the incentive to nurture loan customer relationships.

The trend toward whole-bank deals reflects a deliberate change in the method of handling bank failures. In fact, the bidding procedure reflects the FDIC's preferences in failed-bank transactions. Whole-bank transactions and open-bank assistance are the preferred options. If none of the bids for these types of transactions are acceptable, a P&A is attempted with as many assets as possible being passed. The next option is an insured-deposit transfer, passing assets if possible. If all of these are unsuccessful, a payoff is performed.

If cost were not a consideration, then a particular bank failure could be handled in any way the FDIC chose; it would simply be a matter of paying whatever price necessary. However, the desire, and statutory obligation, to protect the insurance fund limit the FDIC's ability to choose the type of transaction. Moreover, whether open-bank assistance, a whole-bank deal or any other type of P&A takes place is not a unilateral decision on the FDIC's part; the market plays an important role. The price that a bidder offers must be a price that the FDIC determines will be no more expensive to the fund than a payoff. The major purpose of this study is to furnish a method for estimating the price the FDIC should be willing to accept for a particular transaction. To the extent such an effort is successful, it should better enable the FDIC to maintain the

deposit insurance fund while keeping assets in the banking system.

Data

For most of the FDIC's history there was little outside interest in the costs associated with bank failures. Few banks failed and few bank creditors suffered significant losses. FDIC losses were small relative to income. Only in the 1980's has the number of bank failures been significant enough to raise important questions regarding bank-failure costs.

Publicly available information on bank-failure costs prior to recent years is somewhat misleading because it often did not account appropriately for the time value of money. For example, one could look back at completed receiverships and see that the FDIC and the banks' other uninsured creditors often received 90 or 95 percent, and in some cases 100 percent, of their original claim. However, the collections on the failed banks' assets used to satisfy those claims generally occurred over many years. Thus, on a present-value basis, actual recoveries were less than the figures conveyed by accumulated dividend payments (although recoveries may still have been around 90 percent on average).

In recent years the FDIC has expended a great deal of effort in developing systems to provide better information on all aspects of bank-failure operations. Systems currently in place record and monitor liquidation expenses and collections on assets as they occur. Information systems also provide estimates of future liquidation expenses and expected future collections associated with the remaining assets on all outstanding liquidations. These estimates of future expenses and collections are provided for the time periods in which they are expected to occur.

⁷One alternative that has proven to be quite popular with bidders over the past year is called a "small-loan asset purchase agreement." As its name suggests, the smaller loans are passed at a discount to the acquiring institution (with no option to put them back to the FDIC).

The data on actual and expected collections and expenses are combined for each bank in liquidation to provide individual bank estimates on expected collections net of expenses. For each individual bank it is then determined how those proceeds must be distributed amongst the various groups of bank creditors. At this point it is possible to estimate the final cost to the FDIC for each bank. The systems that provide this information are being used to determine the FDIC's loss reserves for failed banks and for estimating expected costs associated with each new bank failure.

Sample

The data for this study are current through midyear 1987. The sample used for analysis was limited to banks that failed in 1985 and 1986. Banks that failed in the first half of 1987 were not included in the sample in order to avoid banks with loss projections based on less than six months' actual liquidation experience. Banks that failed prior to 1985 were excluded from the sample since the new data information systems for failed banks were implemented subsequent to that date and the timing of expenses and collections associated with pre-1985 failures is not as easily determined from the data.

Of the 120 banks that failed or required financial assistance in 1985, the two open-bank assistance transactions and the two savings banks were excluded from the sample. Of the 145 failures in 1986, the seven open-bank assistance transactions were excluded from the sample. Incomplete data resulted in 36 other banks being dropped from the sample, leaving 218 banks altogether. Of these, 156 were state-chartered banks; 62 were nationally-chartered banks. These banks had average assets of \$32 million. Fifty of the banks were handled as deposit payoffs or insured-deposit transfers; 168 were handled as purchase-and-assumption transactions.

Estimates of "Loss on Assets" and "Cost to FDIC" in Bank Failures

It is necessary to emphasize the distinction between two important concepts regarding costs associated with bank failures. From the FDIC's viewpoint, it is primarily interested in its ultimate cost associated with any particular transaction. However, the "cost to FDIC" for any failure resolution will be different from the "loss on assets" realized for the same bank. When a bank fails, the cost to the FDIC depends on a number of factors including: the difference between book values of assets and liabilities (book capital) of the bank, the levels of both uninsured and unsecured liabilities, the premium (if any) paid by an acquiror, losses on contingent claims and the realized value of assets placed in liquidation (by the FDIC). Because the last component, the realized value of assets, is not known until the receivership is closed out, the cost to the FDIC is not known at the time of failure. Hence, the reserve set aside by the FDIC is necessarily based on a forecast of the loss on assets in the bank. As the liquidation proceeds, the forecast of the loss is updated, and concomitantly, the reserve figure is also updated.

Viewed differently, while neither the cost of failure nor the loss on assets is known at the time of failure, the loss on assets is one of several factors that determines the cost of failure. Furthermore, of the components of the cost, the loss on assets and the loss on contingent claims are the only ones that cannot be known at the time of failure and therefore must be forecast. Since losses on contingent claims vary tremendously by bank, they are estimated on an individual bank basis. Thus, only the loss on assets needs to be estimated from historical bank-failure cost data. These loss estimates then can be combined with the other components affecting the FDIC's costs to produce a cost estimate for current failures.

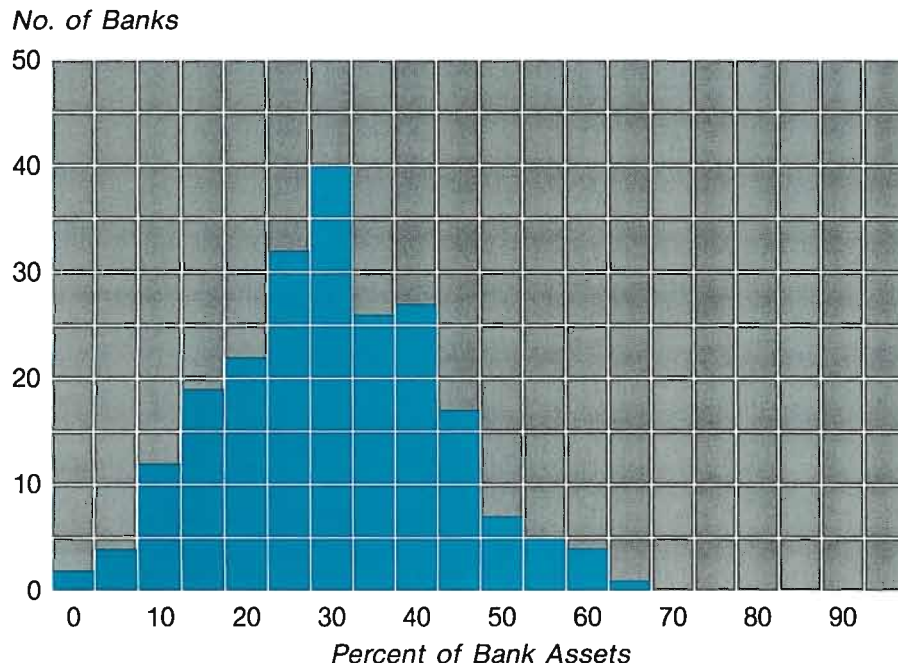
The loss on assets is defined as the difference between the book value of the bank's assets and the value of the assets to the FDIC. For transactions in which the FDIC retains all the bank's assets (payoffs and some insured-deposit transfers), the value is the discounted cash flow from collections net of the discounted stream of liquidation expenses. For transactions in which some assets are passed to the acquiring bank, the value of the assets passed is the price paid for those assets by the acquiror.⁸

For banks in the sample, the estimated loss on assets as a percent of bank assets had a wide distribution, ranging from three percent to 64 percent of assets, with the average bank failure showing a loss on assets of 33 percent. The distribution of costs to the FDIC of bank failures is given in Figure 1. These estimated costs range from two percent to 64 percent of assets, with the average bank costing the FDIC 30 percent of the bank's assets. These costs reflect the FDIC's liquidation experience. The analysis does not address the issue of determining what those assets would be worth in an ongoing institution. The cost to the FDIC is, on average, less than the loss on assets for several reasons. Typically, the book value of assets exceeds the book liabilities; this positive book capital directly reduces the FDIC's cost.⁹ In payoffs and insured-deposit transfers, a portion of the remaining loss is shared by the uninsured creditors. In transactions with another institution a premium may be paid reflecting the bank's franchise value, further reducing the FDIC's cost.

⁸For present purposes all income and expense flows were discounted back to the date of failure by a seven percent annual rate. This rate was roughly equivalent to the two-year Treasury rate and represents the FDIC's opportunity cost.

⁹Even though the bank is insolvent there may be positive *book* capital if worthless assets were not written off prior to the bank's closing. Since "loss on assets" is calculated as the difference between the book value and realized value of the bank's assets, positive or negative "book" capital must be netted out of "loss on assets" in determining actual costs to the FDIC.

Figure 1
Estimated Cost to FDIC of Individual Bank Failures
(As a Percent of Bank Assets)



While the average cost to the FDIC of handling bank failures in 1985 and 1986 is expected to be about 30 percent of total failed-bank assets, as shown above, for any individual bank failure there is a wide dispersion around the average. In order to meet its cost test in determining the appropriate type of bank-failure transaction, and to assess acceptable bids on bank-failure transactions, the FDIC must be able to reasonably determine the degree to which banks are likely to cost more or less than the average. With the ultimate objective of trying to estimate the FDIC's costs for individual bank failures more precisely, we attempted to develop a model that could explain some of the variation in losses on assets among individual failed banks.

The model estimates "loss on assets" rather than "cost to the FDIC." Estimates of losses on assets can be combined with the other directly measurable costs incurred (or benefits realized) by the FDIC to obtain the total cost to the FDIC for a particular bank failure. This information then can form a basis from which the FDIC can determine the amount it may be

willing to pay an acquiring institution to assume the liabilities and accept a large portion of the failed bank's assets.¹⁰

The loss on assets was estimated, using regression analysis, as a function of individual bank characteristics. The loss figures and balance-sheet data were scaled by assets in the bank at the time of failure. This essentially gives equal weight to the experience of each bank in liquidation; alternatively, it prevents the experience of the larger bank failures from distorting the results.

One would expect that the major factor determining the loss on assets would be the type and quality of assets. As a first step in distinguishing between type and quality, assets were divided into two groups: nonrisk (cash, securities and federal funds sold) and risk (everything else).¹¹ The risk assets then were further divided according to examiner classifications. Bank examiners divide problem assets into three groups: substandard, doubtful and loss. These classifications provide information on asset quality as each of the three types of classifications indicates progressively deteriorating asset

quality based on evaluations by the bank examiners. In our breakdown of asset groups, doubtful was combined with loss, due to the small amounts in the doubtful category. Thus, our asset groupings were nonrisk, nonclassified risk, substandard and the combination of doubtful and loss. In future work we intend to further refine these asset groupings.

Additional indicators of asset quality are the nonperforming measures included in bank Call Reports. It is possible that one or more of these measures could augment or substitute for the asset-quality information provided by examiner classifications. At this stage of our analysis we have examined Call Report data on past-due loans, nonaccruing loans and income-earned-but-not-collected. There are other factors that possibly could explain differences in loss among banks: bank size, year of failure, type of failure-resolution transaction, types of loans, whether the bank was an agricultural bank, regional differences, and whether fraud and insider abuse were present in the bank. While we are still exploring the possible significance of these and other factors, some results are presented below.

If we start by using only measures of asset quality as independent variables, Equation 1 provides the best results. The dependent variable is loss on assets (LOSS). The explanatory variables include assets classified as doubtful or loss (LSSDBT), assets classified as substandard (SUBSTD), nonclassified risk assets (NCLRSK) and income-earned-but-not-collected (IENC). The coefficients for each of these variables

¹⁰Even in a whole-bank transaction the FDIC will not be willing to pay an acquiring institution an amount equal to its estimated cost for handling the failures since some of those costs are "fixed" in the sense that they will be incurred by the FDIC (e.g., closing costs) even if the entire bank is sold to another institution.

¹¹Securities are grouped into the nonrisk category only because any appreciation or depreciation due to interest-rate changes is measured directly, it need not be estimated. There is little credit risk (which also can be estimated on a case-by-case basis) since banks invest largely in federal, state and local government securities.

indicate how the loss on assets varies with the respective variables, holding all other variables constant. Thus, the coefficient for NCLRSK indicates that an additional dollar of nonclassified risk assets contributes 19.8 cents to the loss estimate, each dollar of assets classified as substandard contributes 60.9 cents to the loss estimate and each dollar of assets classified as doubtful or loss contributes 91.8 cents to the loss estimate. A dollar of IENC signals an additional \$1.98 in loss. The t-statistics (in parentheses) indicate that each of the variables is statistically significant at the 99 percent confidence level.¹²

$$(1) \text{ LOSS} = 0.198 \text{ * NCLRSK} + 0.609 \text{ * SUBSTD} + 0.918 \text{ * LSSDBT} + 1.98 \text{ * IENC}$$

(7.4) (9.8) (10.1) (4.2)

While it is clear that asset classifications should provide valuable information for estimating bank-failure costs, it is perhaps less clear why income-earned-but-not-collected is an important explanatory variable. We have identified two possible reasons why IENC is important. First, to the extent that a bank has risk assets that should have been classified but were not, the loss on these assets would be greater than the 19.8 cents per dollar estimate included in the equation for nonclassified risk assets. The IENC variable may be capturing these additional losses. This is somewhat comforting since the equation places a great deal of reliance on having good data on classifications. To the extent that classification data are incomplete or dated, the loss estimates would be less accurate unless there is another variable such as IENC to capture this difference. The IENC variable may reflect such assets since a bank nearing failure may be unlikely to put these poorly performing assets on nonaccrual status and thus the IENC category will grow as the number of poorly performing assets grows.

A second reason why IENC may be important has to do with another type of asset underlying uncollected earnings. Often, interest on certain loans, such as real-estate construction projects, is not paid until the project is completed. This does not mean the asset is a poor performer, but that interest does not have to be paid until completion of the project when revenue is available. In other words, income is earned but it is not collected until the project is completed. If a bank fails before the project is completed, the FDIC, in all likelihood, will have to sell a semicompleted project at a discount greater than the 19.8 cents per dollar estimate for all nonclassified risk assets even though the asset may be worth more if the project were completed.

These explanations may not entirely account for the reasons why IENC is helpful in explaining variations in loss on assets in failed banks. Moreover, the measure is imprecise in the sense that not all assets underlying IENC fall into one of the above two categories and bank policies differ in ways that could affect the IENC category. For example, some banks utilize add-on loans rather than IENC; thus, uncollected income is added to principal rather than put in the IENC category. Also, income may be earned but not collected on a bank's government securities portfolio as well as on its loans. At this stage our analysis does not distinguish between the two types of IENC even though income-earned-but-not-collected on a securities portfolio is not reflective of losses that may result on those assets.

The R-squared statistic for Equation 1 is 0.56. This represents the proportion of the variation of loss on assets about its mean that is explained by the regression. For each bank in the sample, there will be an error term that equals the difference between the actual loss and the loss predicted from the regression. The standard error of the regression measures the dispersion of the errors. It indicates how often we can expect the actual loss to be within a certain range of the predicted loss. In this case the standard error for the equation is 8.3. Suppose that for a particular bank the predicted loss is 32 percent of total assets. Adding the standard error to 32 percent gives an upper

boundary of 40.4 percent. Similarly, subtracting the standard error from 32 percent gives a lower boundary of 23.6 percent. Assuming the errors are normally distributed, we expect the actual loss to be below the upper boundary 84 percent of the time. In the current sample, the actual loss did not exceed the predicted loss by more than one standard error for 188 of the 218 banks (86 percent). Similarly, the actual loss did not fall short of the predicted loss by more than one standard error for 180 of the 218 banks (83 percent).¹³

Although the actual loss on a failed bank generally will fall within one standard error of the predicted loss, the range between one standard error below the predicted loss and one standard error above the predicted loss still is quite large (16.6 percent of the bank's assets). Thus, even though the R-squared statistic tells us that 56 percent of the variance in average loss on assets between different failed banks is eliminated using Equation 1, a large amount of uncertainty remains.

Type of Failure-Resolution Transaction

After developing an equation to estimate loss on assets based on asset quality, our next area of investigation was possible differences between loss on assets and cost to the FDIC in banks handled as P&As versus those handled as payoffs or insured-deposit transfers.¹⁴ Fifty of the banks in the sample were handled as payoffs or insured-deposit transfers. These banks had average total assets of \$25.5 million. As shown in Table 1, the average expected loss on assets for these banks is 35.9

¹²The suppression of the constant term in the regression imposes the restriction that in the absence of risk assets the loss on assets in the bank would equal zero.

¹³The standard error can be used to develop a range for bids that may be acceptable on whole-bank transactions.

¹⁴For most of the insured-deposit transfers conducted in 1985 and 1986, few, if any, risk assets were transferred to the acquiring institution. Thus, these transactions were much like payoffs and, for present purposes, have been grouped with the payoffs.

Table 1
Estimated Loss on Assets and Cost to FDIC in Bank Failures
During 1985 and 1986, by Type of Transaction¹

	P&As	Payoffs	Difference
Loss on assets	32.0	35.9	(3.9)
Less:			
Book capital	1.5	(0.1)	1.6
Premium	2.1	0.0	2.1
Uninsureds' loss	0.0	0.7	(0.7)
Cost to FDIC	28.4	35.3	(6.9)

¹All figures are as a percentage of bank assets.

percent of total bank assets. This compares to an average expected loss on assets of 32.0 percent for the 168 bank failures handled through purchase-and-assumption transactions. Therefore, on average, expected losses on assets were higher in payoffs and insured-deposit transfers than in P&As by 3.9 percent of assets.

Table 1 also indicates that payoffs typically are more costly to the FDIC than P&As by an average of seven percent of total assets. This difference should not be surprising since the FDIC's cost test requires that a purchase-and-assumption transaction must be expected to be less costly than a payoff if it is to be attempted.

The difference in loss on assets in P&As versus payoffs and insured-deposit transfers could arise for two reasons. First, there may be differences in the type and quality of assets. In other words, the typical bank handled as a payoff may have poorer-quality assets than the typical bank handled as a P&A. This is a reasonable *a priori* expectation since failed banks are often handled as payoffs only when there is no interest among possible bidders. A lack of interest among bidders may be due, in part, to the quality of the bank's assets. Second, there may be differences in the value of the same assets depending on whether they are left in an ongoing institution or whether they are liquidated. An acquiring in-

stitution can work with a borrower to fashion the best long-term solution. This may involve advancing additional funds or working with the borrower over a long period of time.

The FDIC as receiver must maximize collections on assets over a relatively short time horizon. It liquidates assets usually either by selling them or settling with the borrower for some mutually agreed upon amount. While the FDIC does advance funds on occasion, it does so only when it clearly will result in a higher settlement. The FDIC does not function as a bank and generally does not advance additional funds to borrowers. These borrowers usually must secure new banking relationships with another institution if they wish to obtain additional funds. Such differences in operating procedures between banks and the FDIC may contribute to differences in the average loss on assets in banks handled as P&As (where another financial institution generally retains at least some of the failed bank's assets) and payoffs (where the FDIC retains all of the failed bank's assets).

For banks in the sample, it appears that most of the difference between loss on assets in payoffs and insured-deposit transfers relative to P&As is due to the quality of assets in the individual banks in each group. The data indicate that there are relatively more classified assets in the banks that were handled as payoffs

or insured-deposit transfers (see Table 2). Thus, losses would be higher in those banks regardless of the type of transaction that could be arranged. As further evidence that the difference in losses between the two groups was due primarily to differences in asset quality, when the regression was applied to the two samples independently (P&As vs. payoffs and insured-deposit transfers) the coefficients on the asset categories were not significantly different.

This result does not mean that there are not differences in the value of an asset remaining in an ongoing bank as opposed to being liquidated by the FDIC. However, for banks in the sample (those that failed in 1985 or 1986), most of the transactions resulted in the FDIC retaining virtually all of the risk assets. Therefore, this sample may not be able to shed too much light on the value differential because it cannot show what the FDIC may have saved by transferring risk assets to an acquiring institution. The bank-failure transactions in the years subsequent to 1986 will provide more information in this regard since the P&A transactions generally involved passing at least some risk assets to the acquiring institution. These transactions can be compared with the payoffs in which the FDIC retains all risk assets.¹⁵

In open-bank assistance and whole-bank P&A transactions the FDIC passes virtually all of the failing or failed bank's assets on to the acquiring institution. Looking only at the 14 open-bank and 38 whole-bank transactions conducted in the first half of 1988 indicates that, on average, the cost to the FDIC for one of these types of transactions is about 20 percent of the banks' assets compared to 30 percent in transactions where the FDIC retains almost all of

¹⁵In 1987 and 1988 more risk assets were transferred to the acquiring institution in insured-deposit transfers as well as in P&As. Thus, for these years, insured-deposit transfers cannot be grouped with payoffs if the intent is to examine what the FDIC may save by transferring risk assets to an acquiring institution.

the risk assets.¹⁶ This suggests that there may be differences in the value of the same assets depending on whether they are left in an ongoing institution or whether they are liquidated. Moreover, it suggests that the FDIC is capturing some of this value differential through its bidding process and negotiation procedures. However, one would have to look much more carefully at the bank-failure transactions in 1987 and 1988 before any final determination could be made as to the extent of any possible value differential.

Presently, it is safe to conclude that while there are differences in cost by type of transaction for banks that failed in 1985 and 1986, these differences are largely explained by differences in asset quality within the respective banks. However, it appears that for failure-resolution transactions subsequent to 1986, differences in average costs between P&As and payoffs also may be due to differences in the value of risk assets depending on whether they are left in an ongoing institution or are liquidated.

Fraud and Insider Abuse

Of the 218 banks in the sample, there were 54 (25 percent of the total) where bank examiners detected the presence of fraud or insider abuse. This does not mean that fraud or insider abuse was the cause of each of these failures, just that they were present. The 54 banks where fraud or insider abuse was detected had average total assets of about \$29.5 million, not substantially different from the \$32 million average for all banks in the sample.

In recent years the FDIC has expended greater effort to detect fraud and insider abuse. Indeed, in some quarters there exists the view that the detection of fraud and insider abuse should be the primary focus of bank supervision. This view is based at least in part on the idea that if fraud and insider abuse go undetected for substantial periods of time, when finally uncovered the bank may

Table 2
Summary Statistics for Average Bank in Sample
(Percent of Total Assets in Parentheses)

	All Banks	P&As	Payoffs and Insured-Deposit Transfers
	218	168	50
Number of Banks	218	168	50
Cash	\$ 1,889 ¹ (5.9)	\$ 2,003 (5.9)	\$ 1,635 (6.4)
Fed Funds Sold	1,249 (3.9)	1,290 (3.8)	1,022 (4.0)
Securities	5,315 (16.6)	5,635 (16.6)	4,240 (16.6)
Nonrisk Assets	8,453 (26.4)	8,928 (26.3)	6,872 (26.9)
Loans	21,069 (65.8)	22,269 (65.6)	17,013 (66.6)
IENC	736 (2.3)	713 (2.1)	690 (2.7)
Other	1,761 (5.5)	2,037 (6.0)	971 (3.8)
Risk Assets	23,566 (73.6)	25,018 (73.7)	18,673 (73.1)
Total Assets	32,019 (100.0)	33,946 (100.0)	25,545 (100.0)
Classified Assets	9,253 (28.9)	9,675 (28.5)	7,791 (30.5)
Substandard	6,308 (19.7)	6,586 (19.4)	5,339 (20.9)
Doubtful	640 (2.0)	679 (2.0)	536 (2.1)
Loss	2,305 (7.2)	2,410 (7.1)	1,916 (7.5)
Nonclassified Risk	14,312 (44.7)	15,344 (45.2)	10,882 (42.6)
Total Liabilities	31,635 (98.8)	33,437 (98.5)	25,571 (100.1)
Capital	384 (1.2)	509 (1.5)	-26 (-0.1)

¹Dollar amounts shown are in thousands.

be so insolvent that its cost to the insurance fund will be much higher than for the typical bank failure.

The evidence from the 54 banks in our sample where fraud and insider abuse were present indicates that, on average, losses are not higher than in banks where fraud and insider abuse are not present. In fact, perhaps surprisingly, the average loss on assets is lower in banks in which fraud or insider abuse was present (Table 3). The average loss on assets for the 54 banks where fraud or insider abuse was present was 31.6 percent of total assets. The average loss on assets for the remaining 164 bank failures was 34.2 percent of assets. Correspondingly, the estimated cost to the FDIC is 27.9 percent of total assets in the former case, and 30.7 percent for the latter group of banks.

These results suggest that the presence of fraud or insider abuse is not a significant factor in explaining differences in bank-failure costs. As further evidence of the inability of the presence of fraud or insider abuse to explain differences in bank-failure costs, including the possible pres-

ence of fraud and insider abuse as an independent variable in Equation 1 does not improve the explanatory power of the equation.

Testing Equation 1 only for banks where fraud or insider abuse was present yields an R-squared statistic that is much higher (at .68) than was the case when all banks are included (.56). However, the standard error also is higher at 8.9 (compared to 8.3 for all banks), indicating a greater dispersion in losses on assets among banks where fraud and insider abuse are present.

These results do not necessarily contradict the notion that examiner resources should be allocated more toward the detection of fraud and insider abuse. The fact that the average loss on assets is less in banks where fraud or insider abuse was present may indicate that examiners

¹⁶First City Bancorporation, with \$11,200,000 in total assets, cost the FDIC an estimated \$970,000, or less than nine percent of total assets. Because of this the FDIC's actual cost for open-bank assistance and whole-bank transactions in the first half of 1988 was only about 11 percent of the banks' total assets. Nevertheless, the average transaction has a cost closer to 20 percent of bank assets.

Table 3
Effect of Fraud and Insider Abuse
on Bank-Failure Cost Estimates

Was Fraud or Insider Abuse Present?	Number of Banks	Average Loss on Assets (% of Assets)	Average Cost to FDIC (% of Assets)
Yes	54	31.6	27.9
No	164	34.2	30.7

Table 4
Estimated Loss on Assets and Cost to FDIC in Bank
Failures During 1985 and 1986, by Bank Size

Asset Size (Millions of \$)	Number of Banks	Loss on Assets (% of Assets)	Cost to FDIC (% of Assets)
<10	50	31.5	29.2
10-25	83	33.2	30.0
25-50	57	32.9	29.6
50-100	18	36.0	33.7
>100	10	31.8	29.9

Table 5
Estimated Loss on Assets and Cost to FDIC in Bank
Failures During 1985 and 1986, by Region

Region	Number of Banks	Loss on Assets (% of Assets)	Cost to FDIC (% of Assets)
East	22	31.8	28.1
Midwest	99	32.5	28.6
Southwest	53	37.0	32.8
West	44	29.4	29.6

are doing a reasonably good job in detecting fraud and insider abuse. Examiners tend to be more critical and more alert to weaknesses in institutions where fraud and abuse are prevalent. Frequently, this leads to quicker removal of abusive management. This introduces a fresh perspective into the bank, which may hold down losses in the future. The fact that there is a greater dispersion of average losses among these banks may indicate that when fraud and insider abuse are not detected in a reasonably timely fashion losses can be much greater than for the typical bank failure.

Bank Size

As indicated earlier, the banks in the sample had, on average, \$32 million in total assets. Table 4 presents the loss on assets and cost to the FDIC for banks of various sizes. The table does not present compelling evidence that asset size is a major determinant of the cost to the FDIC (as a percent of assets).

However, only ten of the banks in the sample had assets greater than \$100 million and none had as much as \$600 million in total assets. Thus, while the data suggest that there are not cost savings per dollar of asset for banks with less than \$600 million

in total assets, it doesn't provide information on potential cost savings per dollar of total assets for the largest bank failures. The FDIC's experience with Continental Illinois (in 1984), BancTexas (in 1987) and First City Bancorporation (in 1988) suggests that FDIC costs as a percentage of total assets are significantly less in the billion-plus dollar bank failures.¹⁷

Geographic Differences

Table 5 indicates that there are some differences in estimated bank-failure costs across geographic regions. Not surprisingly, the Southwest has the highest average estimated loss on assets and highest average estimated cost to the FDIC. The East has the lowest average cost experience, reflecting the relatively healthy regional economy.

The fact that there are some reasonably wide differences in average loss on assets and cost to the FDIC among bank failures in different regions suggests that Equation 1 could be improved by adding regional variables. This proved to be the case. The R-squared statistic increased from .56 to .58 and the standard error dropped from 8.3 to 8.1. For estimation purposes we divided the country into six regions corresponding to the regional office structure of the FDIC's Division of Liquidation. Only the Dallas (Southwest) and San Francisco (West) regions produced results significantly different from the national averages. On average, banks in the Dallas region had losses higher than the national average by 2.3 percent of their total assets. Banks in

¹⁷Continental Illinois had about \$37 billion in total assets just prior to when the FDIC arranged its assistance plan for the bank. Presently, the reserve for FDIC losses is \$1.7 billion, which is 4.6 percent of bank assets. BancTexas had \$1.3 billion in assets, and cost the FDIC \$150 million (11.5 percent of the banks' assets). First City Bancorporation, with \$11.2 billion in assets, cost the FDIC \$970 million (nine percent of assets). The difference in cost between small- and large-bank failures may reflect the fact that publicly-owned and audited companies are identified as problems earlier and forced to close earlier due to funding problems.

the San Francisco region had losses lower than the national average by 3.6 percent of total assets. See Equation 2 for the results when these regional variables are added to the equation.

$$(2) \text{ LOSS} = 0.213 * \text{NCLRSK} + 0.619 * \text{SUBSTD} + 0.923 * \text{LSSDBT} \\ (7.6) \qquad (10.1) \qquad (10.2) \\ + 1.65 * \text{IENC} - .0356 * \text{SANFRN} + .0237 * \text{DALLAS} \\ (3.5) \qquad (-1.5) \qquad (1.8)$$

State vs. National Charter

A bank is issued a charter either by the state in which it operates or by the federal government through the Office of the Comptroller of the Currency. The respective chartering authorities also are responsible for closing insolvent banks. In addition, the OCC is responsible for examining national banks; state banks are examined by their state chartering authority and either by the Federal Reserve if they are members, or by the FDIC if they are not members of the Federal Reserve. Any differences in supervisory procedures or closure policies between the various state and federal regulators could show up in differences in average bank-failure costs. Here we looked only at the differences in estimated costs between state- and nationally-chartered banks.

Table 6 shows these results. On balance, state-bank failures were slightly more costly than were national-bank failures. However, the difference is not significant. Including variables in Equation 1 according to whether a bank had a state or national charter did not improve the equation's explanatory power.

Table 6 also presents the estimated cost to the FDIC according to whether the bank was handled as a deposit payoff or as a purchase-and-assumption. The difference, in terms of cost, between a payoff and a purchase-and-assumption was much greater for national banks. Without looking at the individual banks in more detail it is not clear why such a difference would exist.

Table 6
Estimated Cost to FDIC in Bank Failures
During 1985 and 1986, State vs. Nationally-Chartered Banks

Charter	Number of Banks	All Banks (% of Assets)	P&As (% of Assets)	Payoffs (% of Assets)
State	156	30.5	29.4	34.4
National	62	28.9	25.8	37.1

Table 7
Estimated Loss on Assets and Cost to FDIC
in Bank Failures, Farm vs. Nonfarm Banks

	Number of Banks	Loss on Assets (% of Assets)	Book Capital (% of Assets)	Cost to FDIC (% of Assets)
Farm	66	34.3	2.9	30.0
Nonfarm	152	32.3	0.4	30.0

Farm vs. Nonfarm Banks

A farm bank is defined here as a bank in which 25 percent or more of the loans are related to agriculture. As is well known, the sharp decline in farm commodity prices in the early 1980s contributed to the failure of a large number of farm banks, primarily in the Midwest. Table 7 compares the estimated cost to the FDIC of farm and nonfarm bank failures. Notice that despite higher estimated losses on assets in farm banks, the estimated cost to the FDIC for each group is the same. As the table shows, this is because farm banks had more book capital at the time of failure to absorb the higher losses. The difference between estimated loss on assets in farm banks relative to nonfarm banks is not really noteworthy given that cost to the FDIC is the same; that is, if a greater portion of nonperforming assets at farm banks had been written off prior to their failures then their average loss on assets would have been lower as would book capital (which would put their figures more in line with nonfarm banks).

Ongoing Research

Presently, efforts are underway to further refine the results presented in this section. More recent collection experience will be factored into the analysis. Additionally, it may be possible to add greater precision to the asset-quality categories included in the model. At regular intervals the equations presented in this section will have to be modified to account for these and other factors that may impact the FDIC's failure-resolution costs. The results presented here represent the first phase of an ongoing process.

FDIC Procedures for Determining Minimum Acceptable Bids

The current policy of the FDIC is to try to keep as many of the assets of failed banks in the private sector. This is accomplished by attempting whole-bank transactions whenever possible and, failing that, by passing

assets in both purchase-and-assumption transactions and insured-deposit transfers. Of course, the desire to pass assets is tempered by the need to protect the insurance fund; the FDIC must ensure that it sells assets at prices at least equal to liquidation values. The application of that simple guideline poses a knotty problem for the FDIC.

Consider the sequence of events when the FDIC attempts a whole-bank transaction. The FDIC seeks another bank to assume the liabilities and to acquire substantially all of the assets of the failed bank. Because the liabilities of the failed bank exceed the market value of the assets, the acquiring bank will be unwilling to engage in a whole-bank transaction unless the FDIC makes a payment to compensate for the difference between the market value of assets and the bank's liabilities. (This payment is actually a combination of the premium the bank is willing to pay and the discount on the assets.)

Prior to a bank's closing, the FDIC, in concert with the other regulators, selects a list of potential acquirors. The list typically includes healthy banks and holding companies, as well as individuals with the financial capacity to handle the transaction. The universe of bidders is generally governed by applicable laws or regulations. That is, the number of eligible bidders may be restricted in some states because of branching limitations or other regulations. Conversely, some states allow acquisitions on a nationwide basis. Potential bidders must be large enough or have the capacity to take on the failed bank without impairing the surviving institution's future viability.

The potential bidders are usually given a "core" or basic bid package at a bidders' meeting. This package contains financial and other relevant information on the failing bank. Depending on the circumstances, the bidders typically have several days or, in most cases recently, up to two or three weeks to evaluate the infor-

mation before submitting their bids (simultaneously). During the past several months the FDIC has actually attempted to allow potential bidders into the failing institution to perform a careful review of the bank's condition. This allows the bidders more complete information on which to base their bids. However, in order to do this the cooperation of the chartering authority and the failing bank's board of directors is required.

After receiving the bids the FDIC must determine whether the lowest bid is acceptable according to the standard required by the statutory cost test: the premium or discount must result in a transaction which is less costly than the cost of paying off the bank. That determination largely hinges upon the estimated loss on assets in the failed bank. The FDIC currently considers two sources of the estimate of loss on assets, one based on the information in this study and the other based on onsite estimates provided by personnel from the FDIC's Division of Liquidation.

Prior to the failure, a team of FDIC liquidators is sent to review the assets. Time constraints generally prevent the team from assessing every asset, so an extensive sampling procedure is used. Loans are divided into categories such as real estate, commercial, and installment. Within each category the loans are identified as classified, nonperforming or current. For each of these subgroups, a sample of loans is reviewed carefully to determine an estimated liquidation value. Some adjustments are made to discount future cash flows and to account for liquidation expenses. The loss factor that results from this estimate is then applied to the loans in the group that were not reviewed. Risk assets other than loans are evaluated on an individual basis. Securities are marked to market.

The onsite valuation yields a figure that, with some minor adjustments, can be used as an upper bound on the amount that the FDIC should be willing to pay for a whole-bank transaction. The greater the loss that the

liquidators estimate, the more the FDIC is willing to pay.

Another recommendation for the maximum acceptable payment is derived from the model presented in the earlier discussion. Applying the regression results in Equation 2 to the balance sheet and asset classifications of the failing bank yields an estimate of the loss on assets. The liabilities and the levels of uninsured and unsecured creditors are factored in to determine the expected cost to the FDIC of paying off the bank. Adjustments then are made to ensure that the FDIC is not paying an acquiror for "fixed" costs that it will incur regardless of the type of transaction that is conducted. These and a few other minor adjustments help provide a second estimate of the maximum acceptable bid.

To the extent that two bid estimates are better than one, this two-tracked approach should enhance the decision-making process. In practice, however, when the estimates differ substantially the question arises as to which provides a better guide. The onsite estimate has an obviously attractive feature: assets are actually looked at and valued firsthand. The onsite estimate incorporates information that is specific to the bank in question in a way that a simple regression model based on a handful of bank characteristics cannot.

The regression model, on the other hand, has the virtue that it is derived from actual liquidation experience. If the estimated relationship between asset classifications and loss rates has not changed dramatically from the sample period, the estimate obtained from the model will, on average, coincide with the actual losses. In other words, these estimates will not systematically understate nor overstate the actual losses. The liquidators' estimates do not necessarily share this virtue. To the extent that liquidators tend to be either optimistic or pessimistic about collections, the FDIC would be guided to either retain too many assets or to sell banks too cheaply.

The current FDIC policy approximates the following. If the two estimates are reasonably close, the onsite estimate is used. If the estimates diverge significantly, further extensive review of both estimates is conducted to determine the reasons for the difference and to better ascertain the appropriate loss estimate.

To protect against the potential systematic bias in the onsite estimates, a system is in place to monitor the differences between the two approaches. If onsite estimates should prove to be systematically lower or higher than the regression estimates, adjustments can be made to the onsite estimates. Thus, to summarize, whenever possible the onsite estimate is used to determine minimum acceptable bids, and the regression results, in effect, provide a back-up estimate to allow for some greater degree of confidence in the decision-making process.

Conclusion

The FDIC's failure-resolution costs for banks that failed in 1985 and 1986 are estimated to be roughly 30 percent of total failed-bank assets. Since there are assets in these banks that remain to be liquidated, the final cost may change, but probably not significantly. Moreover, since there was only one large-bank failure (greater than \$500 million in total assets) in the sample and the largest banks typically have lower failure-resolution costs per dollar of asset, the FDIC's overall cost for handling bank failures over the past few years is well below 30 percent of all failed-bank assets.

In looking at a 30 percent-of-assets average cost estimate, one question that may come to a reader's mind is: If failure-resolution costs are this high for the typical bank failure, is it because banks are not being closed until they are well past the point of actual insolvency? Some may view such high failure-resolution costs as a clear indication that banks are not being

closed soon enough. However, this is not necessarily the case.

Clearly, assets are worth considerably more in an ongoing institution than in a liquidation. If this were not true, contrary to FDIC experience, most problem banks would become insolvent as they ultimately lost 20-30 percent on their asset portfolio. To the extent that such a value differential exists, it means that even the liquidation of a marginally insolvent bank could cost the FDIC a substantial amount.

The sample used in this study consists almost exclusively of failed banks for which the FDIC retained virtually all of the risk assets. One could look at banks where the acquiring institutions purchased a large portion of the risk assets to get a sense of whether those assets were worth more in an ongoing institution than in a liquidation.

While some value may be lost in transferring assets from one institution to another, our expectation is that risk assets are worth more in another ongoing institution than in a liquidation. During the first half of 1988 the FDIC completed 52 open-bank assistance transactions and whole-bank P&A transactions in which the acquiring institution retained most of the failed (or failing) bank's risk assets. On average, in these transactions the FDIC's cost as a percentage of failed-bank assets was about 20 percent. While there are likely to be other factors involved in creating the 10 percent-of-total-assets difference for the transactions examined in this study versus those where the FDIC did not retain the failed bank's risk assets, it is quite likely that much of the difference may be due to the possibility that assets are worth more in an ongoing institution versus a liquidation. Nevertheless, the issue needs to be examined much more carefully, since there may be differences in asset quality between the two groups and acquiring institutions may realize gains or losses

on their asset purchases.

The results of such an analysis will have important implications for FDIC failure-resolution transactions and for failing-bank closure policies. At this time, however, it should be made clear that the cost estimates presented in this report relate almost exclusively to failure transactions where the FDIC retained virtually all of the risk assets. At least at first glance, it does not appear that these results are directly applicable to transactions where the FDIC sells those assets to another financial institution as part of a failure-resolution transaction.

It also is likely that some portion of the FDIC's resolution costs for failed banks is due to imperfect markets. If the market for failed banks were perfect, that is, if there were many risk-neutral buyers with complete information, the bids they put forth would represent the best measure of the value of the failed bank and the FDIC always would be willing to accept the best bid. In fact, there would be no need for the FDIC to make independent estimates of the value of failing banks. However, because bidders often are few in number, risk-averse, and lacking complete information about asset quality, there are instances where the best bid entails a cost to the FDIC that exceeds the cost of liquidating the bank. Thus, independent estimates are necessary.

Currently, the FDIC is pursuing policies designed to enhance the bidding process. The time period during which potential bidders can review the financial records of a failing bank has been extended. Articles such as this one also help provide potential bidders with greater information. In addition, efforts are being made to attract as many eligible bidders to the bidders' meetings as is possible. Each of these efforts should help to develop a better market for failed banks and enable the FDIC to receive bids on failed banks that better reflect the true condition of those banks.

Measuring the Interest-Rate Exposure of Financial Intermediaries

by George E. French*

U.S. federally insured depository institutions at year-end 1987 held \$1.7 trillion of "long-term" assets maturing or repricing after one year. These assets were acquired mostly by short-term borrowing; liabilities maturing after one year totaled only \$500 billion. Borrowing short term and lending long term has traditionally been the province of thrift institutions, but banks also engage in this to a limited extent. In both cases, this "maturity intermediation" serves to meet the needs of borrowers for long-term funds while allowing depositors to hold shorter-term assets.

Part of banks' and thrifts' spread between interest income and interest expense is earned precisely *because* they borrow short term and lend long term. At year-end 1987, for example, the yield on 91-day Treasury bills was 6.07 percent, that on one-year notes was 7.38 percent, and that on ten-year bonds was 8.85 percent. This situation is not atypical; yields on long-term financial assets usually are higher than those on short-term assets.

The attitude towards interest-rate risk of a financial intermediary's customers may also encourage it to borrow short term and lend long term. Specifically, borrowers generally are willing to pay a premium for long-term, fixed-rate mortgages because they want to avoid unpredictable changes in their monthly payments caused by interest-rate fluctuations.

On the liability side of the balance sheet, depositors prefer short-term deposits to long-term deposits and are willing to accept less interest in return. This, of course, is the reason borrowing short term and lending long term is potentially profitable: the market rewards the bank or thrift for bearing risk.

This "interest-rate risk" is the risk intermediaries incur when the maturity structures of their assets and liabilities are different—roughly speaking, when they either borrow short term to lend long term or *vice versa*. In such situations unexpected changes in interest rates can have adverse effects on institutions' net interest income and net worth.

For example, consider a bank that sells a 90-day certificate of deposit (CD) and uses the proceeds to make a one-year business loan at a specified interest rate. The yield on this asset is "locked in" for one year at the specified rate. Meanwhile, after 90 days the cost of funds will be market-determined. If interest rates rise the bank's interest spread on the loan will decline. At the same time, the resale value of the loan and of all the bank's other fixed-rate assets will fall.

On the other hand, suppose the bank issues a one-year CD and uses the proceeds to make a 90-day business loan. The bank's cost of funds for this liability is locked in for one year; it cannot benefit from a decline in interest rates. On the asset side,

however, yields will be market-determined after 90 days and vulnerable to a decline in interest rates. At the same time, however, the decline in rates will increase the value of the bank's other fixed-rate assets.

The bank in the first example is said to be "liability-sensitive." Since its liabilities reprice sooner than its assets, its net interest income and net worth are vulnerable to increases in interest rates. The bank in the second example is "asset-sensitive" and vulnerable to reductions in interest rates.

A liability-sensitive balance sheet (again, one characterized by short-term borrowings and long-term assets) poses a far more serious risk to the health of a financial institution than an asset-sensitive balance sheet. The reason is that the increase in interest rates which adversely affects a liability-sensitive institution's net interest income also reduces its liquidity by reducing the market value of its assets, and especially since these assets tend to have long maturities.¹ On the other hand, the reduction in interest rates that impairs an asset-sensitive institution's net interest income has the offsetting effect of increasing the value of

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¹The value of long-term assets is more sensitive to interest-rate movements than is that of short-term assets.

the institution's fixed-rate assets, thereby improving liquidity.

The purpose of this paper is to discuss gap and duration methods of measuring the interest-rate exposure of financial institutions, along with the advantages and shortcomings of each method. Estimates of the interest-rate exposure of commercial banks, FDIC-insured savings banks and FSLIC-insured thrift institutions, using both gap and duration measures, are presented in the last section of the paper.

Methods of Measuring Interest Exposure

Gap Measures of Interest Exposure

Gap analysis examines how a change in interest rates would affect the net interest income generated by a portfolio of assets and liabilities, other things held constant. The direction, timing and magnitude of the change in net interest income can be estimated using information on the differences—or gaps—between assets and liabilities repricing in different time intervals and on the assumed change in interest rates.

A gap for a particular time interval is the difference between assets repricing during that time interval and liabilities repricing during that time interval. The idea underlying gap analysis is simple, intuitively appealing, and best understood by using an example. Suppose a bank has \$100 of assets and \$500 of liabilities that are repricable during the next year. Then a 100 basis point (or .01) increase in market yields on assets would enable the bank to increase gross interest income by $1/2 \times [.01 \times \$100] = \0.50 during the year.² Similarly, the 100 basis point in-

crease in liability interest rates would cause an increase in gross interest expense of $1/2 \times [.01 \times \$500] = \2.50 during the year. On balance, net interest income falls by \$2—which is the result obtained by multiplying the change in interest rates, .01, by one-half the “one-year gap” of -\$400:

$$\begin{aligned} (1) \text{ Change in NII} \\ \text{During Year 1} &= 1/2 \times [(.01 \times \$100) - (.01 \times \$500)] \\ &= 1/2 \times [.01 \times (\$100 - \$500)] \\ &= 1/2 \times \text{change in interest rates} \times \text{“one-year} \\ &\quad \text{cumulative gap,”} \end{aligned}$$

where NII is net interest income. Dividing both sides of equation (1) by the average assets of the bank during the year, and assuming the only change in net income is from the change in net interest income, one obtains an expression for the change in ROA:

$$\begin{aligned} \text{Change in ROA} \\ \text{During Year 1} &= 1/2 \times \text{change in interest rates} \\ &\quad \times (\text{one-year cumulative gap-to-average assets}). \end{aligned}$$

An Example of Gap Analysis. An example of gap analysis is presented in Table 1. Repricing information for a U.S. commercial bank from Schedule J of the commercial bank Reports of Condition and Income (Call Reports) appears in condensed form along with selected deposit items.³

The purpose of the analysis is to estimate the change in net interest income that would result from a given change in interest rates, given the assumption that all rates change by equal amounts. It is assumed that all other factors relevant to the determination of the bank's net income remain constant—only the level of interest rates changes. As will be discussed later, this assumption is not nearly as objectionable as it appears.

Banks are required to identify assets and liabilities according to final maturity or earliest time to repricing. For example, if the interest rate on a variable-rate mortgage could be adjusted eight months from now, the current amortized value of the asset would be entered in the six-month to 12-month “maturity bucket.” If a bank bought federal funds it would record these as liabilities repricable immediately. Summing the asset row would give total “rate-sensitive assets.” Liabilities classified as demand or savings deposits are not recorded on Schedule J. Some of these items—NOW accounts and money market deposit accounts (MMDAs)—are included in the table as being repricable within three months but more than one day. Adding these two items to the liabilities row gives total “rate-sensitive liabilities.”

An “incremental gap” is the difference between assets repricing within a given time interval and liabilities repricing within that interval. A “cumulative gap” is the difference between assets and liabilities repricing between the present and some specified future date, and is also the sum of the incremental gaps for the time intervals prior to the specified date. For example, the cumulative six-month gap is the difference between rate-sensitive assets and liabilities in the zero- to six-month time interval, and equals the sum of the one-day, one-day to three-month, and three-month to six-month incremental gaps.

The cumulative and incremental gaps can be used to estimate the changes in net interest income for each time interval caused by a 100 basis point interest-rate increase, as shown in the formulas at the bottom of Table 1. For example, consider the three-month to six-month interval. All assets and liabilities that repriced or matured within the first three months will be yielding or costing an additional 100 basis points per annum during months

²This assumes that the assets reprice evenly throughout the year; if they all repriced immediately at the beginning of the year the increase in income would be \$1. If the assets repriced at the end of the year the change in income during the first year would be zero.

³Much of this repricing information is no longer available as of the March, 1988 Call Report. More detailed information will still be collected for FSLIC-insured S&Ls.

three through six. This represents an increment to NII of $(.01/4)\text{Gap}0d3$, where $\text{Gap}0d3$ is the three-month cumulative gap. The idea is that assets earn .01 more per annum, or .01/4 more for the quarter; liabilities cost .01 more per annum, or .01/4 more for the quarter. The net change in income in quarter two due to the repricing of assets and liabilities during quarter one is $(.01/4)\text{Gap}0d3$. In addition, assets and liabilities repricing from months three through six will yield or cost .01/4 more during the quarter. Just as in equation (1), however, we must multiply by 1/2 because on average these assets and liabilities will be yielding the higher rates for only half the quarter. The total change in NII during months three through six is the sum of these two components, or $(.01/4)\text{Gap}0d3 + (1/2)(.01/4)\text{Gap}3d6$, where $\text{Gap}3d6$ is the incremental gap for months three through six.

Estimated changes in NII per 100 basis point increase in interest rates are presented in Table 1. The table illustrates the importance of using the shortest available repricing intervals in estimating changes in NII. For example, even though the cumulative three-month gap is negative ($-\$1121$), NII is estimated to increase by \$1.4 million per 100 basis point increase in interest rates, because of the large volume of assets repricing immediately.⁴

Duration Measures of Interest Exposure

Duration is a number measuring the sensitivity of the market value of an asset or liability, or portfolio of assets or liabilities, to changes in interest rates. It is potentially useful in evaluating the sensitivity of the net worth of a financial institution to changes in interest rates.

⁴"Immediately" refers to the one-day repricing interval. Since these assets earn higher yields throughout the first three months while liabilities pay more only during half that time (on average), the net effect is an increase in NII when interest rates rise.

Table 1
Gap Analysis for a U.S. Commercial Bank
September 30, 1987
(\\$millions)

	Maturity or Earliest Time to Repricing					
	1 day	1 day- 3 mos.	3 mos.- 6 mos.	6 mos.- 12 mos.	1 year- 5 years	Over 5 years
Assets	\$3666	\$ 2263	\$ 184	\$ 229	\$ 1414	\$1864
Liabilities						
a) Schedule J	1494	5209	210	176	948	258
b) NOW Accounts		184				
c) MMDAs		163				
Incremental \$Gap	2172	-3293	-26	53	466	1606
Cumulative \$Gap	2172	-1121	-1147	-1094	-628	978
Change in NII ¹ during period	0.1	1.3	-2.8	-5.6	-34.4	n.a.
Cumulative Change ¹ (incremental gap method)	0.1	1.4	-1.4	-7.0	-41.4	n.a.
Cumulative Change ¹ (cumulative gap method)	0.1	-1.4	-2.9	-5.5	-12.6	n.a.

¹Per 100 basis point increase in interest rates. Changes in NII during each period (denoted "d(NII)") are estimated as follows:

$$\begin{aligned} \text{Day 1:} & \quad d(\text{NII}) = (.01/360)\text{Gap}0d1 \\ \text{Day 1-3 Mos.:} & \quad d(\text{NII}) = (.01/4)\text{Gap}0d1 + (1/2)(.01/4)\text{Gap}1d3 \\ \text{3 Mos.-6 Mos.:} & \quad d(\text{NII}) = (.01/4)\text{Gap}0d3 + (1/2)(.01/4)\text{Gap}3d6 \\ \text{6 Mos.-12 Mos.:} & \quad d(\text{NII}) = (.01/2)\text{Gap}0d6 + (1/2)(.01/2)\text{Gap}6d12 \\ \text{1 year-5 years:} & \quad d(\text{NII}) = (4)(.01)\text{Gap}0d12 + (1/2)(4)(.01)\text{Gap}12d60, \end{aligned}$$

where $\text{Gap}0d1$ is the cumulative one-day gap, $\text{Gap}0d3$ is the cumulative three-month gap, $\text{Gap}0d6$ the cumulative six-month gap, etc., and $\text{Gap}1d3$ is the incremental one-day to three-month gap, $\text{Gap}3d6$ the incremental three-month to six-month gap, etc. Cumulative changes in NII using the "incremental gap method" are obtained by adding the figures in the preceding row; with the "cumulative gap method" the changes are estimated by multiplying one-half the cumulative gaps by .01, as in equation (1) in the text. No attempt is made to estimate $d(\text{NII})$ for the "over 5 years" maturity bucket.

Measurement of Duration. The calculation of the duration of a security is straightforward, although tedious. Let c_1, c_2, \dots, c_n be the cash flows, including both interest and principal, promised by a security one period from now, two periods from now, and so on. The "period" or time interval between cash flows might be one month as in a mortgage, six months as in most bonds, one year, or any other length. Let r' be the one-period interest rate which discounts the cash flows back to the market value of the security. That is,

$$(2) P = c_1/(1+r') + c_2/(1+r')^2 + \dots + c_n/(1+r')^n,$$

where P is the price of the security and n is the date (measured in periods from the present) of the last cash flow. For a mortgage, r' would be a one-month interest rate; for a bond, r' would be a six-month interest rate; and so on. When r' is expressed as an annual rate it is usually called the "yield to maturity."

The price of the security is the sum of n components, namely the present values of each of the n cash flows. One could measure the percentage of the price of the security contributed by each of the cash flows. Thus,

$$w_i = [c_i/(1+r')^i]/P$$

is the percentage of P which is contributed by the i^{th} cash flow c_i . Naturally,

$$w_1 + w_2 + \dots + w_n = 1,$$

since together the n cash flows contribute 100 percent of the price of the security.

The duration of the security is a weighted average of the dates at which cash flows are received, using the numbers w_i as weights:

$$(3) D = (w_1)(1) + (w_2)(2) + \dots + (w_n)(n).$$

Duration, using this formula, is a weighted average time to repricing. It tells "on average" how soon the investor gets his money back to reinvest at new interest rates. When applied to liabilities, the duration measure tells how soon "on average" the liability must be refinanced.

For all securities other than zero-coupon bonds, duration must be less than the time n to maturity. The reason is that an average of the date n with other dates less than n must be less than n . For zero-coupon bonds, however, there is only one payment c_n and only one weight $w_n = 1$. The duration is thus n , the time to maturity.

For a fixed-rate mortgage with equal payments every month, the duration would be less than half the time to maturity. For example, a newly issued 30-year mortgage would have a duration of less than 15 years. The reason is that each successive equal monthly payment has a smaller present value and contributes less to the price of the mortgage. In the averaging process (equation (3)) which computes the duration, then, dates less than 15 years get higher weights than dates more than 15 years, and the result must be less than 15 years.

The duration of adjustable-rate assets or liabilities which are fully repricable immediately is zero or close to it. This is because there is little time until repricing—and the more quickly the interest rate is adjusted, the less change there is in the present value of such assets and liabilities.⁵

Duration as a Measure of the Interest Sensitivity of Asset Values. At the beginning of this section it was stated that duration measures the sensitivity of the value of a security or portfolio to changes in interest rates. Equation (3), however, defines duration as a weighted average time to repricing. The relation between the definition of duration as a weighted average time to repricing and as a measure of price sensitivity to changes in interest rates is shown in the following formula which is of great importance:

$$(4) dP/P \approx -D(dr')/(1+r') \approx -D(dr'),$$

where dP is the change in the price P of a security from its previous value, r' is the interest rate appropriate for the time interval between the security's cash flows, dr' is the change in this interest rate from its previous value, and D is the duration defined in equation (3). The symbol " \approx " means "approximately equal."⁶ For equation (4) to be valid, D and r' must refer to the same time intervals. For example, if D is expressed in months, then r' must be the one-month interest rate.

According to equation (4), the percentage change in the price of a security is (approximately) inversely proportional to the change in its yield to maturity, and duration is the factor of proportionality. The term dP/P —the absolute change in price divided by its original value—is the percentage change in the price of the security caused by the interest-rate change dr' . The negative sign reflects the fact that security prices are inversely related to interest rates.

As an example of the usefulness of equation (4), suppose the duration of a security is 5 years, and the annual yield to maturity of a security with similar or identical characteristics falls from 8 percent to 7.5 percent. Then $dr' = .075 - .08 = -.005$, and the percentage change in the price of the security would be approximately $(-5)(-.005) = +.025$, i.e., a 2.5 percent increase. As indicated in equation (4), a better approximation could be obtained by dividing this figure by $1 + r'$, or 1.08. The result would indicate a 2.31 percent increase. While even this latter figure is an approximation, it is a very good one.

What is clear from equation (4) is that the longer the duration, the greater will be the percentage change in the price of a security resulting from any given interest-rate change. The equation simply formalizes what is well known to financial practitioners, namely that the value of long-term assets—i.e., those with long durations—is more sensitive to interest-rate changes than that of short-term assets.

The Duration of a Portfolio of Assets or Liabilities. The duration of a portfolio of assets is a weighted average of the durations of the individual assets in the portfolio, where each asset receives a weight equal to its share of the value of the portfolio. For example, suppose a portfolio consists of a bond currently worth \$10,000 with a duration of six years and an auto loan worth \$5,000 with a duration of one year. The value of the portfolio is \$15,000, of which the bond contributes 2/3 and the loan 1/3. The duration of the portfolio is $(2/3)(6) + (1/3)(1) = 4.33$ years. Similarly, the duration of a portfolio of liabilities is a weighted average of the durations of the individual liabilities in the portfolio, where each liability receives a weight equal to its share of the value of total liabilities.

Measuring the Interest-Rate Exposure of Depository Institutions Using Duration. Duration can be used to estimate the change in the market value of a depository institution's net worth resulting from a given change in interest rates using the following approximation:

⁵As an idealized example consider the duration of a consol or perpetuity that pays a market rate of interest r' on a principal value F every period, forever. The present value of the future payments is

$$P = r'F/(1+r') + r'F/(1+r')^2 + \dots + r'F/(1+r')^n + \dots = F,$$

as can easily be demonstrated. The value of this adjustable-rate security is thus independent of interest rates and its duration is zero. Other immediately adjustable instruments may have values that depend on interest rates if the rate paid on the principal balance, while variable, is different from the rate at which the cash flows are discounted.

⁶A derivation and further explanation of equation (4) are contained in Appendix A.

$$(5) \quad dN = -[A/(1+r_A)]GAP_N dr_A = -A(GAP_N)(dr_A).$$

In this equation dN is the change in the market value of net worth from its original value, A is the market value of assets, r_A is the yield on assets, dr_A is the change in this yield from its original value, and GAP_N is the "net worth duration gap" defined by

$$(6) \quad GAP_N = D_A - D_L(L/A)[(1+r_A)/(1+r_L)],$$

where D_A and D_L are the durations of the asset and liability portfolios in years, L is the market value of liabilities and r_L is the rate paid on liabilities.⁷

To illustrate the usefulness of equation (5), suppose the market value of a bank's assets is \$1 billion, its duration gap GAP_N is three years, and asset yields increase from 10 percent to 11 percent. Then $dr_A = .01$, and $dN = -(\$1 \text{ billion})(3 \text{ years})(.01/\text{year}) = \$.03 \text{ billion}$, or three percent of assets. If this hypothetical institution had a market value of six percent of assets, half this value would be wiped out—instantaneously—by an unexpected 100 basis point jump in interest rates.

For the bank to immunize itself against changes in net worth resulting from unexpected interest-rate movements, equation (5) indicates that the duration gap must be zero. This duration gap, defined in equation (6), would typically be close to $D_A - D_L$, the difference between the duration of assets and liabilities. In other words, protecting market value from interest-rate changes requires that the average time to repricing of assets be about the same as that of liabilities.

Estimating Duration with Limited Information. The most important determinants of the duration of a typical financial instrument are its remaining maturity or time to next repricing, and whether it is amortizing or bond-like in its pattern of cash flows. For example, a five-year zero-coupon bond has a duration of five years. A five-year Treasury bond with ten percent coupon rate and yield to maturity has a duration of 4.05 years. A five-year amortizing loan with equal monthly payments and a ten percent yield to maturity has a duration of 2.34 years.

Knowledge of coupon rates and market interest rates is not nearly so important to estimating duration—and this is fortunate for regulators, who receive reports only on average yields, if that much. In the above example, if the coupon rate on the five-year bond was 12 percent rather than ten percent, the duration would fall from 4.05 years to 3.95 years. If the yield on the five-year bond rose to 12 percent from ten percent, its duration would fall from 4.05 years to 4.01 years.⁸

The durations in these examples were computed using formulas that avoid the cumbersome method of equation (3), at least for certain important classes of financial instruments. Durations of amortizing assets or liabilities—those which are paid off in equal periodic payments—can be calculated using equation (9a) of Appendix B, which requires only knowledge of the maturity and market interest rate of the instrument. Durations of bond-like instruments—those with periodic payments of interest—can be calculated using equation (10a) of Appendix B, which requires knowledge of the coupon rate, market interest rate and maturity of the instrument. As illustrated in the examples just given, however, using rough estimates of coupon rates and market interest rates, even if they are off by several hundred basis points, will not result in too great an error in measuring duration. Offsite estimates of duration from financial reports of federally insured depository institutions might proceed as follows.⁹ The amounts in each asset and liability category from the repricing schedules are treated as single financial instruments with

maturity equal to the midpoint of the repricing interval. Depending on the category being considered, the formulas for durations of zero-coupon, bond-like or amortizing instruments are used, with estimates of average coupon rates and market interest rates used where required.

Difficulties of Measuring Interest-Rate Exposure

Measuring the interest-rate exposure of financial intermediaries is subject to considerable difficulties, especially given the limited financial information regularly reported to their federal regulators. The fundamental difficulty is in estimating the timing and magnitude of cash flows, whether for the purpose of determining correct amounts of rate-sensitive assets and liabilities to compute gaps or for the purpose of determining durations. Problems encountered in estimating the interest-rate exposure of financial intermediaries are discussed in this section.

One problem facing regulators attempting to measure interest-rate exposure is a lack of accurate knowledge of maturities or times to repricing. For example, changes in net interest income for each time interval in Table 1 were computed by assuming that assets and liabilities repriced evenly throughout the interval. This introduces potential inaccuracy: conceivably all the liabilities repricing during an interval could reprice on the first day of the interval and all assets on the last day of the interval, or *vice versa*.

For example, recall that in Table 1 it was estimated that NII would increase during the first three months following an interest-rate increase

⁷Equation (5) and the assumptions necessary for its validity are derived and discussed in Appendix A.

⁸The slight reduction in duration occurs because higher interest rates increase the yield from reinvestment of coupon income, so that the initial investment is recouped sooner.

⁹Further details on the duration estimates used in this paper are provided in Appendix B.

even though the cumulative three-month gap was negative, because of the large positive one-day gap. Similarly, the changes estimated for each incremental gap might differ substantially from the "true" figures. This source of error can only be eliminated by collecting repricing information for intervals of increasingly shorter length. In fact, some asset/liability management simulation programs allow financial institutions to divide their repricing periods into intervals of only one day.

Interest-rate risk measurement suffers from a further source of potential inaccuracy—ignoring or incorrectly estimating the intermediate cash flows generated by assets and liabilities.¹⁰ For example, a fixed-rate mortgage maturing in 15 years will generate substantial cash inflows in the form of monthly payments of principal and interest. These cash flows are rate-sensitive assets and should be included in calculating each incremental gap or in estimating durations. Similarly, scheduled payments of principal and interest on, say, Federal Home Loan Bank advances ideally should be counted as rate-sensitive liabilities.

The difficulty of estimating the "true" amounts of assets and liabilities repricing during a given time interval is compounded when deposits can be withdrawn or loans prepaid at the customer's option. This introduces an element of uncertainty to the timing and magnitude of the bank's cash flows, and has important implications for interest-rate exposure. Declining interest rates, for example, are likely to increase loan prepayment rates, causing high-yielding assets to be replaced on the books by lower-yielding assets. Rising interest rates can trigger deposit withdrawals from fixed-maturity deposits, which must be replaced at higher rates. Such considerations are absent from gap or duration analysis.

In addition, the degree to which some assets are rate-sensitive may be impossible to assess. The wide-

spread use of periodic and lifetime interest-rate caps on variable-rate mortgages, for example, limits the degree to which institutions' interest income on such mortgages can respond to increases in interest rates.

For some large institutions, an important problem may be that information on repricing schedules does not reflect participation in the futures, options or swaps markets.¹¹ Such activities can substantially alter institutions' interest-rate exposure—as they are designed to do.

Another problem with the basic gap and duration models is that they assume that interest rates on all assets and liabilities change by equal amounts—an unlikely occurrence. Rates on federal funds and large CDs, for example, are likely to be much more volatile than rates on small savings deposits.

A related problem is that the assets and liabilities being repriced may have coupon rates different from current market rates. In this case the changes in net interest income computed from the gap formulas would be incorrect. For example, suppose current mortgage rates are ten percent and increase to 11 percent. An old 16 percent mortgage matures and reprices at 11 percent. This is a reduction in gross income of five percent, not an increase of one percent as the gap formulas would indicate. Similarly, accurate duration calculations require knowledge of the actual coupon rates of assets or liabilities.

A further problem is that gap analysis and duration analysis typically do not distinguish between the expected and unexpected components of interest-rate changes. This may lead to a fundamental error: asserting that an interest-rate increase would adversely affect an institution when actually the institution benefits. For example, consider the following example provided by Sanford Rose.¹²

Suppose the current three-month interest rate is 5.5 percent per annum, and the current six-month in-

terest rate is 6.0 percent per annum. Suppose a bank borrows \$1 million for three months and lends the proceeds for six months. Its cumulative six-month gap for this transaction is -\$1 million: the asset does not reprice *during* the period while the liability reprices in three months. If annual interest rates rise 50 basis points, gap analysis would indicate an adverse income effect for months three through six of $(.005)(1/4)(-\$1 \text{ million}) = -\$1,250$.

The gap calculation indicates the bank to be \$1,250 worse off if rates increase 50 basis points than if they don't change at all; similarly, duration analysis would show a decline in net worth as compared with the situation in which interest rates don't change. Although accurate, this is somewhat misleading since the bank will actually show a profit from the entire transaction. This profit derives from earning a yield of six percent for six months while paying 5.75 percent *on average*.

The consensus of the market, however, was that borrowing for three months and lending for six months would not earn a riskless profit. In other words, the market's forecast of the three-month interest rate three months from now was 6.5 percent. If this forecast had proved correct the bank would have paid six percent on average and broken even. Since rates rose by only 50 rather than 100 basis points, however, the bank profited.

This example makes it clear that whether a bank profits or loses from borrowing short term and lending long term depends on the movement of interest rates over the life of the long-term asset. Banks with negative gaps or long durations will suffer

¹⁰This problem can be corrected partially by estimating these cash flows from the available data. In Appendix C an example is presented indicating how this might be done. In the next section, estimates of the effects of these adjustments on institutions' gaps are presented.

¹¹The "impact of hedging activities" is, however, reported on S&Ls' repricing schedules.

¹²*American Banker*, February 2, 1988, p. 1.

adverse effects not from interest-rate increases *per se*, but from interest-rate increases that are *unexpectedly* large relative to the consensus of the market at the time the bank made its initial interest-rate bet.

Even with complete and perfect financial information about every asset and liability on an institution's balance sheet, there would still be difficulties in measuring interest-rate exposure because the market yield curve (which summarizes the interest rates prevailing for different maturities) is likely to shift in ways which do not correspond to the simple cases analyzed in this paper. For example, equations (4) and (5) are the basis of estimating changes in values using duration in this paper. These equations are derived from equation (2), which assumes that all future cash flows are discounted at the same rate; that is, it assumes a flat yield curve. In addition, the derivation of equations (4) and (5) involves assuming that this flat yield curve shifts in a parallel fashion. Gap analysis also assumes the yield curve to shift in a parallel fashion, but does not require it to be flat.

An important criticism of gap analysis alone is that it focuses exclusively on changes in net interest income, and not at all on market value. This encourages a view of the effects of adverse interest-rate changes which may be misleading in some cases. The "output" of gap analysis is a series of numbers indicating changes in net interest income from what it would have been without an interest-rate change. It is tempting to conclude that the effect of these successive income changes is a *gradual* change in the institution's capital position. In market-value terms, however, all these future changes in income are discounted back to the present; the full change in market value occurs immediately, not gradually.

If an institution adversely affected by an interest-rate change is solvent and does not face liquidity pressures,

then the change in its cash flows may adequately describe the effects of the interest-rate change. If, however, the institution is or becomes insolvent on a market-value basis—or worse, on a book-value basis—as a result of a rate change, its incentives to take risks are affected immediately. Such insolvent institutions may be tempted to try to get out of their difficulties by undertaking high-yielding, risky activities with the attitude: "Heads I win, tails the federal insurer loses." This of course depends on managements' view of whether the institutions' problems are temporary or permanent.

The situation is even more clear-cut for problem institutions that federal insurers are trying to close or for which they are trying to find a buyer: the market-value implications of every interest-rate change are felt dollar-for-dollar—immediately—by the insurers. This is particularly so if the adversely affected institution must sell assets as a result of liquidity pressures. In this case, capital losses or a deterioration in asset portfolio quality would be sustained in addition to the adverse cash flow effects described by gap analysis.

The criticism that gap analysis does not attempt to estimate changes in net worth is really only a criticism of how the "output" of the analysis is typically used. To estimate changes in net worth requires knowledge of both changes in net income and changes in the rates at which this income is discounted. Gap analysis generates the first set of numbers—the changes in net income. There is no reason these numbers could not be combined with estimates of discount factors to estimate changes in net worth, a procedure currently used by the FDIC as part of its offsite monitoring of interest-rate exposure. In principle, such a procedure should give the same results as duration analysis. In practice the net worth estimates are not likely to be identical: due to the substantial uncertainties associated

with the measurement of interest-rate exposure outlined in this section, any method of estimating interest-rate exposure should be regarded as an approximation.

An invalid criticism of gap analysis and duration analysis is that they do not adequately examine the evolution of interest-rate exposure over time. The maturities and repricing characteristics of a financial institution's assets and liabilities are apt to change significantly over time as it reinvests cash flows and refinances liabilities. This is particularly true if changes in the level of interest rates or the shape of the yield curve dictate changes in the institution's investment strategies and cash flows on existing assets and liabilities. The interest exposure of the institution thus also can change significantly over time.

This means that financial institutions wishing to manage their interest exposure must monitor this exposure on a regular basis. It means that regulators' offsite or onsite examinations of interest exposure may become dated very quickly. It does not mean, contrary to what some would say, that analyses of current interest exposure that do not account for a bank's future reinvestment and funding strategies are invalid.

To measure current interest exposure it is unnecessary and misleading to try to simulate the effects of future operations. For a bank with exposure to rising interest rates as determined by its current balance sheet position, a Monday afternoon jump in interest rates will have adverse effects which cannot be corrected by operations commencing on Tuesday morning.

Gap analysis estimates the changes in net income resulting from an interest-rate change based upon the bank's current balance sheet. Discounting these changes in income provides an estimate of the change in net worth. There is no doubt that the future pattern of cash flows may be different from that implied by the

current balance sheet, but that is irrelevant. What is important is the change in the present value of these cash flows, and that *can* be approximated using gap or duration analysis applied to the current balance sheet.

The bank has tremendous leeway to change the timing and repricing characteristics of its net income by buying or selling assets and liabilities, trading in futures or options, entering into interest-rate swaps, and so on. These activities can certainly change the bank's future interest exposure and cash flows, but cannot affect the value of these cash flows. In short, the present value of the bank's income stream, and changes to that value resulting from a *current* shift in interest rates, depends only on the current balance sheet and not on future operations.

The Usefulness of Gap and Duration Measures of Interest Exposure. If one thing is clear by this point, it should be that measuring the interest-rate exposure of financial intermediaries is very difficult. Institutions' cash flows are the building blocks of any analysis of interest-rate exposure, and these cash flows depend in a very complicated way on the shape and movements of the market yield curve as well as on the idiosyncrasies of individual institutions' balance sheets.

These factors sometimes can make measured gaps and durations differ substantially from their "true" values. Over time and on average, however, both gap analysis and duration analysis provide serviceable tools to compare the degree to which institutions are exposed to adverse interest-rate movements and to alert regulators to excessive interest-rate exposure in particular cases.

Duration analysis has the advantage of attempting to measure changes in net worth resulting from interest-rate movements. The cash flows which are often the sole focus of gap analysis can be modified drastically by the purchase and sale of

traditional assets and liabilities as well as by operations in the markets for futures, options and swaps. These transactions can alter the timing and magnitude of cash flows but not their total present value, which is the more fundamental and important quantity to measure.

The "output" of duration analysis—a change in the capital-to-asset ratio per change in interest rates—is easier to understand and more useful than an assortment of one-day, three-month, six-month, one-year, two-year, three-year and five-year gaps. Gap analysis is probably most useful when its estimates of changes in net interest income are discounted to produce estimates of changes in net worth. Such a procedure has the advantage, like duration analysis, of emphasizing that the full market-value effects of interest-rate changes occur immediately upon a rate change and will be felt immediately by institutions that face liquidity pressures, or by regulators who are searching for the least-cost method of closing insolvent institutions.

All this does not mean that one should dispense with gap analysis *per se*. In light of all the uncertainties surrounding the measurement of interest-rate exposure, one should not put too much stock in a single-number index of risk like duration. As in the example in Table 1, gap analysis can put considerable balance-sheet information before the analyst in a compact form which is readily understandable. This allows an overall impression of an institution's balance sheet which could not be obtained simply by feeding information into a computer to obtain a single "magic number."

Interest-Rate Exposure of Federally Insured Depository Institutions

Gap and duration measures of interest-rate exposure at year-end 1987 indicate considerable exposure exists at many thrift institutions. The savings and loan (S&L) industry appears to have the greatest exposure to rising interest rates, followed by

FDIC-insured savings banks, and both have greater exposure than commercial banks (although data shortcomings make it extremely difficult to estimate meaningfully commercial banks' exposures). This conclusion holds whether one examines the weighted average industrywide gaps in Tables 2 through 4 or the quartile distributions of gap and duration measures in Table 5.

These differences in interest-rate exposure are largely related to the traditional role of thrift institutions as providers of mortgage funds. At year-end 1987, FSLIC-insured thrifts had 71 percent of their assets in the form of mortgages, compared to 55 percent for FDIC-insured savings banks and 19 percent for FDIC-insured commercial banks. Not only do S&Ls have a higher proportion of mortgages than FDIC-insured savings banks or commercial banks, but a greater proportion of those mortgages are fixed-rate. Forty-seven percent of the S&L industry's mortgage portfolio was adjustable-rate at year-end, compared to 58 percent of the savings banks' mortgage portfolio.¹³

Gap Measures of Interest-Rate Exposure

In the aggregate, thrifts borrow short term and lend long term to a greater extent than commercial banks. If one assumes that passbook savings accounts do *not* reprice within one year,¹⁴ then 70 percent of S&L liabilities matured or repriced within one year at year-end 1987 (Table 2),¹⁵ while only 38 percent of S&L assets matured or repriced within one year. The weighted

¹³Breakdowns of mortgages between fixed-rate and adjustable-rate are not reported by commercial banks.

¹⁴The Federal Financial Institutions Examination Council's definitions of one-year and five-year gaps assume that passbook savings accounts do not reprice for at least five years after an interest-rate change.

¹⁵Passbook savings accounts constitute only seven percent of S&Ls' liabilities; if "passbooks" repriced in less than one year, 77 percent of S&L liabilities would be repriceable in less than one year.

Table 2
Repricing Information for FDIC-Insured Commercial Banks, Year-end 1987 (\$billions)

	Maturity or Earliest Time to Repricing			Total NOW + MMDA + Schedule J	Call Report Totals
	1 year or less	1 year-5 years	Over 5 years		
Selected Assets ¹	\$1613	\$619	\$342	\$2574	\$3000
Selected Liabilities ²	1846	166	20	2032	2819
Incremental Gap	-233	453			
Cumulative Gap	-233	220			
As percent of total assets:					
		one-year	five-year		
Cumulative Gap		-7.8	7.3		
Plus: Estimated Amortization ³		0.7	1.5		
Estimated Prepayments ⁴		0.8	3.8		
Estimated Repricing of Passbook Savings ⁵		-2.9	-2.9		
Adjusted Gaps		-9.2	9.7		

Table 3
Repricing Information for FDIC-Insured Savings Banks, Year-end 1987 (\$billions)

	Maturity or Earliest Time to Repricing			Total NOW + MMDA + Schedule J	Call Report Totals
	1 year or less	1 year-5 years	Over 5 years		
Selected Assets ¹	\$ 81	\$47	\$71	\$199	\$217
Selected Liabilities ⁶	124	29	4	157	200
Incremental Gap	-43	19			
Cumulative Gap	-43	-24			
As percent of total assets:					
		one-year	five-year		
Cumulative Gap		-19.8	-11.0		
Plus: Estimated Amortization ⁷		8.8	25.8		
Estimated Prepayments ⁴		2.2	10.9		
Estimated Repricing of Passbook Savings ⁵		-8.3	-8.3		
Adjusted Gaps		-17.1	17.4		

Table 4
Repricing Information for FSLIC-Insured S&Ls and Savings Banks, Year-end 1987 (\$billions)

	Maturity or Earliest Time to Repricing			Total NOW + MMDA + Section II	Call Report Totals
	1 year or less	1 year-5 years	Over 5 years		
Selected Assets ¹	\$477	\$146	\$498	\$1121	\$1252
Selected Liabilities	840	212	43	1204	1204
Incremental Gap	-363	-65			
Cumulative Gap	-363	-428			
As percent of total assets:					
		one-year	five-year		
Cumulative Gap		-29.0	-34.2		
Plus: Estimated Amortization ⁷		8.5	17.6		
Estimated Prepayments ⁴		2.9	14.2		
"Impact of Hedging Activities" ⁸		3.5	0.9		
Estimated Repricing of Passbook Savings ⁵		-3.5	-3.5		
Adjusted Gaps		-17.6	-5.0		

¹Excludes assets held in trading accounts, equity securities, nonaccruing assets, intangible assets, fixed assets and miscellaneous other assets.

²Excludes \$456 billion in demand deposits and \$177 billion in "passbook" savings deposits as well as \$154 billion of miscellaneous liabilities. Includes NOWs and MMDAs in the "less than one year" repricing interval.

³The "preferred method" for banks to use in reporting mortgage loans and loans to individuals is by scheduled amortization. Banks not using this method report these principal payments (but not interest payments); for the purposes of this table these reported payments are used to estimate amortization.

⁴Prepayments are assumed to be four percent per year of total mortgages held by each institution.

⁵One-half of "other savings deposits" ("passbook savings" in the case of S&Ls) is assumed to reprice during year one and none thereafter.

⁶Excludes \$36 billion in "passbook" savings deposits as well as \$7 billion of miscellaneous liabilities. Includes NOW and MMDAs in the "less than one year" repricing interval.

⁷Savings banks report all loans and leases and all certificates of participation in residential mortgages according to final maturity or earliest time to repricing. Principal payments received on these items are reported and used to estimate amortization.

⁸As reported on Section II of S&Ls' Quarterly Financial Reports.

average (unadjusted¹⁶) one-year gap for the industry was -29 percent at year-end. The corresponding figures were -19.8 percent for savings banks and -7.8 percent for commercial banks.

Interestingly, S&Ls also had more liabilities in the one-year to five-year repricing interval than assets, making the industry's five-year gap larger than its one-year gap. The weighted average unadjusted five-year gap-to-asset ratio for the S&L industry was -34.2 percent at year-end 1987, compared to -11 percent for the savings banks and 7.3 percent for the commercial banks. These figures overstate the degree of interest-rate exposure, however, since they take no account of the effects of, especially, mortgage prepayments and amortization of assets.

The "adjusted gaps" presented at the bottom of Tables 2 through 4 attempt to correct the unadjusted figures for the effects of scheduled amortizations of assets, mortgage prepayments, hedging activities (in the case of S&Ls, which report the effects of such operations) and repricing of "passbook" or "other non-transaction savings" accounts—also referred to as core deposits.¹⁷ These adjustments are substantial, reducing the S&L industry's one-year gap from -29 percent to -17.6 percent and its five-year gap from -34 percent to -5 percent. The savings banks' industrywide one-year gap is reduced from -19.8 percent to -17.1 percent, and its five-year gap from -11 percent to a positive 17.4 percent. The commercial banks' one-year gap increases from -7.8 percent to -9.2 percent, and its five-year gap from 7.3 percent to 9.7 percent.

Using equation (1), and keeping in mind that it produces only the roughest of estimates, the weighted average adjusted one-year gaps just given imply about a nine basis point reduction in S&L industry ROA per 100 basis point increase in interest rates during the first year after such a rate increase. The corresponding

Table 5
Quartile Distribution of Gap and Duration Estimates
of Interest-Rate Exposure¹, Year-end 1987

FDIC-Insured Commercial Banks			
	Lower	Median	Upper
As percent of assets:			
1-year unadjusted gap	-18.3	-8.7	0.8
1-year adjusted gap	-21.4	-11.9	-2.1
5-year unadjusted gap	4.2	12.2	19.6
5-year adjusted gap	5.5	13.3	20.5
Net worth duration gap (years)	0.4	0.7	1.2
FDIC-Insured Savings Banks			
	Lower	Median	Upper
As percent of assets:			
1-year unadjusted gap	-27.6	-14.9	-2.8
1-year adjusted gap	-29.0	-16.0	-0.7
5-year unadjusted gap	-9.6	0.5	10.1
5-year adjusted gap	3.5	16.2	29.0
Net worth duration gap (years)	0.6	1.1	1.9
FSLIC-Insured S&Ls and Savings Banks			
	Lower	Median	Upper
As percent of assets:			
1-year unadjusted gap	-41.0	-28.7	-16.8
1-year adjusted gap	-33.9	-21.0	-8.6
5-year unadjusted gap	-45.5	-30.3	-16.7
5-year adjusted gap	-3.4	7.1	17.3
Net worth duration gap (years)	1.2	2.1	3.1

¹⁶Unadjusted gaps use Schedule J information for FDIC-insured institutions and Section II information for FSLIC-insured institutions as is, except that i) "passbook" and "other savings deposits" are not included as repriceable liabilities; and ii) NOW accounts and MMDAs are included as repriceable in year one. "Adjusted gaps" attempt to correct for scheduled amortization, mortgage prepayments and repricing of some passbook savings accounts in a manner described in Appendix C. The duration estimates are described in Appendix B.

reductions in ROA are nine basis points for savings banks and five basis points for commercial banks. As percentages of 1987 net interest margin (NIM), the reductions in income are 5.6 percent for S&Ls, 3.1 percent for savings banks and 1.3 percent for commercial banks. During years two through five following such a rate increase, one would predict reductions in S&L industry ROA of 11 basis points per year per 100 basis point increase in interest rates. Because of their large positive incremental one-to-five year gaps, no change in ROA during years two

through five following an interest-rate increase would be estimated to occur for savings banks and commercial banks.¹⁸

¹⁶Unadjusted gaps are computed by subtracting rate-sensitive assets and liabilities from the repricing schedules reported by the institutions, except that i) NOW accounts and MMDAs are counted as repricing in less than one year; ii) "passbook" or "other non-transaction savings" accounts are assumed never to reprice.

¹⁷Details of the adjustments are presented in Appendix C.

¹⁸The above figures assume assets and liabilities reprice evenly during years one through five following an interest-rate change, and use the formulas at the bottom of Table 1.

The Duration Measure of Interest Exposure

The duration measure gives a similar ranking of institutions' interest-rate exposure. The median estimated net worth duration gap defined in equation (6) was 2.1 years at S&Ls, 1.1 years at savings banks, and 0.7 years at commercial banks. Interpretation of these figures is made easy by equation (5); the duration gap in years is approximately equal to the percentage point reduction in market value capital-to-asset ratio per 100 basis point increase in interest rates. For example, the median S&L (by duration) would be estimated to lose 2.1 percentage points (e.g., from 7.0 percent to 4.9 percent) of its market value net worth-to-asset ratio per 100 basis point increase in interest rates. A typical mutual savings bank would be predicted to lose about 1.1 percentage points of market value capital-to-asset ratio and a typical commercial bank would be expected to lose about 0.7 percentage points of capital-to-asset ratio per 100 basis point increase in interest rates.

The significance of interest-rate exposure depends in part on institutions' capital ratios. In this regard, the relatively low levels of capital at some solvent S&Ls may be cause for concern. For these institutions, the percentage point reductions in their capital-to-asset ratios outlined in the preceding paragraph would represent a large share of their total capital.

Quartile distributions for the duration gap measure (Table 5) indicate that considerable interest-rate exposure apparently exists at many thrifts. The "worst" 25 percent of the savings banks (with respect to interest-rate exposure) would be expected to lose at least 1.9 percentage points of market value capital-to-asset ratio per 100 basis point increase in interest rates; the "worst" 25 percent of S&Ls would be expected to lose at least 3.1 percentage points per 100 basis point increase in interest rates.

Conclusions

The figures in the last section indicate substantial exposure of earnings and net worth to rising

interest rates on the part of some savings banks and, to a much greater extent, S&Ls.

As emphasized throughout this paper, however, measuring interest-rate exposure is very difficult without detailed and reliable financial information. With the information currently reported to federal regulators (and this is especially true of commercial banks), offsite analysis of interest-rate exposure can produce only the roughest of estimates, for the reasons discussed at length.

Therefore it is *not* a "conclusion" of this paper that, for example, "25 percent of the savings bank industry would lose at least 1.9 percentage points of their capital-to-asset ratios per 100 basis point increase in interest rates." Rather, the conclusion is that available offsite measures of interest-rate exposure suggest that such exposure is considerable at some institutions. These measures provide a useful means for directing attention to institutions that warrant closer review.

Appendix A

Derivation of Equations (4) and (5)

The following derivations can be found in G. O. Bierwag's *Duration Analysis* (pp. 72—73 and pp. 193—194). Recall from equation (2) that the price of a security with cash flows c_1, c_2, \dots, c_M is

$$(1a) \quad P = c_1/(1+r') + c_2/(1+r')^2 + \dots + c_M/(1+r')^M,$$

where r' is the interest rate appropriate for the time interval between cash flows. Differentiating this expression with respect to r' one gets

$$(2a) \quad \begin{aligned} dP/dr' &= -c_1/(1+r')^2 - 2c_2/(1+r')^3 - \dots - Mc_M/(1+r')^M \\ &= -(1+r')^{-1}P[c_1/(1+r')P + 2c_2/(1+r')^2P + \dots + Mc_M/(1+r')^M P] \\ &= -(1+r')^{-1}P[w_1 + 2w_2 + \dots + Mw_M] \\ &= -PD/(1+r'), \end{aligned}$$

using the definition of the weights w_j and duration D given earlier in the text.

One can regard the price of the security as a function of the interest rate r' , holding other things constant. Graphing this function would produce a downward sloping curve: the higher the rate of interest, the lower the price of the security. This curve would not be a straight line. Evaluating the right-hand side of (2a) for a given r' gives the slope dP/dr' of the curve at that particular value of r' . This slope measures how much P changes per unit change in r' , at that particular point on the curve, and can be regarded as the slope of a straight line just tangent to the curve at that point.

Dividing equation (2a) by P and multiplying by dr' gives equation (4) in the text, reproduced here:

$$(3a) \quad dP/P = -D(dr')/(1+r').$$

The new price resulting from a change in interest rates predicted by equation (3a) lies on the tangent line just mentioned. The smaller is the change dr' , the closer is the tangent line to the curve and the better is the approximation in equation (3a). The second part of equation (4) is an approximation obtained by assuming that $1+r' = 1$.

To derive equation (5), let the market value of assets be a function of the annual interest rate r_A on assets, and the market value of liabilities a function of the annual interest rate r_L on liabilities. Then the market value of a depository institution's net worth is a function of both interest rates:

$$N(r_A, r_L) = A(r_A) - L(r_L).$$

Differentiating (4a) with respect to r_A gives

$$(4a) \quad dN/dr_A = A'(r_A) - L'(r_L)[dr_L/dr_A],$$

where $A'(r_A)$ and $L'(r_L)$ are the derivatives of the market values of assets and liabilities with respect to a change in the relevant interest rates, dN/dr_A is the derivative of net worth with respect to the interest rate on assets, and dr_L/dr_A is the derivative of liability interest rates with respect to asset interest rates. One can regard the portfolios of assets and liabilities, respectively, as single securities with cash flows equal to the cash flows of the portfolios. The market values A and L would then take the role of P in equation (2a), and equation (2a) would imply that

$$(5a) \quad A'(r_A) = -D_A A(r_A)/(1+r_A), \text{ and } L'(r_L) = -D_L L(r_L)/(1+r_L),$$

where D_A and D_L are the durations of assets and liabilities in years (since r_A and r_L are annual rates of interest).

If one assumes that r_A and r_L change by the same amount, then $dr_L/dr_A = 1$. Substituting (5a) into (2a) would then give

$$(6a) \quad dN/dr_A = -D_A A(r_A)/(1+r_A) + D_L L(r_L)/(1+r_L).$$

This equation can be rewritten

$$(7a) \quad \begin{aligned} dN/dr_A &= [A(r_A)/(1+r_A)] [-D_A + D_L L(r_L)(1+r_A)/A(r_A)(1+r_L)] \\ &= -A(r_A)GAP_N/(1+r_A), \end{aligned}$$

where

$$(8a) \quad GAP_N = D_A - D_L L(r_L)(1+r_A)/A(r_A)(1+r_L).$$

Equations (7a) and (8a) are equations (5) and (6) in the text.

Appendix B

Duration Estimates

For all duration estimates in this paper, the annual rate of interest was assumed to be eight percent. All maturities were assumed equal to the midpoints of the repricing intervals. Maturities for the "over five years" interval (commercial banks) were assumed equal to 10 years, for the "over ten years" (mutual savings banks) interval were assumed equal to 20 years, and for the "over 20 years" (S&Ls) interval were assumed equal to 25 years.

All assets and liabilities with maturities of six months or less were assumed to have durations equal to their maturities. Thus, duration for the one-day interval was assumed equal to zero, duration for the zero- to three-month interval was assumed to be 1.5 months, for the three- to six-month interval was assumed to be 4.5 months, and for the zero- to six-month interval was assumed to be three months. For such short maturities, intermediate cash flows, if any, would not reduce durations by much, so these assumptions seem reasonable.

For assets of greater maturity than six months, all loans and leases and certificates of participation in residential mortgage pools were assumed to amortize monthly. Under this assumption the formula for the duration of a mortgage¹⁹ could be used to estimate their durations. The duration of mortgages having fixed identical monthly payments is given by

$$(9a) \quad D = [(1+r')/r'] - [M / \{(1+r')^M - 1\}],$$

where D is the duration in months, r' is the one-month interest rate and M is the number of months to maturity. Again, the annual interest rate was assumed to be eight percent.

Investment securities, debt securities and other interest-bearing assets were assumed to pay interest every six months. Under this assumption their durations could be estimated using the formula for the duration of a bond. The duration of bonds paying semiannual coupons is given by

$$(10a) \quad D = [(1+r')/r'] - \{ [((c/2) - r')M + (1+r')] / [(1+r')^M(c/2) - ((c/2) - r')] \},$$

where D is the duration in six-month intervals (for example, $D=3$ would indicate a duration of 1.5 years), r' is the six-month interest rate, c is the annual coupon rate and M is the number of six-month intervals remaining until maturity. The annual coupon rate c was assumed to be eight percent (the same as the annual interest rate).

Half of all "passbook savings" or "other savings deposits" were assumed to have durations of one year. The other half were assumed to have durations of five years. The durations of NOW accounts, and MMDAs were assumed to be three months. Liabilities other than MMDAs, NOW accounts and passbook savings accounts were assumed to pay interest quarterly. Under this assumption their durations could be estimated using equation (9a), where all units are expressed on a quarterly rather than a semiannual basis.

¹⁹This and the next formula are derived in *Duration Analysis*, by Gerald O. Bierwag, pp. 72-78.

Appendix C

Adjusted Gap Estimates

Savings banks report scheduled payments of principal received during each quarter on most of their assets. This amount multiplied by four and divided by total assets listed on the repricing schedule was assumed to be an institution's "annual amortization rate." The weighted average rate for all savings banks was 9.5 percent. To estimate amortization occurring during each of years one through five, each institution's amortization rate was multiplied by the assets remaining on its repricing schedule from that time forward. For this purpose it was assumed that assets repriced evenly over each repricing interval.

Commercial banks also report scheduled principal payments on mortgages and installment loans to individuals if they have elected to

report items on their repricing schedule by final maturity or earliest time to repricing rather than by scheduled amortization. For these banks amortization was estimated in the same way as it was for savings banks.

S&Ls report all items on their repricing schedules by final maturity or earliest time to repricing, and do not report principal payments received at all. For S&Ls, amortization was estimated by assuming a 9.5 percent annual amortization rate—the rate derived from mutual savings bank data.

Prepayments were assumed to amount to four percent per annum of total mortgages held by an institution. This figure is toward the lower end of historical experience, but this seems appropriate if the intent is to consider "worst-case

scenarios" in which interest rates rise suddenly and by substantial amounts. In such scenarios, prepayments would be expected to be at their base levels determined by demographic factors rather than by demand for refinancing.

Finally, one-half of "passbook" or "other nontransaction savings" accounts were assumed to reprice during the year-one repricing interval, and not at all thereafter. This assumption is somewhat arbitrary. If the remaining half of "core deposits" were assumed to reprice during years one through five, savings banks' five-year gaps would be reduced by 8.3 percentage points, S&Ls' five-year gaps by 3.5 percentage points, and commercial banks' five-year gaps by 2.9 percentage points.

"Derivative" Mortgage Securities and Their Risk/Return Characteristics

by Panos Konstas*

Market innovation and recent federal legislation have led to the development of new instruments in the mortgage-securities market that now make it possible to implement investment strategies that only months ago would have been thought of as out of the question. The new securities often are referred to as "derivative" products because they are derived, generally, from ordinary mortgage-backed securities (MBSs) which have existed since the early 1970's. These new instruments, which include "Stripped Mortgage-Backed Securities" (SMBSs), "Collateralized Mortgage Obligations" (CMOs), and "Real-Estate Mortgage Investment Conduits" (REMICs), facilitate a more efficient flow of funds into the mortgage market. They also provide increased flexibility to financial institutions in managing their asset/liability mix and hedging against interest-rate risk. However, it is essential that market participants understand the underlying characteristics of these investments, because if they are not used properly they can greatly increase risk for a financial institution.

The general structure and main features of SMBSs, CMOs, REMICs and related securities were discussed in an article in the May/June 1987 issue of the FDIC's *Banking and Economic Review*.¹ The present discussion focuses on analyzing the risk characteristics of these securities under changing economic and market

conditions. The discussion begins with stripped Treasury bonds, proceeds into stripped mortgage-backed bonds, and concludes with CMO and REMIC securities, including the latest development in this group—the floating-rate CMO.

Stripped Treasury Securities

Introduced about 10 years ago, this type of security involves dividing an individual Treasury bond into two separate securities (strips). One security, the "interest-only" (IO) strip, consists of all interest payments contained in the original Treasury bond; the other, the "principal-only" (PO) strip, is a zero-coupon bond which is sold at a discount and is redeemed at maturity at the par value of the original bond. The maturities and the credit risks associated with either the IO or the PO strip are the same as those of the Treasury bond.

The price of Treasury strips in the secondary market is influenced solely by market interest rates. As market interest rates change, the periodic payments of the IO strip and the final payment of the PO strip remain constant. However, the rate used to discount the payments of the two strips changes, which alters the present values (or market prices) of the two strips.²

The market values of Treasury bonds and their IO/PO strips under

various interest-rate changes are illustrated in Figure 1. As interest rates change, the market values of the IO and PO strips tend to move in almost parallel ways. In general, there is an inverse relationship between changes in interest rates and the market values of strips and Treasury bonds—the larger the increase in interest rates, the lower the market value, (and *vice versa*).

Separating a Treasury bond into interest-only and principal-only strips can increase the overall market value of the underlying security. The price of a Treasury bond represents the present values of two future payments: the discounted values of the semiannual coupon payments and the discounted value of the final (par value) payment at maturity. The same two payment streams are discounted by the same factor when the bond is stripped; hence, it may be thought that the sum of the two parts would equal the price of the bond. In practice, however, the total

*Panos Konstas is a senior economist in the FDIC's Office of Research and Statistics. James Booth, John Bovenzi and Lynn Nejezchleb contributed useful comments and suggestions in the development of this paper.

¹See Panos Konstas, "REMICs: Their Role in Mortgage Finance and the Securities Market," *Banking and Economic Review*, Vol. 5, No. 3 (May/June 1987): 11-18.

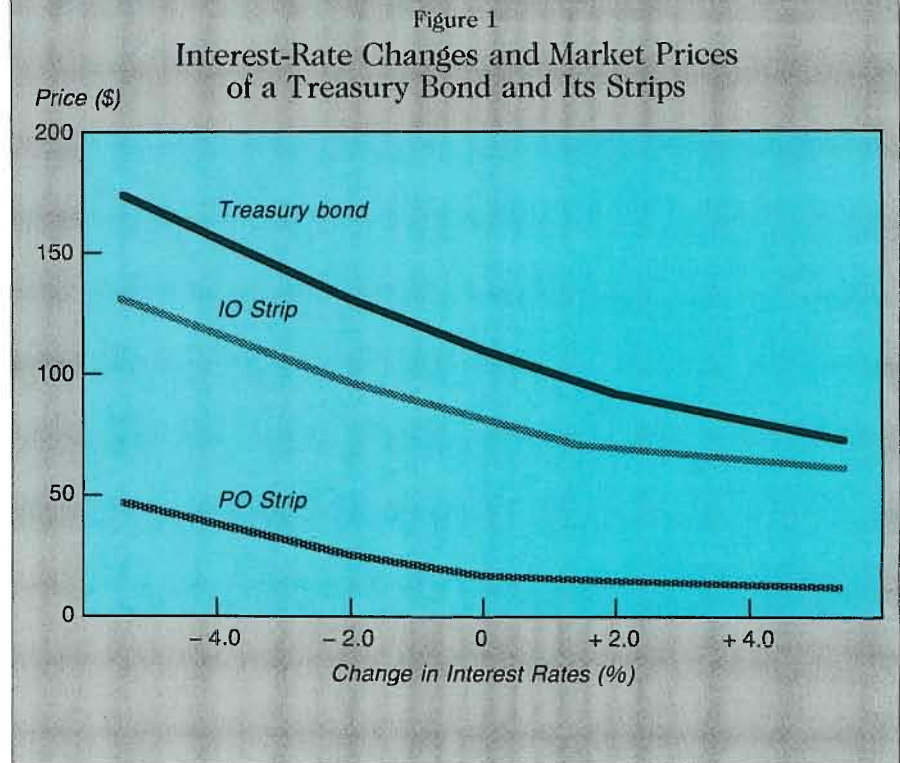
²The discount rate used in calculating the present value of a security is generally the current market rate on an issue of similar maturity and credit risk.

price for the two parts ordinarily exceeds the price of the whole bond because the issuer is able to cater to two different sets of investor preferences. Some investors desire the steady flow of payments in an IO strip without the one-time payment at redemption, while others prefer to purchase the long-term, zero-coupon security embodied in the PO strip. Naturally, investors will pay a little more for their individual preferences, and this accrues as additional revenue to the issuer.

Stripped Mortgage-Backed Issues

Stripped mortgage-backed securities were introduced in July 1986, when the Federal National Mortgage Association (FNMA) "stripped" a \$200 million pool of 11 percent mortgages into two distinct classes of securities. Unlike Treasury strips, however, this offering was not bisected strictly on an IO-PO basis. Instead, each strip contained portions of both principal and interest. Class 1 was allocated a coupon rate of five percent and 99 percent of the principal payment, while Class 2 consisted of the remaining coupon rate of six percent and one percent of principal. More recently, FNMA has introduced offerings that are similar to U.S. Treasury issues, with Class 1 receiving all of the principal and Class 2 all of the interest.

A typical FNMA issue of stripped securities is backed by a pool of mortgages with varying coupon rates. For example, a \$2.0 million FNMA issue dated June 31, 1987 was backed by a pool of individual mortgage loans with coupon rates varying from 9.8 percent to 11 percent. The weighted-average coupon rate for the entire pool was 10.2 percent. Interest payments of 9.5 percent were earmarked for pass-through to the SMBS certificate holders—the 70 basis-point difference was retained by FNMA as compensation for servicing and insuring the underlying pool of mortgages.



There are several basic differences between stripped mortgage-backed securities and Treasury strips. First, a Class 1 or principal-only (PO) mortgage strip offers the holder monthly payments of principal, whereas the zero-coupon Treasury strip offers a lump-sum payment at maturity. Based on this difference alone the risk from changing market interest rates (interest-rate risk) for a PO Treasury strip is greater than that for a PO mortgage strip of the same maturity. This is because the effective maturity of the mortgage strip, which generates monthly payments, is about half of the maturity of the zero-coupon strip which pays the principal in one lump sum.

However, mortgage strips (both the PO and IO portions) are subject to another type of risk called prepayment risk, which does not apply in the case of Treasury strips. With a Treasury strip, it is known for certain that the principal and interest portions will be paid on the specified dates. Due to home sales and refinancings, however, mortgages typically are paid off prior to their maturity dates. Because of the uncertainty

involved in determining when home sales or refinancings may occur, the time period over which the holder of a mortgage strip will receive the total principal and accrued interest payments is uncertain. This uncertainty creates what is called "prepayment risk."

When mortgage strips are sold, they are priced at discount of their par values, and implicit in their prices is an assumed prepayment pattern. If the prepayment rate turns out to be higher than expected, the holders of the principal-only class will realize increased yields since they will be paid at a faster rate than originally anticipated. The opposite holds true for the holders of the interest-only class. Yields will decline as prepayments increase, since higher prepayment rates mean fewer interest payments over the life of the security.

Prepayment risk for interest-only and principal-only mortgage-backed strips can be illustrated by looking at a specific example. In the prospectus for the June 1987 offering, FNMA calculated the relationship between

purchase prices for strips and effective yields under different prepayment assumptions. The prepayment rate was measured on a standard developed by the Public Securities Association, a standard that is commonly known as the PSA assumption. This information is shown in Table 1.

Table 1 indicates that changes in prepayment rates can result in widely varying yields. For example, the effective yield on the IO strip would vary from 12.83 percent if the prepayment rate is equal to the standard assumption, to -11.00 percent if the prepayment rate is five times faster than the standard assumption.

Changes in market interest rates

Two distinct forces on the values of stripped issues come into play when interest rates change. The first force is changes in the rate against which the future cash flows from both the PO and IO strips are discounted. If interest rates decline (rise) the present value of the future cash flows increases (declines), which is another way of saying that the market prices of the two strips will rise

(decline). As noted before, Treasury strips would be similarly affected.

A second force applies only to mortgage securities. When interest rates decline, it becomes more advantageous to refinance existing mortgages and, thus, prepayment rates increase. For holders of PO strips, faster prepayment rates mean that they will be getting their expected future payments over a shorter pe-

riod than originally expected. Thus, during periods of falling interest rates a lower discount rate and a higher prepayment rate both work to increase the market value of PO mortgage strips. As shown in Figure 2, the combined positive effects of a lower discount rate and higher prepayment rate can significantly increase the market value of PO strips when interest rates decline.

It is a different story, however, for the holders of IO strips. Faster mortgage prepayments mean that IO investors will receive less interest income, since there will be less outstanding principal at any point in time. Thus, the amount of future interest payments will be less than originally expected and this will lower the market values of IO securities. This negative effect overshadows the positive effect from the lower discount rate and will result in declining market values for IO securities as interest rates decline. Since prepayments can increase dramatically in a declining interest-rate environment, the decline in market value can be quite severe.

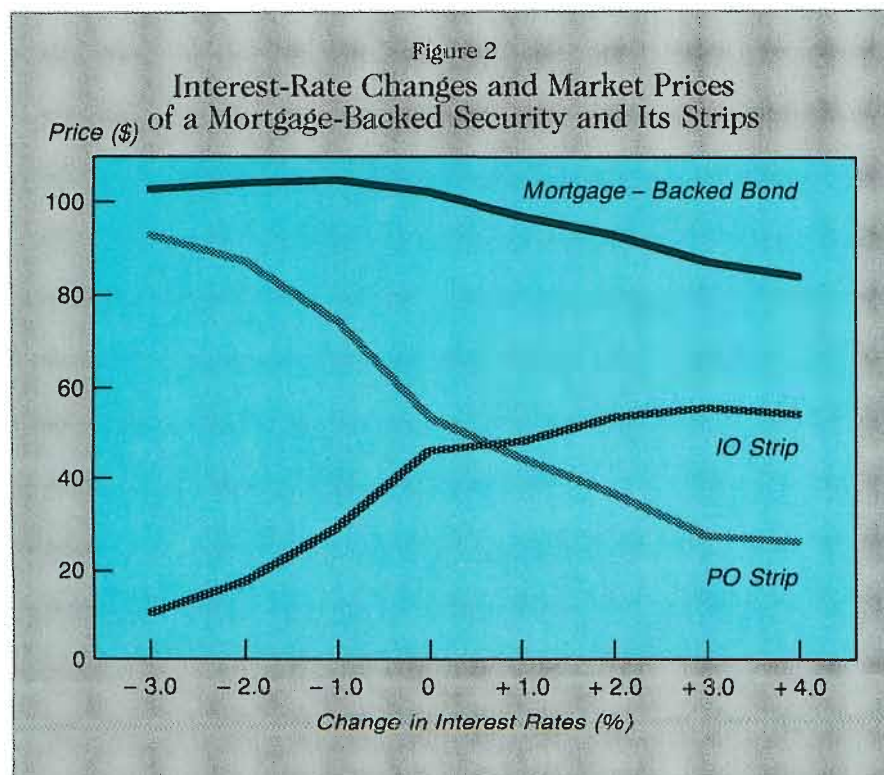
As shown in Figure 2, the opposite results can be expected when market rates of interest are rising. With IO securities, the positive effect of a lower prepayment rate will offset the negative effect of a higher discount rate, resulting in somewhat higher

Table 1
Effective Yields of Stripped Mortgage-Backed Securities under Alternative Prepayment Rates

	Prepayment Assumptions (PSA basis)				
	100%	150%	165%	200%	500%
	Yield to Maturity				
Class 1 Certificates (PO)	5.46%	7.12%	7.64%	8.86%	19.11%
Class 2 Certificates (IO)	12.83%	9.99%	9.13%	7.11%	-11.00%

NOTE: The prepayment rate is the amount of prepaid principal in a given month over the total remaining balance of the pool for the same month. In the above table, 100% PSA reflects a constant annualized prepayment rate of .2% per month in the first month, increasing by .2% each month until the thirtieth month and leveling off at a .6% rate thereafter. A PSA of 200% reflects prepayments at twice that rate.

SOURCE: Federal National Mortgage Association.



returns for holders of IO securities. A lower prepayment rate adversely affects PO securities, which reinforces the negative effect of a higher discount rate, resulting in a clear decline in market value.³

REMICs and CMOs

Real-Estate Mortgage Investment Conduits (REMICs) and Collateralized Mortgage Obligations (CMOs) constitute the newest developments in the mortgage-backed securities market. The word "development" should be stressed because, unlike the CMO, a REMIC is not a new innovation in the mortgage market. A REMIC is nothing more than an entry in the U.S. Tax Code created by the Tax Reform Act of 1986. The REMIC legislation does not specify how a security ought to be structured from a financial or a risk standpoint. Rather, it indicates how income from a mortgage security should be treated for Internal Revenue purposes. Any real-estate-backed security such as a CMO, a SMBS, a mortgage pass-through, or even a group of ordinary mortgages may be treated as a REMIC for tax purposes if its issuers so choose.

Up to now, most of the security instruments designated as REMICs have been CMOs. For this reason, REMICs currently are generally viewed as synonymous with CMOs. The REMIC designation affords certain tax advantages to the CMO issuer that otherwise are not available. Indeed, it was problems with the then-existing IRS rules on CMO taxation that prompted the passage of REMIC legislation.⁴

Analogies with stripped issues

REMICs and CMOs contain many features and attributes that are similar to those of Treasury strips and SMBSs. Some other features resemble those of ordinary mortgage pass-throughs. Like stripped issues, which are divided into IO and PO components, REMICs contain two distinct types of securities. In REMIC terminology these are called "regular" and "residual" interests.

In some respects, regular interests resemble mortgage pass-through certificates. Like pass-throughs, they have a fixed rate of interest (pass-through rate) and similarly are subject to prepayment risk. They differ from pass-throughs, however, in that REMICs/CMOs have multiple maturity classes (called tranches), whereas a pass-through is a single-maturity instrument. In a pass-through the cash flows from the underlying collateral, whether in the form of interest payments, principal payments, or advances from mortgage prepayments, are all distributed *pro rata* to the certificate holders. In REMICs and CMOs the different payment flows are precisely prioritized. Cash generated from the underlying mortgage interest payments is used to pay the contractual interest obligation on all of the different tranches of the issue. The flows accruing from mortgage principal payments (as well as from any prepayments), however, are utilized in their entirety to retire the outstanding principal balance of the first tranche—the tranche with the shortest maturity. Once the first tranche has been paid, all principal payments (including prepayments) are directed toward paying off the second tranche, while the interest inflows continue to be distributed to all remaining tranches. The sequence continues until all tranches have been retired.

Residual interests, in contrast, are similar to IO strips, at least insofar as interest-rate risk is concerned. Residual holders receive the difference between the total interest payments emanating from the mortgage collateral and the amount of interest payments required to service the regular interests (bond tranches) of the REMIC/CMO. In addition, residual securities receive any reinvestment income earned between the monthly receipt of interest and principal payments, and their subsequent disbursement to the regular interests of the CMO.

Residuals, like the interest-only portions of stripped mortgage-backed

securities, stand to gain when interest rates rise and lose when interest rates fall. When interest rates rise, prepayments tend to slow down. This lengthens the actual maturities of the bond tranches and, in turn, leads to the coupon differential being available to residual holders for a longer period of time. In addition, higher interest rates increase the income from the temporary reinvestment of the monthly mortgage payments, which further enhances the earnings of residual investors. Conversely, when rates fall, prepayments tend to increase, reducing the cash flows to residual holders.

Floating-rate offerings

Beginning in September 1986, a new type of CMO was introduced in the market: CMOs were structured to include floating-rate provisions. Previously, all CMOs that had been issued contained fixed coupon rates on their bond tranches. Initially, it was required that all interest payments be fixed at the issue date if a CMO were to obtain REMIC status. In June 1987, however, the U.S. Treasury Department changed this requirement, and it is now possible to issue REMIC securities with floating-rate provisions.

Floating-rate CMO bonds allow investors to reduce the risk exposure of their portfolios resulting from interest-rate fluctuations. This is achieved by tying the coupon rate on the bond portions of a CMO to some market index of interest rates,

³It should be noted that prepayment risk will depend importantly upon the relationship between the original mortgage coupon of the underlying collateral and the prevailing market rates of interest at the time the PO and IO strips were issued. If, for example, coupon rates on the mortgage collateral happen to be above interest rates in the mortgage market at the time of issue, prepayment risk would be high. This situation would be advantageous for the holders of PO strips. IO buyers would stand to lose under an accelerated prepayment rate which would deprive them of future payment flows. Under these conditions, the risk premium commanded by the IO investor on account of the prepayment factor would be considerable.

⁴For more discussion on the tax advantages of REMICs, see Konstas, *op. cit.*, pp. 13–15.

similar to the way rates are set for adjustable-rate mortgages. The large majority of floating-rate CMOs issued so far have utilized the London Interbank Offered Rate (LIBOR) as an index for setting rates on CMO bonds. Floating-rate tranches, just like their fixed-rate counterparts, are paid off before any other tranches or residual interests receive any early prepayments. Unlike traditional CMOs, however, in which all principal payments from the underlying collateral first go to retire the tranche with the shortest maturity, in some floating-rate CMOs two or more tranches receive principal payments at the same time.

By varying the floating-rate adjustment, the principal pay-down method, and possibly combining fixed- with floating-rate tranches, it is possible to create a wide variety of different types of CMOs. However, most of these fall into one of the following major categories:

(a) **Prioritized floaters**—Often a floating-rate tranche is combined with other bond tranches that carry fixed rates. The floating-rate tranche is retired before any payments are made to the remaining tranches. One issue of this type, for example, contained bonds with maturities of 2.1, 5.6, 11.3, and 20.9 years, and corresponding coupons of LIBOR plus .375%, 8.05%, 8.125%, and 8.95%, respectively. Floating-rate bonds generally have been offered at spreads of 25 to 60 basis points over the 3-month LIBOR rate. The interest rate on the floating bond (LIBOR plus spread) is generally calculated prior to each CMO payment date—usually three or six months. Since the underlying mortgage collateral is composed of fixed-rate mortgages, the coupon of the floating-rate tranche must be capped. In general, this type of a floating-rate bond is valuable to lending institutions seeking to match variable-rate liabilities with floating-rate assets. Alternatively, when a hedge for fixed-rate liabilities is desired, the floating-rate CMO bonds

can be swapped against fixed-rate mortgages to create fixed-rate assets.

(b) **The inverse floater arrangement**—In this form, the principal payments from a mortgage pool are directed simultaneously to two different bond classes of the CMO. The amount directed to each class is determined by its share of the total issue. Interest payments from the collateral also are distributed simultaneously to the two classes. In both classes the coupon rate is tied to an index such as LIBOR rate. However, coupon rates for the two classes are designed to move in opposite directions. In one floating class the coupon declines when LIBOR increases and rises when LIBOR decreases, while in the other floater class coupon rates move in tandem with LIBOR.

(c) **Simultaneous floater/fixed-rate combinations**—Just as in the previous case, two classes of CMO bonds receive principal and interest payments simultaneously. One class carries a floating coupon rate, and the other a fixed coupon rate. The fixed class is sold at a discount and its nominal coupon rate is set below that of the "pass-through rate," *i.e.*, the rate flowing from the underlying collateral. The difference between the discounted coupon rate of the fixed-rate class and the rate on the mortgage collateral goes to fund the amount of interest that may be needed to pay the floating-rate class in the event the floating rate rises above the pass-through rate.⁵

Effect of floating rates on residuals

Residuals produced from CMOs with only fixed-rate bond classes generally increase in yield as interest rates rise, and decrease in yield as interest rates fall. Residuals derived from CMOs containing floating-rate classes may behave quite differently.

In a floating-rate CMO with a prioritized payment class, the residual behaves in a manner similar to residuals of fixed-rate CMOs, *i.e.*, the residual yield declines when interest rates fall. Two opposing forces are at

work in a falling-rate environment. Returns on the residual are increased because of the lower coupon on the floating-rate class. But this increase is more than offset by the lower payments that accrue to the residual due to the increase in mortgage prepayments. In a rising interest-rate environment, residual returns are reduced somewhat by the increased coupon payments on the floating-rate class. But here again, the prepayment effect often dominates, and as interest rates rise residual yields increase.

A floater/inverse floater combination produces a residual that shows comparatively small changes in yield regardless of interest-rate movements. In a floater/inverse floater CMO, the effect of higher coupons for one regular class is offset by lower coupons for the other regular class, regardless of the direction of interest-rate movements. As a result, the cash flow to the residual is unaffected by changes in the coupon rates, although it does continue to be affected by changes in prepayments.

The residual of a simultaneous floater/fixed-rate CMO affords greater protection against downside risk relative to the residual of a prioritized floater. In a falling-rate environment, the residual benefits both by the drop in the coupon of the floater class and by early prepayments if the CMO was issued using discounted collateral. (These benefits would be, of course, balanced against the increased prepayments in a falling-rate environment, which, as indicated,

⁵The three floating-rate categories described above by no means exhaust the different types of securities that have evolved (and continue to evolve) in the CMO market. In some cases the evolution has led to more complex hybrids, combining features from all three types of CMOs discussed above. These are beyond the scope of the present discussion, but there are several publications available for those interested in further exploration of the subject. See especially, Gail M. Belonsky and Steven D. Meyer, "Floating Rate CMOs: the Floater, the Inverse Floater, and the Residual," Drexel Burnham Lambert, December 1986, and "The Developing Market for Residuals," *Mortgage Banking*, October 1987, pp. 107-122.

adversely affects residual returns.) In a rising-rate environment, however, the residual receives reduced returns because of the increased coupon payments on the floater class.

Concluding Comments

Derivative mortgage products (derived from traditional mortgage-backed securities), such as strips, REMICs, and CMOs, have begun to capture the interest of a growing number of investors, including financial institutions. They are valued not only for their unusually high-return characteristics but, more im-

portantly, for their risk-hedging properties as well.

In general, the cash flows from these new derivative mortgage securities are rearranged to reflect the interest-rate risk and maturity preferences of potential investors. Some of these derivative instruments may contain considerable downside risk in a rising interest-rate environment, while under the same conditions others may actually appreciate in value. Generally speaking, market values of derivative mortgage products are extremely sensitive to the prepayment

experience of the underlying collateral. Investors, therefore, not only run the risk of realizing lower than expected yields, but also in some cases the risk of not fully recovering the value of their initial investment. Consequently, derivative mortgage securities require careful consideration by investors before inclusion in any portfolio strategy. For those who know what they are doing, derivative products can prove highly instrumental in achieving desired goals in the asset and liability management of investors' portfolios.

Recent Developments Affecting Depository Institutions

by Benjamin B. Christopher*

Regulatory Agency Actions Federal Deposit Insurance Corporation

New Approach To Handling Bank Failures

The FDIC announced a new approach to handling bank failures, in which potential acquirors of failed or failing banks will have more options and more time to submit their bids. Whenever possible, potential bidders will be invited to submit competitive bids for a "whole bank," either on an "open" bank basis or a "closed" bank basis, at the bidder's option. In either case, using the closed-bank approach or the open-bank assistance under Section 13(c) of the FDI Act, the acquiror would assume all of the assets and liabilities of the bank in return for a payment from the FDIC.

The FDIC will try to give potential acquirors up to three or four weeks to analyze a failing institution before submitting their bids, removing much of the uncertainty under the present system which requires bids on short notice. Should it not be possible to arrange the preferred "whole bank" transaction on either an "open" or "closed" bank basis, the FDIC would then attempt a traditional purchase-and-assumption transaction, with the FDIC taking possession of certain problem assets.

Chairman Seidman noted that the new approach was developed in close cooperation with the various state banking departments and the Comptroller of the Currency. *PR-79-88, 4/18.*

Acquisition Of First RepublicBank Subsidiaries Approved

The FDIC, the Office of the Comptroller of the Currency and the Board of Governors of the Federal Reserve approved the acquisition by NCNB Corporation, Charlotte, North Carolina, of subsidiary banks of First RepublicBank Corporation, Dallas, Texas. The arrangement, approved in principle by the regulators, accomplishes the restructuring and recapitalization of First Republic banks in Texas, and ensures the full protection of all depositors and general creditors. All of the banking offices will continue to operate without interruption.

The 41 banks of the First Republic system, including the \$17.0 billion lead bank in Dallas, had total assets of approximately \$32.5 billion.

NCNB has agreed to infuse between \$210 million and \$240 million in NCNB Texas National Bank, an amount equal to 20 percent of the new bank's total equity capital. The FDIC's initial outlay is expected to be approximately \$2 billion, in addition to the \$1 billion advanced in March. Further outlays are expected to be about \$1 billion. Although it cannot be accurately estimated at this time, the FDIC's net cost for this transaction is expected to be significantly lower than its total outlays. *PR-148-88, 7/29.*

Guidelines For Financial Institution Directors

The FDIC distributed a *Pocket Guide For Directors*, described as a "brief, plain-English reference source," to the chief executive officers of all insured financial institutions. The guide was developed by the FDIC and has been endorsed by the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency and the Federal Home Loan Bank Board. *PR-26-88, 2/11.*

Delinquent And Inaccurate Call Reports

The FDIC and the Office of the Comptroller of the Currency issued a joint letter to banks stating that, effective with the March 31, 1988 Call Report, the agencies will substantially increase money penalty assessments against banks for submission of delinquent and inaccurate Call Reports and, if necessary, take appropriate enforcement action against the banks and/or individuals responsible. This action is necessary because more and more banks are submitting their Call Reports after the due date. Banks should make every effort to ensure that Call Reports are mailed or electronically transmitted sufficiently in advance

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Reference sources: *American Banker* (AB); *Wall Street Journal* (WSJ); *BNA's Banking Report* (BBR); *Federal Register* (FR).

of the due date to be in the hands of the regulator no later than 30 days following the Call date. *BL-7-88, 3/21.*

Agricultural Loan Loss Amortization

The FDIC issued a regulation under the Competitive Equality Banking Act of 1987 (CEBA) which permits agricultural banks to amortize losses on qualified agricultural loans. The rule amends and makes final the interim regulation which had been in effect since November 9, 1987. It describes the procedures and standards applicable to banks desiring to amortize losses under that statute, and the manner in which such amortizations are to be done. *FR, 6/14/88, p. 22130.*

Crime Reporting Requirements

The FDIC and the other financial institution regulatory agencies have revised the criminal reporting forms to reduce the reporting burden, incorporate additional criminal statutes, and standardize the reporting basis.

In addition to the mandatory requirement to report suspected criminal activity, instructions on the revised Short Form permit its use to report on a voluntary basis "suspicious transactions" to law enforcement authorities, such as in connection with deposits and withdrawals of currency or official checks in amounts less than \$10,000 where circumstances suggest an illegal purpose.

Certain previously mandatory reporting requirements are made voluntary. For example, losses or apparent violations aggregating less than \$5,000, where the bank has no substantial basis for identifying a possible suspect, may be reported on a voluntary basis. The prior limit was \$2,500. The revision also permits banks to report, at their option, losses under \$1,000, where the bank has a substantial basis for identifying a possible suspect.

When a bank employee or agent is suspected, a report must be submitted *regardless of the amount.* *BL-18-88, 6/16.*

Selection Of Securities Dealers—Unsuitable Investment Practices

The Board of Directors (and the Federal Reserve Board) adopted a Federal Financial Institutions Examination Council (FFIEC) policy statement regarding the selection of securities dealers and unsuitable investment practices. These guidelines were adopted because regulators have become aware of a number of depository institutions engaging in speculative securities activities. The supervisory policy stresses the need for depository institutions to know the creditworthiness and reputation of the securities dealers with whom they transact business. Additionally, the statement points out various securities transactions that are considered unsuitable for an investment account. *BL-15-88, 4/26; FR, 4/26, p. 14852.*

Country Risk Exposure—Branches Of Foreign Banks

The FDIC extended from June 14, 1988 until year-end the time for compliance with the new regulations on country risk exposures of insured domestic branches of foreign banks operating as such on November 19, 1984. The new regulations were put in place in December 1987. *FR, 6/13/88, p. 21986.*

Bank Audits

The Corporation decided *not* to propose at this time a regulation requiring a full opinion "outside" audit for banks subject to its regulatory authority. Chairman Seidman noted two reasons for the decision: first, practically all large banks already obtain such audits annually, and second, many small banks may be un-

able to afford or obtain a full opinion audit. He said the FDIC staff is developing the framework for an independent, "special review" of small banks as part of the agency's effort to encourage all banks to effectively audit their operations.

Under current policies, independent audits are expected from institutions with more than \$50 million in assets that are converting to FDIC insurance coverage. Also, newly chartered banks insured by the FDIC must obtain an independent audit during their first three years of operation. *PR-1-88, 1/5.*

The Board of Directors proposed a new policy under which state non-member banks are *encouraged* to obtain independent annual audits by certified public accounting firms. The proposed policy statement suggests that the outside annual audit should be conducted regardless of the nature of the institution's internal auditing procedures. If a bank decides such an audit by an independent CPA firm is unnecessary, a more limited "review" of financial statements and controls should be considered. Banks should send copies of the external audit reports to appropriate FDIC regional offices, and notify such offices when an outside auditor is changed.

Applicants for deposit insurance coverage after the effective date of the policy statement will be expected to obtain an external audit annually for at least the first three years after deposit insurance coverage is granted. The proposed statement also notes that an annual audit by an outside CPA firm will be a condition of future enforcement actions under certain circumstances. *PR-74-88, 4/13.*

Office Of The Comptroller Of The Currency

National Banks' Securities Brokerage And Adviser Authority

The Office of the Comptroller of the Currency (OCC), in an interpretive letter to First Union National

Bank, Charlotte, North Carolina, said that a national bank can act as an investment adviser to a mutual fund, and at the same time may recommend and transact buy/sell orders for customers in the shares of the same fund.

The OCC ruled last July that a subsidiary of Charlotte-based NCNB National Bank could recommend mutual funds sponsored by a third party. The letter to NCNB affirmed that the banks could offer advice on a broad range of securities, including over-the-counter stocks and exchange-traded stocks. In each case it was noted that the bank's brokerage unit cannot direct trading in customer accounts with respect to making final decisions on purchases or sales. *AB*, 1/29/88, p. 1.

Securitizing Commercial Real-Estate Loans

The OCC granted approval for Chase Manhattan Bank to set up a subsidiary to underwrite pools of its commercial real-estate loans. Chase and Security Pacific National Bank, Los Angeles, which received the OCC's approval last June to securitize its residential mortgage portfolio, are the first national banks to be given federal approval to conduct underwriting through subsidiaries. Three other national banks have applied to the OCC for permission to form subsidiaries to underwrite asset-backed securities.

A suit brought by the Securities Industry Association against the OCC following the Security Pacific decision, now pending in a U.S. District Court in New York, charges that bank sales of securities violate the Glass-Steagall Act. *AB*, 3/22/88, p. 2.

Futures And Options Trading

The OCC, in an interpretive letter, granted approval for the First National Bank of Chicago to operate an arbitrage business in interest-rate instruments through the bank's futures brokerage subsidiary. First Chicago Futures Inc. was given permission to expand its market-making and arbitrage operations to include Treasury bills and notes, obligations of the Government National Mortgage Association, certificates of deposit, and Eurodollar time deposits. In addition, the subsidiary can act as market maker in derivatives of those

instruments on various futures and options exchanges and in the spot, forward, and over-the-counter options markets.

The approval, while expanding the approved nonhedging activities for national banks, specifies that only the dealer units of a bank can engage in speculative trading, and also generally restricts bankwide positions in options and futures to "a reasonable percentage" of outstanding contracts.

First Chicago Futures said it would fully coordinate its trading positions in derivative markets with its arbitrage operations, or else be fully hedged. It also assured the OCC that the parent bank would not be responsible for any liabilities that arise from exchange membership. *AB*, 5/19/88, p. 161.

Lending Limits And Loan Commitments

The OCC issued a temporary rule revising national bank lending limits to provide relief for banks which have experienced a decline in their capital and, hence, their lending limits after entering into commitments. Under the revision, a commitment within a bank's lending limit would be treated as a loan made at the time the bank entered into the commitment. Thus, a subsequent decline in lending limits would not result in a violation when the commitment is funded. Although the temporary rule is effective immediately, the OCC is requesting comments from the public prior to adopting a final regulation. *FR*, 6/24/88, p. 23752.

Bank Indemnification Of Officials

The OCC released Interpretive Letter 401 stating that directors, officers and personnel of national banks can, under certain circumstances, be indemnified against legal and other expenses incurred in defending lawsuits. The indemnification must be authorized by the bank's articles of association. Criminal acts, willful misconduct, and gross neglect of duty

are excluded. *ABA Bankers Weekly*, 3/15/88, p. 15.

Crime Report Filing Requirements

The OCC issued an interim rule, effective April 11, 1988, to clarify the filing requirement for reports of known or suspected crimes, and to reduce the number of criminal referral reports filed by national banks. The interim rule raises the threshold for filing criminal referrals where no suspect has been identified, and clarifies the filing requirement for reporting financial crimes where no loss is incurred by the bank, such as money laundering, bank bribery, and Bank Secrecy Act violations. *FR*, 3/11/88, p. 7885.

Merger Approval Procedures

Changes adopted by the OCC in the processing of applications from national banks for mergers, consolidations, and purchase and assumptions will speed up substantially the approval time for such transactions. Included is an agreement with the Justice Department for streamlining its review of reorganization mergers. Also, the OCC will no longer require shareholder approval of a merger before approving the transaction. If the agency approves a transaction before shareholders do, the bank must disclose that fact to the shareholders "in a timely manner." Such disclosures must include all "material facts and circumstances surrounding the approval."

The processing changes are effective immediately for those banks filing merger applications after June 6. *BBR*, 6/20/88, p. 1050; *BC-230*, 6/6, *OCC*.

Federal Reserve Board

Check-Hold, Processing Rules

The Federal Reserve Board (FRB) adopted final rules, to be effective September 1, that require banks to make check deposits available to customers within specified time limits. They conform to the Board's original proposals with only minor changes.

The rules generally require that local check deposits be made available within three business days after deposit, and nonlocal checks within seven days. Local checks are those drawn on a bank within the same Federal Reserve district. Next-day availability is required for the first \$100 of all checks, and for all government checks, cashier's checks, and certified checks.

On September 1, 1990 the maximum hold periods will be shortened to two business days on local checks and five on nonlocal items.

Because the schedules and availability provisions were specified by the Expedited Funds Availability Act of 1987 the Board had limited flexibility in its ruling. Continuing its efforts to speed the collection process, the Board recently adopted measures on how banks should endorse deposited checks (see below). *AB*, 5/12/88, p. 1; *FR*, 5/27, p. 19372.

The FRB proposed amendments to its Regulation CC, including a restriction on certain delayed disbursement practices, in further implementation of the Expedited Funds Availability Act of 1987. Under these proposals, a bank would be permitted to issue an official check drawn on another bank provided a depository bank in the same community could receive credit for the item as early as a check drawn on the issuing bank. Under Reg. CC the term "bank" includes all depository institutions. Federal Reserve Banks' availability schedules may be used to determine equivalent availability. The draft rule would not prohibit banks from issuing official checks drawn on remote banks "to take advantage of improved processing and reconciliation capabilities." *BBR*, 6/20/88, p. 1047; *FR*, 6/28, p. 24093.

The Board published for comment proposed official Board interpretations concerning preemptions under its regulation of the availability of funds and collection of checks, with respect to the laws of Maine, New York, and Illinois. A state law that makes funds available for withdrawal in the same or a longer period than permitted under

Regulation CC is preempted. State disclosure provisions regarding accounts covered by the Regulation are also superseded. *FR*, 6/28/88, p. 24315; *ABA Bankers Weekly*, 7/5, p. 4.

The FRB, as part of a larger effort to speed the processing of bounced checks, adopted formal rules on how banks should endorse deposited checks, effective September 1, 1988. In addition, the Board issued for comment a proposal to ban presentment fees. When imposed, these fees encourage the collecting banks to hold checks until after 2 p.m. each day. *FR*, 4/11/88, pp. 11832, 11911; 5/27, p. 19490; *AB*, 4/5, p. 1.

Risk-Based Capital Requirements

The FRB approved final risk-based capital standards based on an agreement signed last month by 12 countries to apply common risk-based capital rules to their banks.

The Board agreed to some changes in its previous position, for example, to reduce the capital required to back home mortgages by placing the activity in the 50 percent risk-weight category. Also it agreed to redefine long-term securities as those maturing in over one year, rather than 90 days. The Board did not alter its position that long-term government securities should be supported by more capital than short-term government securities.

The Board also said that all bank holding companies and their subsidiaries must meet the capital minimums, except securities underwriting subsidiaries where there are adequate firewalls between them and their holding companies. The securities underwriting subsidiaries must meet capital standards set by the Securities and Exchange Commission. *AB*, 8/4/88, p. 2.

The FRB had previously proposed risk-based capital guidelines that largely conform to those accepted by bank regulators in 12 countries. Under the proposal banks' assets would be grouped into five risk categories with different weights and requiring

different amounts of capital. For the first time, capital would be required to support off-balance-sheet activities. In the new proposal there were some changes from the earlier plan in the assigned risk category of some assets.

Until the end of 1990 the minimum capital guideline would be the current total capital-to-assets ratio of six percent. From the end of 1990 to 1992, the minimum capital would be 7.25 percent, with at least 3.25 percent in common equity. At the end of 1992 minimum capital would increase to eight percent, of which four percent would have to be common equity.

The FRB's risk-based plan, which was developed in cooperation with the FDIC and the Comptroller of the Currency, would require compliance by all U.S. banks. *AB*, 1/28/88, p. 1.

Restrictions On Nonbank Banks

The FRB proposed rules, implementing provisions of the Competitive Equality Banking Act of 1987 (CEBA), to restrict the growth and activities of the 55 limited-service banks which were grandfathered under the Act. CEBA allowed institutions in existence on March 5, 1987 to continue operating but imposed several restrictions, including a seven-percent cap on an institution's asset growth during any 12-month period beginning August 10, 1987. The Board proposed two ways for an institution to calculate its asset base to determine growth—actual assets on August 10, 1988, or average total assets as of the third quarter 1988.

CEBA prohibits limited-service institutions from any new activity which they were not engaged in as of March 5, 1987, and to implement this provision the Board proposed subcategories, for example, different classes of deposits, to restrict expansion. Each nonbanking activity such as data processing and investment advice would be treated as a separate activity. Also proposed were restrictions on cross-marketing among affiliates and caps on an affiliate's over-

drafts. CEBA prohibits limited-service banks from incurring overdrafts with Federal Reserve Banks, and affiliates generally are not permitted to have overdrafts at the parent limited-service bank. *AB*, 6/2/88, p. 1; *FR*, 5/26, p. 21462.

Rules On Debt-Equity Swaps

New rules issued by the FRB, effective February 24, allow U.S. banks to swap debt for stock in any private-sector nonfinancial companies in developing countries, and lengthen the maximum holding period to 15 years. The changes liberalize the FRB's guidelines issued last August which allowed U.S. banks to swap debt only for stock in a government corporation that is being privatized, and required that banks sell the stock within five years. While ownership in privatized government enterprises is not restricted, banks' share in other private-sector companies continues to be limited to 40 percent, or 25 percent if the company has no larger stockholder.

The requirement that debt-equity swaps be done through a bank holding company is continued. A requirement that advance notice be given to the FRB when transactions exceed \$15 million was amended to require notice only when the amount exceeds the greater of \$15 million or one percent of a BHC's equity capital. *WSJ*, 2/19/88, p. 40; *BBR*, 2/29, p. 367.

State Member Banks' Disclosure Of Financial Condition

The FRB proposed a change in its rules to require state member banks to make available to shareholders and any member of the public, upon request, information regarding each bank's financial condition in the form of the bank's two most recent year-end Reports of Condition and Income (Call Reports). As an alternative to the Call Reports banks may provide, at their option, the specified schedules from the Call Reports, certain annual reports to shareholders, and independently audited financial statements containing com-

parable information. *FR*, 5/27/88, p. 19308.

Truth In Lending

The FRB adopted revisions to its official staff commentary for Regulation Z (Truth In Lending). The changes address, for example, disclosure questions raised by the emergence of conversion features in adjustable-rate mortgages, as well as the imposition of fees that are considered finance charges at the time a credit card plan is renewed. *FR*, 4/5/88, p. 11055.

Mortgage Disclosure

The FRB requested comments on its revised Regulation C, incorporating recent amendments to the Home Mortgage Disclosure Act (HMDA). The amendments permanently extended the Act and expanded its coverage to mortgage banking subsidiaries of bank and savings and loan holding companies and also to savings and loan service corporations that originate or purchase mortgage loans. Until now, the Act's coverage has applied only to depository institutions and their majority-owned subsidiaries.

Among other changes, the regulation would require mortgage banking subsidiaries of depository institutions to itemize loan data by census tract (or by county, in some instances) for property located in metropolitan statistical areas where the subsidiary has offices for taking loan applications from the public. This information is required at present only for an MSA where the parent institution has an office. *FR*, 5/13/88, p. 17061.

Equal Credit Opportunity

The FRB adopted revisions to the official staff commentary to Regulation B (Equal Credit Opportunity). The revisions address issues concerning consideration of age in evaluating creditworthiness, signature requirements, record retention and collection of monitoring information. *FR*, 4/5/88, p. 11044.

BHC Allowed To Keep Insurance Subsidiary In Merger

The FRB approved the merger of Hartford National Corp., Hartford, Connecticut, and Shawmut Corp., Boston. Shawmut National Corp., the resulting company, will acquire Hartford National's ten subsidiary banks in Massachusetts, Rhode Island and Connecticut, and Shawmut's nine subsidiary banks in Connecticut and Massachusetts.

The Board allowed Shawmut to retain its insurance agency subsidiary, under the "grandfather clause" in Exemption D of the Garn-St Germain Act that allowed BHCs and their subsidiaries to continue insurance activities they were conducting on May 1, 1982. Following the FRB's requirements in an earlier decision involving Sovran Financial Corp., Shawmut will keep the insurance subsidiary separately incorporated, and not begin insurance activities in any other subsidiary following the merger.

The FRB also permitted Shawmut to acquire Hartford National's trust subsidiary in New York, but the trust company will give up its FDIC insurance. The Douglas amendment to the Bank Holding Company Act prohibits a BHC from acquiring a bank in another state unless that state's laws expressly authorize the acquisition. New York's laws do not permit such acquisitions by Massachusetts banking firms. By dropping its FDIC coverage the trust company is no longer a "bank" under the BHC Act, as amended by CEBA. *BBR*, 2/8/88, p. 198.

Bank Acquisition Approved For BHC With Real-Estate Subsidiary

The FRB granted approval for Napa Valley Bancorporation, Napa, California, whose bank subsidiary owns a real-estate investment subsidiary that engages in real-estate activities permitted by California law, to own two proposed new banks in

the state. Napa Valley agreed to limit its subsidiary's real-estate development activities and, in addition, the approval was conditioned on the holding company's compliance with the eventual results of the FRB's real-estate development rulemaking. *BBR*, 5/23/88, p. 862.

BHC Allowed To Acquire Savings Bank And Real-Estate Subsidiary

The FRB approved an application by Citizens Financial Group, Providence, Rhode Island, to acquire Fairhaven Savings Bank, Fairhaven, Massachusetts, and its real-estate investment and development subsidiary. Provisions of CEBA authorizing savings banks to continue state-authorized real-estate activities were cited by the Board.

The approval was conditioned upon Citizens' agreement to comply if the Board should issue a rule requiring that approved real-estate development activities be conducted through a holding company subsidiary, rather than a bank subsidiary. *BBR*, 5/9/88, p. 782.

Underwriting Equity Securities Overseas

The FRB, in a letter to Security Pacific Corp., clarified that the bank holding company's subsidiaries in London can join together to underwrite up to \$15 million of equity securities from any one issuer. Federal law restricts each overseas subsidiary to \$2 million of such underwriting. The subsidiaries also were allowed for one year to make subordinated loans to one another to cover their underwriting commitments. However, the FRB must be given prior notice of such transfers to cover losses from adverse market moves. *AB*, 5/25/88, p. 1.

Loan Strip Participations

The FRB issued a clarification stating that the ostensible sale of a short-term loan made under a long-term lending commitment, known as a

loan strip or strip participation, is a "deposit" for the purposes of Regulation D whenever the depository institution sells the loan at the end of the short-term period if the original investor does not wish to renew its interest and another investor cannot be located.

The Board has issued a proposal for the reporting of these liabilities by depository institutions. The reporting and required reserve main-

tenance will begin after final approval of a new reporting form.

The Board also has been concerned about the funding risks because investors may decide without warning to stop buying strips in a particular loan.

It is believed that only seven or eight banks presently engage in loan stripping and thus would be affected by the requirement. *FR*, 7/1/88, p. 24930; *AB*, 6/28, p. 3.

Federal Home Loan Bank Board

Regulatory Capital Requirements

The Federal Home Loan Bank Board (FHLBB) amended its regulation setting the regulatory capital requirements for institutions insured by the Federal Savings and Loan Insurance Corporation (FSLIC), changing the method of computing the April calculation of industry profits by basing it on the median return on assets of all insured institutions. With the change 12 years may be needed to reach the six percent capital-to-deposits target for the industry based on current earnings. This period is substantially less than the estimated time required under the previous method. *FR*, 3/29/88, p. 11242; *AB*, 4/5, p. 2.

Regulatory Capital GAAP Phase-In

The FHLBB amended its regulations, implementing a provision of the Competitive Equality Banking Act of 1987 (CEBA), to begin FSLIC-insured institutions' phase-in of generally accepted accounting principles (GAAP) on January 1, 1989. The phase-in would end on December 31, 1993, at which time insured institutions would be required to report virtually all components of regulatory capital in accordance with GAAP or the regulatory accounting practices employed by commercial banks. *FR*, 1/6/88, p. 324.

Capital Forbearance

The FHLBB adopted regulations, implementing a provision of CEBA, which set forth the requirements that FSLIC-insured institutions must meet to obtain capital forbearance under this program, the procedures for requesting forbearance, the procedures under which an applicant's Principal Supervisory Agent will consider such requests, the effect of forbearance, and termination of a grant of forbearance. The effective date is January 1, 1988. *FR*, 1/6/88, p. 354.

Enforcement Of Regulatory Capital Requirements

The FHLBB adopted rules, to become effective February 5, 1988, to set and enforce regulatory capital requirements for FSLIC-insured institutions under authority granted by CEBA and pursuant to the Board's authority to regulate those institutions. Section 406 of CEBA authorizes the Board to vary the minimum regulatory capital requirements of an individual insured institution as may be necessary or appropriate in light of the particular circumstances of the insured institution. The regulations also establish procedures for implementing the authority granted by section 406 to issue a directive and enforce a plan for increasing an insured institution's capital level. *FR*, 1/6/88, p. 363.

Special Assessment Phase-Out Proposal

The FHLBB proposed phasing out the special assessment which FSLIC-insured institutions have paid quarterly since 1985 at an annual rate of 1/8 of one percent. For thrifts with capital of at least six percent of assets the special assessment would be reduced to 1/12 of one percent this year, and in steps to 1/48 of one percent in 1991, and zero in 1992. About 1,400 of the nation's 3,126 thrifts would benefit from the proposal. The Board also asked for comments on whether to use another threshold for capital, or a sliding scale for reducing the special assessment on well-capitalized institutions.

CEBA requires the FHLBB to begin phasing out the special assessment within five years unless the Board can show a necessity for continuing it.

An industry official said the Board's proposal could prevent the shift to FDIC insurance by many strong thrifts when conversion becomes possible. *WSJ*, 4/13/88, p. 18; *BBR*, 4/18, p. 651.

Thrift Readmissions To FHL District Member Bank Status

An advisory from the FHLBB to Federal Home Loan Banks states that applications for readmission to district bank membership from any thrift that terminates FSLIC insurance of accounts must be reviewed in Washington. An application for readmission by an insured institution that converts to a state-chartered savings bank insured by the FDIC would raise substantial legal and policy issues, the directive said.

The FHLBB wants to decide whether to revoke a 1970 rule that permits immediate readmission to district bank membership of a thrift that switches from FSLIC insurance to FDIC coverage. A provision of the 1982 Garn-St Germain Depository Institutions Act states that any institution withdrawing from FHLBB membership can be readmitted only

after five years has expired. *News, FHLBB*, 7/21/88. (Proposed rule change: *FR*, 8/9/88, p. 30665).

Permissible Affiliate Transactions Proposal

The FHLBB proposed a regulation to bring greater parity between operations of bank and thrift holding companies' subsidiaries. Comment is sought on the incorporation and application of two provisions of the Federal Reserve Act into thrift rules as directed by CEBA. The two provisions govern transactions between bank holding company subsidiaries and their affiliates. Among other things, the sections impose restrictions on the dollar amount of permitted transactions and require that transactions be conducted at arms' length.

Before enactment of CEBA, transactions between an insured thrift subsidiary and its affiliates were restricted by the Bank Board's conflict rules, and insured thrift subsidiaries were prohibited from engaging in certain transactions and had to obtain prior approval for affiliate transactions.

The proposal also seeks public comment on how such terms as "affiliates" should be defined and whether the agency should have authority to exempt certain activities. *News, FHLBB*, 6/9/88.

Trading/Investment Proposed Rule And Policy Statement

The FHLBB proposed a rule and policy statement to make clear that insured institutions must account for securities held for investment, sale or trading using documented generally accepted accounting principles (GAAP). The proposed rule and policy are in response to CEBA which mandates that the Bank Board prescribe uniformly applicable accounting standards to be used by all FSLIC-insured institutions.

Under the proposal thrifts could be barred from placing securities in the investment category unless they showed the intent and ability to hold them "for the foreseeable future." The rule if adopted would move thrift

accounting closer to the methods required for banks. The FDIC allows banks to carry securities held for investment at cost, but requires that trading securities be marked to market. Thrifts nevertheless would have much more flexibility than banks in justifying trading in their long-term investment portfolios. *WSJ*, 6/10/88, p. 26; *AB*, 6/10, p. 1; *News, FHLBB*, 6/9.

Securities Brokerage

The FHLBB proposed changes in its regulations to enable service corporations to commence certain types of securities brokerage activities without preparing an application and obtaining individual Board approval, and to designate certain types of these activities as preapproved service corporation activities. *FR*, 4/28/88, p. 16147.

Securities Firm Acquires Troubled Thrifts

The FHLBB permitted the Statesman Group, an Iowa insurance and securities firm, to acquire four troubled thrifts with combined assets of nearly \$700 million in Florida and Iowa, the first such acquisitions the agency has allowed in several years.

Statesman's thrift and securities affiliates are permitted to cross market each other's products and services. However, the Board placed restrictions on certain transactions between the affiliates for 180 days, while it considers the imposition of longer-term safeguards. The temporary prohibitions relate to extensions of credit from the S&L to the securities affiliate and the purchase of assets by the thrift from the securities affiliate, in order to "prevent the insured institution from extending its resources . . . to prop up or enhance the securities affiliate." *BBR*, 3/21/88, p. 488.

Adjustable-Rate Mortgage Disclosures

Amendments to the FHLBB's regulations require lenders to provide to a prospective borrower a clear and concise description of the lender's ARM program(s), including a historical example, either when an application form is given to the

consumer or before the consumer pays a non-refundable fee, whichever is earlier, and contain other ARM provisions. The amendments enact the Federal Financial Examination Council's (FFIEC) recommendations of August 1986. *FR*, 5/23/88, p. 18261.

New Powers For State Banks

Securities Powers

Indiana: The Governor signed legislation which permits state-chartered banks that are not members of the Federal Reserve System to underwrite municipal revenue bonds, and to sell mutual funds and mortgage-backed securities. The expanded powers cannot be exercised, however, unless the Glass-Steagall Act, which separates commercial banking from the securities business, is repealed or amended. *AB*, 3/11/88, p. 3.

A new law permits state-chartered banks to invest up to ten percent of their total equity capital in investment securities beginning July 1, giving them parity with national banks in this respect. Total equity capital includes unimpaired capital stock, unimpaired surplus, undivided profits, and 100 percent of loan reserves. *BBR*, 3/21/88, p. 500.

Kansas: A new law allows state-chartered banks, beginning July 1, to establish a subsidiary that may engage in various securities activities, including selling or distributing stocks, bonds, debentures, and notes; issuing and underwriting municipal bonds; organizing, sponsoring, and operating mutual funds; and acting as broker-dealers for securities. *AB*, 4/15/88, p. 1.

Michigan: Recent legislation removes certain restrictions on state banks' securities activities, including a prohibition on a bank being affiliated with an organization principally engaged in the securities business. Also removed is the current prohibi-

tion on a person being an officer, director, employee or partner of both a bank and a securities firm. Existing provisions that an officer or employee of a bank may not act in an individual capacity as an agent to sell stocks or securities, and may not receive a commission for the sale of stocks or securities to the bank, continue in effect.

The legislation also makes several changes to allow state banks to apply to offer new products and services and requires the Commissioner of Banking to act pro-competitively when making decisions on applications by state banks for new powers. These provisions are intended to create parity in powers with competing financial-service providers. *Legislative-Legal Bulletin No. 4, Michigan Bankers Association*, 6/30/88.

Leasing Powers

Minnesota: A new law gives state banks leasing authority in partial parity with national banks. A previous limitation on acquisition and leasing of personal property to 200 percent of the bank's capital and surplus no longer applies if the institution meets certain requirements related to the residual value of the property being leased. *BBR*, 5/23/88, p. 867.

Surety Insurance Powers

Tennessee: A new law, effective July 1, 1988, authorizes state banks to own, operate, or manage an insurance company offering only surety insurance. The legislation must comply with provisions of Tennessee law applicable to such insurance companies, and the activities will be regulated by the Commissioner of Commerce and Insurance. *BBR*, 5/9/88, p. 786.

Interstate Banking

Arkansas: The Governor signed a law which provides for interstate banking between Arkansas and 16 states and the District of Columbia. The states are Tennessee, Missouri,

Mississippi, Texas, Louisiana, Oklahoma, Alabama, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, Kansas, Nebraska and West Virginia. Reciprocity is required. The legislation is effective January 1, 1989.

Before acquiring an Arkansas institution an out-of-state purchaser would have to provide to the Bank Commissioner certain community reinvestment information, and subsequently file reports yearly with the Commissioner on compliance with its community reinvestment plan and impact on the community. If an institution was found to be not meeting its reinvestment commitments, the Commissioner would be empowered to issue a cease-and-desist order, impose a fine of up to \$10,000 for each day of noncompliance, and may require divestiture in not less than two years.

The legislation also provides for a phase-in of statewide branch banking (see below). *BBR*, 7/18/88, p. 88.

Colorado: Legislation was enacted providing for regional, reciprocal interstate banking until January 1, 1991, when nationwide, non-reciprocal interstate banking will be permitted. The interstate banking region consists of the contiguous states of Nebraska, Kansas, Oklahoma, New Mexico, Arizona, Utah and Wyoming.

An out-of-state bank holding company may not acquire, until July 1993, a Colorado banking organization which has not been in operation for five years.

The new law prohibits an interstate acquisition of a Colorado bank or BHC if the acquired institution would control more than 25 percent of the total deposits of banks, savings and loan associations, and other federally-insured institutions in Colorado. An out-of-state BHC which has a total capital-to-assets ratio of less than six percent may not acquire a Colorado bank or BHC.

In efforts to resolve the state's industrial bank crisis an amendment was added to permit two out-of-region

holding companies to make additional bank purchases in the state before 1991, provided they acquire the assets and liabilities of an industrial bank or provide assistance. *BBR*, 4/18/88, p. 661.

The \$26 billion-asset First Bank System, a Minnesota bank holding company, agreed to contribute \$8 million to depositors of Colorado's failed industrial banks, and received permission to acquire control of the \$2 billion-asset Central Bancorp, Denver. The acquisition is subject to approval by the Federal Reserve. *AB*, 8/10/88, p. 7.

Hawaii: A new law permits the acquisition of a failing financial institution in the state by an out-of-state chartered institution.

The legislation also permits banking institutions based in several Pacific islands to acquire or control banks in the state, with reciprocity for Hawaiian institutions. Island states included in the banking region are Guam, American Samoa, Micronesia, Palau, Northern Marianas and the Marshall Islands. *BBR*, 7/4/88, p. 17.

Minnesota: Legislation effective August 1 expands the state's interstate, reciprocal banking region to 14 states, adding Illinois, Missouri, Kansas, Nebraska, Colorado, Wyoming, Idaho, Montana and Washington. The region presently consists of Iowa, North and South Dakota, and Wisconsin. Within the expanded region, the states of South Dakota, Wisconsin, Wyoming, Idaho and Washington now have reciprocal, interstate laws.

Purchases are prohibited that would result in out-of-state financial institutions in the aggregate holding more than 30 percent of the deposits held in Minnesota financial institutions.

Out-of-state banking firms are permitted to charter one *de novo* bank in Minnesota. *BBR*, 5/2/88, p. 751.

Nebraska: The Governor signed legislation that provides for reciprocal interstate banking between Nebraska and the states of Iowa, Mis-

souri, Kansas, Colorado, Wyoming, South Dakota, North Dakota, Minnesota, Montana and Wisconsin, effective January 1, 1990. A nationwide interstate trigger goes into effect on January 1, 1991.

Prohibited are acquisitions of Nebraska banks that would give an out-of-state banking organization the control of more than 12 percent of the aggregate bank deposits in the state. Also the state department of banking is authorized to deny an application for an acquisition if the out-of-state acquiror's community reinvestment record is deemed to be inadequate. *AB*, 4/13/88, p. 3; 4/11, p. 32.

New Hampshire: The state's regional, reciprocal banking law was amended to permit bank holding companies in New England to enter the state even if they own affiliates outside the six-state region. The amended law requires that a BHC must have its principal place of business in New England, and obtain a majority of its deposits from the region, in order to enter New Hampshire. *BBR*, 4/18/88, p. 661.

New Mexico: A new law permits out-of-state banking institutions anywhere in the U.S. to acquire New Mexico banks, beginning January 1, 1990. Reciprocity is not required. Until July 1, 1992 a bank acquired by an out-of-state banking firm must have been in operation for at least five years. Out-of-state firms may establish new banks in the state starting July 1, 1992. *AB*, 2/25/88, and *New Mexico Financial Institutions Division*.

South Dakota: A new law, effective immediately, permits out-of-state bank holding companies anywhere in the U.S. to own banks in South Dakota. Reciprocity is required. The law follows a court decision in January that the state's limited-purpose interstate banking law was unconstitutional. The new law also repeals all operating restrictions which were applicable only to banks acquired by out-of-state bank holding companies. *BBR*, 2/22/88, p. 308.

Intrastate Branching

Arkansas: New legislation, effective January 1, authorizes banks to branch in contiguous counties in the state after December 31, 1993, and statewide after December 31, 1998.

The legislation was a result of the Deposit Guaranty case in Mississippi. Early in 1987 the OCC permitted a national bank in Mississippi to branch outside the 100-mile limit then applicable to commercial banks under that state's law. That decision was upheld by a federal appeals court. As in Mississippi, thrift institutions in Arkansas currently are allowed to branch statewide. However, the legislation would prohibit new branching by state-chartered thrifts outside their home counties except on the same schedule that will apply to banks. *BBR*, 7/18/88, p. 88.

Florida: The OCC granted approval for the \$820 million-asset Consolidated Bank, Miami, to open a branch in Palm Beach County. Consolidated was the first national bank in the state to seek statewide branching powers after a Court of Appeals upheld similar powers for national banks in Mississippi. Florida's thrift institutions may branch anywhere in the state.

Earlier this year legislation was enacted in Florida that gives state banks the same branch powers as national banks. This provision becomes effective 45 days after the establishment of the first national bank branch outside the bank's home office county. *AB*, 6/20/88, p. 3; *Florida Division of Banking*.

Michigan: An amendment to the branching law, effective August 1, permits banks to open *de novo* branches throughout the state. Previously, statewide branching was permissible only by mergers, and *de novo* branching was restricted to the county where a bank's head office is located, or, to an adjacent county within 25 miles of the head office. Also branch home office protection is eliminated. *Michigan Financial Institutions Bureau*, 7/6/88.

Missouri: The deposit base has been broadened to include savings and loan associations and credit unions under the state law which prohibits mergers that would result in a banking institution having more than 13 percent of the aggregate deposits in the state. Previously the deposit base consisted of only deposits held in banks. The change increased the deposit base from \$42.8 billion to \$63.6 billion. *BBR*, 6/13/88, p. 1014.

Oklahoma: Statewide branching through acquisition or merger is now authorized. Unchanged is a provision that allows up to two *de novo* branches to be established in a bank's main office city, and up to 25 miles away so long as the main office of another bank is not located in the town.

The new law prohibits banks chartered after December 31, 1986 from being acquired until they have operated continuously for more than five years. Acquisitions are prohibited that would give the resulting institution direct or indirect ownership or control of more than 11 percent of the aggregate deposits of banks, savings and loan associations and credit unions in the state. *BBR*, 3/28/88, p. 541; *Oklahoma Department of Banking*, 6/22.

Tennessee: A U.S. District Court upheld a ruling by the Comptroller of the Currency permitting Memphis-based National Bank of Commerce to open five branches outside its home county. Tennessee's law restricts branching of state-chartered banks to the county where a bank's main office is located; however, any thrift in the state that is at least five years old may branch statewide.

Before the latest court decision the Tennessee banking commissioner had approved statewide branching for state banks under a "wild card" statute that gives the banks parity with national banks in the exercise of powers in Tennessee. *BBR*, 5/23/88, p. 872.

Texas: A federal district court ruled that national banks can branch anywhere in the state because savings and loan associations in the state

have statewide branching powers. The decision came in a suit brought by the Attorney General of Texas against the OCC, which late last year approved applications by two Texas banks.

Banks are generally restricted by the state's constitution to county-wide branching, except to acquire a failing bank. *AB*, 6/27/88, p. 2.

Parity For State Banks

Alabama: A new law grants to state banks the same powers that federally chartered banks may exercise, subject to prior approval by the Superintendent of Banks. The legislation was prompted by the Deposit Guaranty branching case in Mississippi (see below).

The new legislation gives state banks expanded leasing powers, and enables them to pledge assets to secure deposits in trust departments. In other respects the powers of the state's banks already are equal to or exceed those of national banks, an official said. *BBR*, 5/23/88, p. 865.

Mississippi: The Governor signed a law, to be effective immediately, which gives state-chartered banks parity with national banks in the state with respect to banking powers.

A primary motivation for the legislation was the Comptroller of the Currency's Deposit Guaranty decision, upheld by the courts in 1987. It permitted the bank to branch 100 miles from its home office, because such a branch would be permissible under state law for savings and loan associations, though not for banks. Mississippi's existing law did not permit state-chartered banks to branch statewide until 1991.

The new parity law applies across the board to banking powers. For example, it also could give state banks more liberal lending limits. The new powers will expire on June 30, 1991, unless reenacted. Before banks can take advantage of the newly authorized powers the state banking board must issue implementing regulations. *BBR*, 5/16/88, p. 819.

Miscellaneous

Bank Capital Requirements Do Not Increase Risk-Taking

Some analysts have contended that higher bank capital standards lead to more asset risk because institutions that are required to increase capital will shift to higher-yielding, riskier assets to increase the rate of return on equity. The results of this study of 98 large, publicly traded bank holding companies between 1981 and 1986 "do not support the view that increases in regulatory capital standards lead banks to increase asset risk." *Economic Review, Federal Reserve Bank of San Francisco, Spring 1988, pp. 45-56.*

GAO Report On Supervision Of U.S. Banks' Foreign Lending

A report by the *General Accounting Office* concluded that the OCC, FDIC, and Federal Reserve have required inadequate reserves for the country risk contained in U.S. banks' foreign loans. The principal reason for the inadequacy is that the agencies have restricted use of their reserving authority to loans rated "value-impaired"—currently less than two percent of U.S. bank loans owed by less-developed countries (LDCs). The agencies have not required reserves for "other transfer risk problem" (OTRP) and "substandard" foreign loans which contain considerable country risk. In addition, required reserve rates for "value-impaired" loans are too low.

GAO recommended that the OCC, FDIC and Federal Reserve: (1) require reserves for loans that currently have no reserve requirements, basing reserve requirements primarily on secondary market prices for foreign loans; (2) ensure that forecasts are made for countries very likely to develop debt servicing problems; (3) eliminate deficiencies in the information used to determine loan ratings; and (4) ensure that bank examiners comply with requirements of the International Lending Supervision Act of 1983 (ILSA).

The report notes that the bank supervisory agencies disagreed with GAO's recommendations concerning required reserves principally because they believe that prices for international debt on the secondary market are not a reasonable measure of this debt's real worth. "*Supervision of Overseas Lending is Inadequate*," U.S. General Accounting Office, May 1988.

The Federal Reserve Board, commenting on the GAO report, criticized the idea of using the secondary market to evaluate underdeveloped-country loans. "The secondary market basically reflects the sale price for assets that are being sold on an expedited basis by banks exiting the business of lending to developing countries . . . it provides little useful information about ultimate collectibility of the loans being sold," the Board said.

In response to the GAO's call for more reserves against foreign loans, the FR stressed its work on improving overall capital levels, saying that "the emphasis on primary capital has been considered the more appropriate focus of supervisory attention . . . since the reserving process *per se* involves only a transfer of funds and does not increase the total resources available to banks to absorb losses." The Board rejected an increase in the number of categories requiring reserves. It said that "the magnitude of any eventual loss is highly subjective," and bank management, not bank regulators, should decide whether a marginal borrower will remain current or default. *AB*, 6/23/88, p. 2.

Supreme Court Upholds New Securities Powers

The U.S. Supreme Court let stand the Federal Reserve Board's approval for commercial bank affiliates to underwrite commercial paper, municipal revenue bonds, and securities backed by mortgages or consumer debt. The Court's ruling, against a challenge by the Securities Industry Association, clears the way for banks that have received the Board's approval to begin these activities. Sev-

eral have announced immediate plans to do so.

Section 20 of the Glass-Steagall Act prohibits FR member banks from affiliating with firms "engaged principally" in securities underwriting. The FRB's approvals restrict the newly approved activities to five percent of an affiliate's gross revenues.

The Court's action will probably increase the pressure on Congress to act on pending legislation that would amend Glass-Steagall in important respects. *WSJ*, 6/14/88, p. 3; *AB*, 6/14, p. 1.

GAO Report On Condition Of S&L Industry

A report of the *General Accounting Office* which details financial trends in the savings and loan industry from 1977 to mid-1987 found that the thrifts' mortgage assets declined from 85.6 percent to 69.7 percent of their total assets during the period. The dominant non-mortgage asset category in 1987 was investment securities. The decline in the mortgage assets percentage in insolvent thrifts was even more dramatic, the report said. These institutions, at mid-1987, were holding about 60 percent of assets in mortgage assets. They tended to hold more direct investments, repossessed assets, and deferred net losses than did other thrifts.

Reliance on deposits as a source of funds has diminished, declining from 86.9 percent of total assets in December 1977 to 74.7 percent in June 1987. Other borrowed money and reverse repurchase agreements had the greatest increase in this period. Small deposits declined as a source of funds for the industry, and brokered deposits increased.

As of mid-1987 there were 491 GAAP-insolvent thrifts and an additional 463 institutions with net worth-to-assets of between zero and three percent, according to the report.

The industry's total assets increased from \$434.3 billion to \$1202.8 billion in the period, while the number of thrifts in the U.S.

declined from 4,055 to 3,191. *Thrift Industry Report*, U.S. General Accounting Office, May 1988.

Legislation Extends Moratorium On Thrifts Leaving FSLIC

President Reagan signed a bill that extends the moratorium, imposed by CEBA, on thrift institutions insured by the Federal Savings and Loan Insurance Corporation converting to FDIC insurance. The moratorium, scheduled to expire August 10, 1988, was extended for one year.

CEBA permitted 40 thrifts then in the process of conversion to FDIC insurance to continue, and under the new bill the 30 of these which have not converted would be allowed to do so. *BRR*, 7/18/88, p. 80.

Profitability And Risk Of New Banking Powers—Some Conflicting Conclusions

A study by Federal Reserve Bank of Minneapolis staff focuses on whether the risk of bankruptcy will decrease or increase if bank holding companies are permitted to engage in the securities, insurance, and real-estate businesses. The study, using data for 249 bank and nonbank financial firms in 1971-1984, analyzes the effects of BHC expansion into currently prohibited activities by simulating mergers between actual BHCs and nonbank firms as if such mergers had been permitted. Average rates of return, the variability of rates of return, and levels of capitalization are considered.

The merger simulations suggest that BHC combinations with securities firms or real-estate developers would increase the volatility of returns and the risk of failure. Combinations of BHCs and life insurance companies, however, would reduce both the volatility of returns and the risk of failure. *Quarterly Review*, Federal Reserve Bank of Minneapolis, Spring 1988, pp. 3-20.

A study by Federal Reserve Bank of Chicago staff found that a very small investment by bank holding

companies in a few nonbank activities—insurance brokerage and property and casualty and life insurance underwriting—would reduce their risk. Further, a ten percent investment in most activities, other than securities-related activities, would not increase their risk significantly. *Economic Perspectives, Federal Reserve Bank of Chicago, July/August, 1988, pp. 14–26.*

Home-Equity Loans

A recent survey of home-equity loans by 248 major lenders concludes that credit standards generally are high and foreclosures are rare. Consumers are using the loans conservatively, the report says, as 44 percent of the loans were for debt consolidation, and 40 percent were for home improvements. The limit put by lenders on home-equity lines averaged 77 percent of a home's value, and they allowed total monthly debt payments up to 37 percent of a borrower's income.

The report was concerned, however, that only 58 percent of lenders required full appraisals of property securing home-equity lines, down from 62 percent in 1986. Also noted was an excessive aggressiveness on the part of some loan advertisers. *AB, 4/21/88, p. 6.*

At year-end 1987, outstanding credit on home-equity loans represented 2.7 percent of banks' loans. The delinquency rate continued to be the lowest of any loan product at 0.67 percent. *ABA Bankers Weekly, 7/12/88, p. 6.*

The Senate passed legislation in March that requires uniform disclosure of terms of home-equity loans

and prohibits unilateral changes in loan terms by lenders.

Recently enacted legislation in Connecticut limits the life of a home-equity loan to 30 years, and requires that all advances on equity take place within 10 years of the approval of the loan. The use of credit cards to draw on home equity loans is prohibited. *Connecticut State Library, 6/22/88.*

Court Decides For Credit Unions On Check Holds

A decision of a U.S. District Court, District of Columbia, in favor of the Credit Union National Administration, effectively requires banks to treat local credit union share drafts as local checks, even if the draft is drawn on an out-of-town bank. CUNA said the FR's regulations as written would allow banks and thrifts to hold share drafts more than twice as long as local checks, making them less acceptable than checks as a means of payment. The court said that deeming a share draft nonlocal because it is drawn on a remote institution, as Reg. CC stipulates, violates the language of the Expedited Funds Availability Act. *AB, 8/1/88, p. 1.*

Consumer Credit Leads Bank Lending

Commercial banks now hold more consumer loans than business loans, according to data from the year-end 1987 Call Reports. Consumer loans at FDIC-insured commercial banks grew more than 50 percent between year-end 1983 and 1987, while business loans increased only 12.3 per-

cent. At the largest 300 banks, in 1987, consumer loans grew 11.3 percent, while at the 300 largest in business lending commercial loans fell two percent. At all other commercial banks, consumer loans were up 10.1 percent, and business loans were down 1.9 percent. *AB, 6/23/88, p. 1.*

States To Coordinate Bank Supervision

Banking officials of 12 western states issued a policy statement calling for coordinated supervision of interstate banking activities and for the sharing of supervisory information between state and federal agencies. Participating states include Alaska, Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington and Wyoming. The program will include interagency advice, examination scheduling, sharing and accepting each other's examinations, and information on compliance and enforcement activities. The state where a state-chartered institution is based will have the primary coordinating responsibility.

The states have agreed to maintain confidentiality of information in accordance with their own laws. States may form separate agreements regarding disclosure of shared information, but in the absence of any specific agreement they are asked not to disclose such information without the consent of the state that provided that information. *BBR, 5/2/88, p. 751.*