7 Conclusions: Risk-Related Insurance

In this final chapter of part 1, we summarize some prior results and conclusions, while at the same time examining a few additional issues in more depth. We pay special attention to what knowledge would be essential if a system of risk-related insurance premiums were to be substituted for the current flat FDIC rates that depend on regulations and examinations to hold down risks.

Portfolio theory offers general techniques that can improve analysis of bank risks and capital adequacy. It enables managers and regulators to be more objective in their evaluations. As more information becomes available and techniques improve, decision-makers should be able to increase their use of the price-market system. Such methods can be substituted for the regulatory tradition that forms the basis of the existing procedures.

7.1 Risk and Capital Adequacy

We have analyzed dangers of insolvency to find methods of measuring such risks. A system based on reliable estimates would make risk-free deposits possible (through a fair insurance) while allowing managers and owners of banks to select those risks they feel are appropriate to the circumstances. For every level of potential portfolio volatility there is a related sum of capital sufficient to reduce its risk to a predetermined level.

To determine whether capital is adequate, we must be able to define and measure it. The basic protection capital offers against the risk of insolvency depends not on a firm's book net worth, but on the true economic value of its capital. A difficult but necessary first step in measuring capital adequacy is estimating a bank's true expected net worth. Capital is adequate when it reduces risk of future insolvency to an

acceptable level or, alternatively, when the premium the firm pays to an insurer is fair.

To determine capital adequacy, this volume models the risk of insolvency. Portfolio theory furnishes us the necessary tools. A bank selects a particular portfolio consisting of a variety of activities. These activities include assets, liabilities, non-balance-sheet operations, including foreign exchange and loan commitments, and capital and reserves (net worth). The expected rate of return on these activities together with the bank's capital policy give an anticipated end-of-period economic net worth. However, this expected net worth is unlikely to eventuate. Economic events will cause returns to fall short or to exceed their expected levels. Risk depends on the probable variance of the returns in the particular portfolio selected by the bank. More specifically, risk depends on the likelihood that returns will be so negative as to cause the firm to be insolvent, and on the expected losses in case of such failure.

7.1.1 Variances in Returns

The volatility of each portfolio depends upon the weight of the activities within it, the underlying variance of each activity, and the correlation among them. Fluctuations become most dangerous when a bank concentrates its assets or liabilities into relatively few activities, each of which experiences wide swings as the economy shifts.

In most bank portfolios, the number of securities and individual loans is large enough so that activities can be combined into broad classes for analysis. Activities are sufficiently comprehensive so that within them the diversifiable risks of the individual components offset each other. Such groupings become the basis for estimating nondiversifiable risk of the portfolio. These are the losses likely to occur as a result of the market, shifts in the GNP, price changes, and variations in interest rates.

The most probable causes of shortfalls in income are found to be changes in interest rates and risk premiums, unexpected loan losses, and variations in operating income and expenses. Interest rate risks are by far the largest.

Obvious and seemingly evident dangers are not among the major risk factors. Activities with high systematic or market risks also carry high gross margins that tend to lower their danger. Insolvency occurs when a bank selects too high a level of nonmarket risks or fails to diversify. A concentration of loans in an industry, region, or foreign sphere or to insiders can be expensive. Such portfolios carry a higher probability of large variances.

Financial theory emphasizes the differences between shortfalls of revenues on individual assets, which are expected to occur and are paid for through larger gross charges, and portfolio risks, which carry a higher return because they cannot be diversified away. Since the risks of indi-

vidual assets can be diversified away by proper choices, they carry no incremental return. In banks, returns on activities that require higher gross rates to yield a net return equal to the market are part of the level of current earnings. Examinations of past experience can be used to measure expected future trends. The current level and trends in earnings are the basis upon which net worth is analyzed. If capital is expected to be negative under current conditions, it must be supplemented. To fund portfolio risks, however, one must do more than make certain that a bank does not have negative expected capital. One must calculate the probabilities of shortfalls in returns and of insolvency by applying to the entire portfolio estimates of interest, operating, and credit risks determined by the bank's specific activities.

In determining portfolio policies and adequate capital, it is not necessary to reduce volatility per se. Risk-takers should be welcome as long as they assume the full costs of their activities. Our financial system will work best when financial intermediaries are allowed a wide choice in determining their own most effective risk level. They should be able to judge—backing their judgment with their own funds—whether the gross return on any asset is sufficient to cover its specific risk. Regulatory concerns should be limited to the risk of insolvency. What is necessary is that a bank's nondiversifiable risks be reduced to where its capital adequately supports its choices. If its capital is inadequate, a bank should be required either to reduce its risks or to increase its capital to a level that just makes fair the insurance premium it pays.

7.1.2 Actual Measurements

Critical measures include both the expected level of net worth and probable fluctuations around it. Although our studies expended a great deal of effort trying to utilize the market to estimate expected net worth, our results were somewhat disappointing. The Rosenberg and Perry, Morrison and Pyle, and Jacobson papers (chaps. 16, 13, and 11) report some progress, but other results were negative.

Chapter 5 notes that difficulties arise because of possible conflicts among the risks being evaluated by the market. Some changes in stock or bond prices reflect risks of insolvency. In contrast, other movements are based on variations in the degree of uncertainty of other returns. However, these may not be so large as to alter significantly the probability of failure. Bankruptcy sets one limit to the fluctuations in net worth and influences market prices. In addition, however, investors may adjust their willingness to purchase securities on the basis of risks arising from uncertainties over future rates of return other than those affected by insolvency.

The analysis clarifies the unsatisfactory nature of book net worth as a measure of capital. Book values fail to reflect many events that have

already occurred. This is obvious in the First Pennsylvania case, as in many others. The differential movements of market to book stock values have ranged over a wide area and furnished a good deal of useful information. The changes in stock market values reflect at least partially the result of movements in the expected income from intangibles, securities, and loans.

A better estimate of net worth than that contained on the books can be derived by applying movements in market prices to the separate activities of a bank. Current practice is for footnotes to financial statements to show the relationship between market and book values for the bank's investment portfolio. They also include a statement about the interest rate sensitivity of parts of the loan portfolio and of some liabilities. However, these sensitivity footnotes are rarely in a form useful for estimating either current or net worth or the net duration of the bank's assets and liabilities.

Net worth calculations require more complete descriptions of loan portfolios, as well as a more detailed analysis of commitments and intangibles. However, even when this desired data is lacking, the application of market prices to individual activities can improve upon net worth estimates that use book values alone. Market-based projections employ the information contained in the markets' own estimates of future values in place of the arbitrary assumptions about what will happen contained in unadjusted book values. While estimates using techniques based on the market will not be exact, experience should show the extent of probable errors and enable them to be improved.

Our ability to estimate potential fluctuations in returns seems somewhat better. The studies for this volume make major contributions to the theory of such risks and methods of calculating them as well as to estimating orders of magnitude. Movements in interest rates cause capital values and cash flows to change. Movements in current cash flows affect reported earnings from operations. Changes in expected flows alter current values. Shifts both in levels of interest rates and in the term structure cause values to move. McCulloch's calculations contain estimates of the effect of both types of movements on the distribution functions.

The analysis of loan losses and operating earnings highlights the important differences between predictable and unpredictable movements in returns. A good deal of effort was expended in attempting to devise models and more complete classification systems for loans in order to improve the predictability of losses. The market, however, appears to be highly efficient in its pricing of returns that can be predicted. The more complete models made only marginal improvements in estimates of expected returns. Differences do exist in the likelihood that, on average, some classes will experience greater losses than other types—for exam-

ple, average losses on consumer loans run more than ten times as high as those on residential mortgage loans. However, the Maisel and Jacobson paper (chap. 9) shows that, though results will diverge for one or several years, on the whole differences in predictable outcome are already reflected in gross interest rates and current earning experiences. Classifications of loans yield minimal information about the likelihood of unexpected movements.

The estimates of the probable distribution of changes in loan losses and operating earnings contained in chapters 4 and 5 are based on time series of past changes and on cross-sectional data in the years of maximum upheaval. Both approaches indicate that well-diversified portfolios and operations do not contain large risks from these factors. The type of reserves already found in most banks are sufficient protection against them.

These risk estimates do not, however, take into account poor diversification or fraud. Both theory and history show that such risks are found primarily among small firms. They are among the reasons that large and small banks should be differentiated in examinations and regulations. However, maldiversification can also cause large banks to fail. They can speculate in futures, take undue country risks, or concentrate too many loans to a few related firms. Such possibilities seem to call for better accounting and auditing principles or a change in examination practices to put more emphasis on diversification and the possible correlations among loan and security losses resulting from interest rate movements or other economic events.

7.1.3 Some Inferences with Respect to the Regulatory Process

The final section discusses in greater detail procedures that might make it possible to substitute fair payments for risks in place of the restrictions over activities and decision-making now contained in the regulatory process. Such a change would aim at removing the dangerous flaw that makes it profitable for banks to increase their risks because their costs of insurance are not based on their capital adequacy.

Before proceeding, we again observe some possible improvements in the regulatory and examination process brought out in previous discussions. Probably most important are changes in how the regulatory system evaluates bank operations and risks. Both the theoretical work and the empirical work emphasize a need to differentiate between predictable and nonpredictable future movements and between economic and book values in calculating effective capital. In these areas, the present regulatory system appears weakest. The examination process often succeeds in requiring that banks charge off actual losses that have occurred or that have a high probability of occurring. The examinations also form a base for estimating whether the earnings trend of a bank is up or down. Such

analysis can find weak performances, and it can become the base upon which demands for additional capital or improved procedures can be made.

However, it appears that the current procedures miss dangers that are equally serious. They fail to estimate the probabilities that portfolio choices may lead to large-scale future losses. Such losses become probable when portfolios are too sensitive to unpredictable events. These changes are distinct from past losses or trends in earnings. Needed reforms would place greater emphasis on the possible distribution of returns around expectations and on evaluating those changes that have already reduced the level of capital. Such movements are reflected in market prices and can be used to calculate a bank's economic net worth.

7.1.4 Size of Bank

Another possibility arises from the potential regulatory advantage to be gained from recognizing the differences between the risks faced by large and small banks and treating them separately. Fewer than 100 banks hold more than half the assets of the banking system. The 1,600 banks with over $100 million in assets (as of the start of 1980) held 80 percent of total assets. Because their portfolios are larger, the normal degree of diversification for these banks is greater. Their record-keeping is more likely to be handled in a satisfactory manner. They can afford good internal and external auditing.

If large banks assume too much risk in relation to their capital, it is probably because they follow faulty theories and have an inadequate understanding of how insolvency is likely to occur, or because they desire to increase their profits by assuming a position of maximum leverage with a high-risk portfolio. The form of examination needed to monitor their performance should be quite different from that applied to smaller banks.

The Comptroller of the Currency has established special units to work on issues of direct concern to larger and multinational banks. It is not clear how successful these units have been in interfacing with the traditional examination process, or what theories they have developed to help carry out their tasks.

The problems facing the nearly 13,000 remaining banks with 20 percent of the assets may be quite different. Because they are small, a successful diversification program may require constant effort. Their policies are far more likely to be dominated by a single individual, a fact that greatly increases their risk of maldiversification. An executive who merely expresses strong opinions on what constitutes sound investments and loans is likely to reduce diversification. If the views are wrong, undue concentration, whether in a type of loan, in an industry, or in maturity structure, can lead to dangerous risks. In addition, of course, record-keeping among smaller institutions is more likely to fall short of adequate stan-

dards. Furthermore, if either external or internal fraud occurs—and it probably will, even if only through random chance—a loss of any given size will be harder to absorb without insolvency the smaller the bank and the less the capital available to offset the loss.

7.1.5 Uninsured Depositors

Another potential danger also pointed out previously is the ambiguous position of uninsured depositors. Those in large banks have been insured de facto, while those in small banks have suffered losses. However, since protection is not a matter of law, unless changes are made the future may witness major runs together with all the difficulties the deposit insurance system is supposed to avoid.

One of the reasons advanced for maintaining uninsured depositors is that procedures for determining insolvency are less than satisfactory. When a regulator fails to close an insolvent bank, both stockholders and the public may gain. If it is closed too soon, all may lose. But it is also possible that delay will be at the expense of the public, both now and in the future. With a more careful analysis of the dangers of improper timing, a better decision process should be possible.

7.1.6 Liquidity

When our analysis of risks is compared with the traditional literature and examination process, there seems to be a huge gap. We appear to have neglected an analysis of liquidity. This topic plays a critical role in existing practice. Since banks can be, and in the past frequently were, closed when they could not meet current demands for payment, an examination of potential liquidity has been an extremely important part of examinations. What is behind our seeming omission of this crucial topic? The apparent neglect is, in fact, primarily a difference in nomenclature. Liquidity remains a vital part of our analysis, but we believe that a study of the concepts that underlie the problems lumped together under the term liquidity provides a more useful approach to this issue.

Liquidity can be divided into two factors, either of which can present a threat to a bank's solvency. Such a division makes it easier to avoid its dangers. When divided, liquidity appears either as a problem of interest rate risk or as one of potential transaction costs. The term liquidity is used in two related but entirely different senses: (*a*) The first considers the balance or lack of balance of interest rate risks that arise from holding assets with a duration closely related to or far different from one's liabilities. Under this concept, a bank can improve its liquidity either by shortening the average maturity of its assets or by lengthening the average maturity of its liabilities. (*b*) The second is the ability to obtain cash when necessary from an asset or a liability, while experiencing only minor transaction costs or low interest penalties.

Liquidity as an Interest Rate Risk

The first concept—that it is necessary to protect against interest rate risk by matching the maturities of a bank's assets and liabilities—is an integral part of our analysis. In fact, the ability to measure such risk specifically rather than covering it under the general rubric of liquidity can, we feel, lead to a major improvement in bank planning and regulation.

The relationships between interest rate risks and transaction costs are frequently confused because of conventional accounting and examination procedures. In these, the actual loss to the bank as a result of an interest rate shift is not taken into account (except in a footnote to the balance sheet for marketable securities) at the time it occurs. Instead, depreciated assets are carried on the balance sheet at original cost. If such an asset has to be sold, both the loss that occurred earlier from interest rate movements and the loss from the transaction cost of the final liquidation are added together. They are thought of as a liquidation cost.

Cootner (1969) analyzed the difference between these two factors. His presentation makes the concepts clear. The loss from an interest movement occurs at the time the market shifts, not at the time of liquidation, when it is entered on the books. He also showed how confusion over a real or economic loss and what was shown on the books could lead to uneconomic decisions.

The whole discussion in the 1940s of the "locked-in effect" assumed that banks did not react to economic values. Changes in tax laws, accounting regulations, and pressure for better information have all improved current practice, but errors are still common. Increased emphasis on the economic balance sheet and interest rate risk can, we hope, improve analysis and practice in protecting against this form of liquidity risk. It is necessary to reemphasize that this interest rate risk applies to loans as well as securities. The duration of a loan depends on when and if its interest rate can be shifted as the market moves.

Liquidity and Transaction Costs

If cash is required to meet adverse deposit flows or takedowns against loan commitments, or to allow a bank to avail itself of a profitable investment opportunity, it would like to obtain the funds without undue costs. This need to manage liquidity, or the ability to obtain funds without high transaction costs, is an important function. The better it is performed, the higher the bank's profits.

There many ways to obtain funds. A well-operating bank models and plans liquidity carefully. It may sell some assets or, more commonly, it may borrow. In fact, large money market banks in recent years have carried more liquid liabilities than liquid assets.

Many observers of the growing use by banks of liability management and the increased ratio of borrowed money among bank liabilities consider liquidity a constant and heightened danger. As an example, Kane (1978) draws a gloomy picture of an increasing threat of financial panic as liability management expands. He differentiates between the day-to-day adjustment of liquidity, which he agrees is a necessary and useful function for a financial intermediary, and the growth of higher ratios of nontraditional borrowing.

Implicit in such views is the fear that, because of ineptness or in a desire to contract the economy to fight inflation, the Federal Reserve and the FDIC will cause or allow financial markets in general to collapse. If markets do not fail, banks can obtain funds by shifting assets to others. They may be penalized by transaction costs, but not to an undue extent.

A government-induced market collapse is neither useful, necessary, nor (we hope) likely. The Penn Central bankruptcy and its threat to the commercial paper market and bank lending demonstrated that the Federal Reserve can furnish the economy with required liquidity (Maisel 1973). The threats to individual banks in 1974 that were aborted is another example.

In fact, increased liability management can potentially increase the effectiveness of monetary policy. Without large fixed-rate liabilities, banks find it necessary to adjust the price of their loans to market rates more rapidly. They are less likely to expand credit by offering their customers below-market rates.

7.1.7 The Ability to Shift Funds

In general, liquidation costs should not be large. Dangers exist only to the extent that cash flows are so great that a bank has to start liquidating assets with high transaction costs. (Recall that capital losses from interest or default risks of borrowers need not be considered; they have already led to an economic loss.)

General financial theory points out that in a well-operating market, it should be possible to raise funds without major transaction costs (Stiglitz 1974). Problems arise when lack of information creates moral hazards, or when there is no lender of last resort for the system. The lender of last resort need not lend directly to the needy borrower. The Federal Reserve has for many years had contingency plans calling for the use of pass-through lending.

Two primary dangers exist: (*a*) Customers with existing loans may not be able to afford market rates. (*b*) Because of the lack of 100 percent deposit insurance, large lenders to banks may be unwilling to ascertain the institutions' safety. They will either flee to a few large banks on the assumption that the Federal Reserve and the FDIC will allow middle-sized, but not larger, banks to fail; or they will concentrate their funds in

the government securities market. Both dangers depend upon a failure of the government to furnish adequate liquidity to allow shifts among banks of assets and liabilities. As corporations transfer funds from a bank or banks to governments or large banks, the Federal Reserve, by substituting loans to the banks needing liquidity for securities in its own portfolio, can furnish unlimited liquidity.

Even in tight circumstances, extremely large amounts can be raised rapidly by banks. In the Franklin Bank case, several billion dollars were obtained. Insolvency arose not from transaction costs, but because prior losses in assets were still carried at inflated book values. The bank was also faced with much higher market rates on its liabilities. Its current earnings were low or negative because it had to pay market rates to others but appeared to be earning below-market rates on its assets. This illusion occurred because it was carrying its assets at book values that far exceeded their true economic values. Failing to recognize losses in market values did not affect the bank's economic earnings, and it fooled few. The market, including the Federal Reserve, recognized that its capital was low or negative, even though the losses were not shown on the books. The bank could borrow only on secure collateral, which was valued currently on an economic basis far below its face or book value.

Difficulties of smooth transitions will be worsened if potential lenders, whether other banks, the Federal Reserve or the FDIC, feel constrained not to lend because they fear they will be subsidizing the borrower as a result of quoting below-market rates. If banks believe that subsidies from below-market rates will be granted, they need not calculate the true cost of liquidity. They can gain at the expense of the lender. If the Federal Reserve or FDIC, as a result of improper pricing, refuses to lend, troubles could follow. A small penalty rate on emergency borrowing should exist (as is now possible at the Federal Reserve), with its amount known in advance so banks can estimate what it will cost them to obtain the necessary funds. In such circumstances, an apparent lack of liquidity resulting from an inability to earn market rates would primarily reflect a failure to diversify properly. A bank holding a typical portfolio should find its costs and revenues moving with the market. It should not face undue problems from transaction costs.

The possible costs of having to borrow or sell assets when interest rates have moved are true risks. They are part of the general risks of operations. Lack of liquidity can mean interest rate penalties and potential losses from operations. Such risks must be and are measured in the models developed in this volume. However, there is no need for or advantage from double counting by showing liquidity as a separate factor over and above interest rate risks and potential costs of liability management.

7.2 The Insurance System

One of the principal suggestions on how to improve our existing regulatory system is to increase its flexibility. A possible procedure is to reshape deposit insurance so that it depends more on prices and less on detailed regulations. An analysis of some of the changes necessary if insurance rates were to vary with risk will enable us to bring together again some of the main points made in the analysis of the previous chapters.

Before any major shift is possible, it may be necessary to have interested policy-makers rethink the purposes of the existing regulatory system. One of the great advantages of being able to measure risk more accurately is the potential ability to separate policies needed to maintain a safe banking system from those regulations that maintain monopolistic power or unequal income distributions. Since the latter are undemocratic and counter to our usual political thrust, it is likely that the political influence of those supporting the regulatory system for their own ends would decrease if it were recognized that we could have a safe financial system without the existing form of regulations.

Another problem would be to convince policy-makers to think of the FDIC as a true insurer, charging rates and building reserves related to real risks. If the FDIC were recognized as primarily an insurer covering its own costs and perhaps earning a profit, no one would be shocked when it experienced an occasional loss as a result of a bank closing. There is no need for people to worry each time a bank fails. The government pays out on crop, housing, flood and many other types of insurance without its being considered unseemly. Such acceptance of bank failures, however, would also require movement to 100 percent deposit insurance.

Perhaps one reason for the current view that a bank failure reflects a critical error in regulatory judgment is that too much emphasis is put on the examination process. The regulators take too much responsibility, which they can fulfill only at decided costs to the system. It is also recognized that, under the existing system, many failures reflect an attempt by banks to profit at the expense of the FDIC and others. If banks fail, a suspicion arises that they went too far in expanding risks in an attempt to profit at others' expense. If they were forced to pay for their true costs when they took excess risks, failures might be recognized as already paid for and either part of normal business or an act of nature.

7.2.1 Potential Changes

Suggestions on changes in the FDIC primarily discuss either the advantages of relating rates for individual banks to the real value they and their depositors receive from the insurance or the advantages of creating

private competitive firms, as has been accomplished in the mortgage insurance business, which, not too long ago, was also a government monopoly (Scott and Mayer 1971).

Four basic topics dominate discussions of the need for change: (*a*) The belief that regulators require arbitrary amounts of capital. With a changed system, banks and the market could be given more freedom of choice. (*b*) The idea that the present examination system and portfolio regulations dissuade banks from making venture or risk loans that they should make. Too few or improper risks are taken. (*c*) The fear that a failure to charge properly for differences in risks penalizes the well-managed bank in favor of the poor ones. (*d*) The assumption that any lasting government agencies become overly bureaucratic and that their functions could be performed more efficiently by private profit-making firms.

There is general agreement that the existing system has numerous built-in conflicts between market efficiency and regulatory needs or desires. Because the regulators have only a subjective measurement of the proper relationship between risk and capital adequacy, their ability to enforce their standards is limited, even though it entails a vast panoply of exams and analysis. Banks are under constant pressure to invent schemes and procedures that will enable them to live and profit under the existing network of regulatory constraints. Much of this effort is costly and lowers the economy's productivity and welfare (Kane 1978).

Insurance against What?

It is not clear whether banks ought to be charged only for normal year-to-year risks, with the government making funds available through other sources in major financial crises, or whether the insurance fund should be able to withstand all losses. Currently, the FDIC returns to banks two-thirds of the amount by which annual assessments exceed FDIC expenses. Such a policy, in effect, accepts recent developments as typical of what should be insured against. Yet, as many of our studies make clear, in pursuing such a policy the FDIC fails to charge for major risks. Crises arise because rare events do occur. The reckless firms are those that fail to plan for unusual economic events. Insurance funds and rates should be set so that they cover the rare event, not merely the normal. Both, in fact, are probable and expected. We build our sewers for rains expected to occur only every one hundred years, not for the yearly average.

The Fund

When one examines past FDIC expenses and losses, the existing insurance fund seems ample, even though it is small compared with the

funds insured. Total FDIC losses, including interest not earned, were about $460 million from 1934 through 1978.

In terms of needs and expenses, we can think of 1978 as a typical year. Total domestic deposits of insured banks were over $1,000 billion. The deposit insurance fund was $8.8 billion, or less than 1 percent of deposits. The gross revenues of the fund in 1978 were $1.39 billion, including $0.81 billion from assessments and $0.58 billion from interest earnings on the fund's assets. However, $0.44 billion was returned to banks so that net revenues were $0.95 billion consisting of $0.37 billion (0.81 − 0.44) in net assessments and $0.58 billion in interest.

Against these revenues, the FDIC paid out $42 million for insurance losses plus expenses of $103 million, primarily for bank examinations and supervision. The deposit insurance fund was increased by $803 million. Actual losses in 1977 were under 4/10,000 of 1 percent of total deposits and about 5/1,000 of 1 percent of net revenues after expenses. These ratios are low compared with past years, but not extremely low. From 1941 through 1977, only in four years did losses exceed 0.01 of 1 percent of deposits. The largest single year's loss was $100 million in 1974. This was 0.012 of 1 percent of total deposits in that year and was about 15 percent of the FDIC's income in that year. For the five years of heaviest losses, 1973–77, the total cost to the FDIC averaged about $48 million a year. This was about 0.005 of 1 percent of average deposits in this period and about 7 percent of the FDIC's average income in these years. These were, of course, additional bank supervision expenses for the Comptroller of the Currency, the Federal Reserve, and state bank commissioners.

Thus, if experience were to be the major guide to needs, insurance premiums would appear adequate and even high. But this reasoning neglects the infrequent event. In 1974 the total fund appeared low compared with possible near-term requirements. In 1980 there were about twenty banks that each had liabilities larger than the insurance fund. Had any of these collapsed, the FDIC of necessity would have had to arrange a merger into another very large bank.

Furthermore, in chapter 5, we saw that, while most banks are paying higher insurance rates than they would have to if premiums were based on their true risk, this is not the case for banks that have picked riskier portfolios. In many cases banks may be paying half or less of their fair charges. If regulations were removed without any techniques to ensure fair charges, the number of high-risk banks might well increase rapidly.

7.2.2 Public Functions of Insurance

There are numerous possible debates over the public functions of the insurance system, but we have not analyzed them. Questions have been raised whether the regulators are too close to those being regulated, and

therefore whether the public or the industry is being benefited. Observers seem to see fluctuations in agencies' attitudes, depending partly on the administration in power and partly on the individuals in charge of the agencies.

In other related areas of government, agencies similar to the FDIC have been used to promote rather than hinder competition, to increase entry, to aid small businesses. These types of factors lead to support of public insurance. Their importance, weighed against the value of profit-making incentives, must be evaluated.

Experience seems to say that if the purpose of the government regulations is clarified and if the existing agency makes more use of market mechanisms, then it may seem possible to consider splitting off specific functions and operations. Competition from the private sector would become more feasible.

7.2.3 Insurance Terms

In addition to risks of insolvency, another variable in the value or cost of insurance is the terms under which it is written or operated. Terms include such factors as the frequency of examination, the rapidity with which capital and risk are required to come into line with the standards of the insurer, and the point at which an institution is found to be insolvent and is shut down.

The amount of losses an insurer will have to pay will depend upon how much the bank's liabilities exceed its assets and upon transaction, liquidation, and bankruptcy costs. In theory, if exams were frequent enough and were sufficiently accurate, and if macrovariable changes were smooth, institutions could be closed at the moment they reach insolvency. In that case the liquidation would cover all costs. Creditors and insurers would not lose, even if stockholders would.

In fact, however, examinations are not that frequent. The estimation of the value of the balance sheet is not that accurate, and there may be negotiations over required changes in capital and risk. This means that the regulator allows potentially insolvent firms to continue to operate. In such circumstances, the stockholders have a great deal to gain by continuing operations without adding capital. If events improve, the value of their stock will increase. On the other hand, if events deteriorate they have no more to lose. Only the losses to the insurer will increase. Thus, the terms of the insurance are a significant variable similar to the premiums, the amount of capital, and the amount of risk.

7.3 Variable Rates

Many observers have argued that charging deposit insurance premiums that vary with actual risk to the insurer is a necessary step in solving many

regulatory problems (Barnett 1976*b*; Scott and Mayer 1971). If charges were related to the risks they assumed, individual banks could have far greater freedom in deciding what were and were not logical loans. Our system of intermediation would improve. The amount of required regulation would fall. The straitjacket within which the system operates could be removed.

Some believe that a goal of variable premiums is impossible to achieve, even if desirable. They feel we do not know enough to accurately classify banks into risk classes. As a result, they fear that too much authority would be given to those establishing the classification system. Decisions would be arbitrary and even less acceptable to banks than the existing ones. An added disadvantage would arise from political pressures to change the classification system. Although the present system is arbitrary and creates subsidies and maldistributions of income, as a flat rate it is simple to explain. It is set by Congress, thought to be insensitive to problems of fairness or efficiency. Critics fear that a variable rate system would be subject to constant political interference (Scott and Mayer 1971).

The discussions in the previous chapters indicate that we may be close to understanding how a more logical system of deposit insurance could be established. They also show the type of knowledge that would still need to be developed if a variable system were to be introduced.

7.3.1 Risk Rating

In theory, if it were decided to use variable rates, the premium could be set so it would return a sum just sufficient to pay for any combination of capital and risk a bank desired. While not foolish as an ultimate goal, so complex a system would make little sense at first. It would be sufficient if variable rates could be set initially for a limited number (five to ten) of risk classes. Each class would consist of a range of equivalent risk/capital trade-offs. Banks could choose a specific risk class by picking any of the combination risk/capital trade-offs within the class.

As an example of how a variable scheme might work, think of a form somewhat similar to the Federal Reserve's ABC form. It could be filled out by the bank, certified by the bank's auditors, and spot-checked by the regulators. Initially, bank supervisors could furnish the necessary instructions and offer help in filling out the form similar to that granted when reserve requirement forms have changed.

As a starter, the form might break risks down into four separate classes that would then be added together. Another section would estimate the level of economic capital relative to either liabilities or earning assets, also in several steps as discussed in chapter 5. The level of risk would then be measured against the capital ratio. The resulting index number would place the bank in a specific class with a specified premium.

7.3.2 Risk Classes

While more complex schemes are possible, the prior studies indicated that it may be satisfactory initially to use only a limited number of risk categories. They show that because market rates and competition already are forcing banks to charge for the necessary trade-offs between expected losses and expected returns, the critical problem is to evaluate the risk of unanticipated changes or higher variances and, therefore, possible insolvency. Less concern is needed over existing high or low losses. These and their projected earnings show up as part of economic capital and the expected end-of-period capital/asset ratio. What must be insured against is those portfolios of loans and investments that have a greater probability of a concentration of unanticipated negative returns. It is this variance, not the higher or lower expected rates of loss, that requires insurance.

Interest Rate Risk

The first and most important division of the portfolio for insurance underwriting is into groups based on interest rate risk. Chapters 10 and 13 discuss in detail and illustrate the type of analysis required to measure interest rate risk. Both assets and liabilities must be divided into a limited number of maturity or duration groups. Loans as well as securities must be included. Potential changes in risk premiums, as discussed in chapters 14 and 15, must also be added to simple interest rate risk. Each group has a risk factor. These can be aggregated to obtain the total interest rate risk for the bank.

Loan Loss or Credit Risk

Although information is skimpy, the studies indicate that the measurement of credit risk can start with three basic concepts: (*a*) The amount of unanticipated losses can be estimated from existing distributions of past changes in loan losses, based on either cross-sectional or time-series data. Again, a major point is that this distribution appears to be independent of expected losses. In fact, banks with high expected losses are likely to have a somewhat reduced probability of large unanticipated losses, since they are likely to regress back toward the overall mean. (*b*) A system of penalties for nondiversification is another critical component. Risks arise from an undue concentration of any type, whether by industry, locality, domestic-foreign, related companies or individuals, and so forth. (*c*) It is likely that some penalty should be assessed or credit granted for an unusual distribution of loans by major classes. The rate of return for a whole class of assets may be far lower than anticipated as a result of related but unexpected losses. Such surprises were apparently true of nonhome real estate loans for the past decade. They were also obvious in

loans to real estate investment trusts. The three factors influencing credit risk can be summed to obtain the total expected variance of the portfolio and a single value for the bank's risk of unanticipated loan losses.

Changes in Operating Earnings or Margins

Again, as for credit risks, operating risks can be considered under several headings. (*a*) In chapter 4 we saw measures of income before net charge-offs for loan losses. High gross earnings may be reduced by collection and loss expenses. We also noted the possibility of using a general probability distribution for unanticipated changes in earnings. As with loan losses, high or low past earnings enter directly into expected values but have little obvious influence on unanticipated changes. Again, however, a slight tendency exists for earnings to regress toward the mean. Whether this is important enough to use in projections is not clear. Perhaps banks in the upper range of high earnings should be penalized on the assumption that they contain a slight additional risk, even if no credit is given those with low expected earnings. (*b*) However, those with anticipated low earnings should also pay a premium. The early warning systems indicate that continuous low earnings are a critical factor in predicting certain types of bankruptcy. Such firms have less room for error, since unanticipated decreases will take the firm into the loss sphere more rapidly. At this point, penalties should be assessed for firms that show up in the danger category from past failures to earn normal sums. These firms should be required to make improvements in their operations and capital and should also pay higher insurance premiums. (*c*) We assumed initially, as does much of the literature, that there were major risks in borrowed liabilities—the traditional fear of illiquidity. As discussed previously, however, such risks may arise only at the extremes of imbalance or of market collapses. Whether borrowed liabilities are safer than demand or savings deposits depends on the likelihood that the market will stop lending compared with possible outflows from disintermediation. It also depends on a possible large increase in margins on market funds compared with the cost of replacing lost demand and savings deposits at market rates. (*d*) We also saw that size influences variances in earnings; small firms experience more unanticipated decreases. Whether they should be charged for their lack of size is a policy decision. Their value to the economy may make a small subsidy worthwhile.

Fraud or Defalcations

A final category of risk is from insider abuse, or from fraud and major losses in single "stings." These losses definitely are a function of size, with risk from this factor falling steadily and then disappearing as banks grow large enough and sufficiently bureaucratic. The risk penalty for fraud can

also be made a function of the degree to which these risks are underwritten by private insurance. For example, the level of bonding and the form of audit could be used to differentiate various degrees of risk. In fact, new forms of private audits might be devised to replace most examinations. Many types of risk and liability that are not now covered in a traditional audit could be shifted to auditors for a fee.

7.3.3 Estimate of Capital or Net Worth

As significant as measurement of risk for setting fair insurance premiums is the estimate of what capital is expected between examinations. The risk of insolvency depends on the capital/asset ratio and how it is expected to change between examinations. This means that both the present net worth and expected movements in it as well as in earning assets must be estimated.

Net Worth is the present value of expected earnings. The greater the share of the capital estimate that can be made from market data, the more accurate the results are likely to be. Most securities and loans, as well as several types of liabilities, can be valued at the market. Part 2 also discusses methods of making such estimates by discounting the expected returns from individual assets or classes of assets.

Intangibles are harder to value. For most banks, the most important intangibles are the bank's holdings of demand and saving deposits. The expected earnings from these must be capitalized. Chapter 9 indicates the possibility of arriving at general values for such factors. Further analysis of individual situations is necessary to find the degree to which it would be proper to apply average values for such deposits to individual banks. It may be that estimates of both expected deposits and their correct capitalization rates require a more complete breakdown by size, type, and region than we used in our analysis.

Finally, some banks achieve large additional earnings from other intangibles. These revenues must also be capitalized. Again, the discount rate selected can be developed either from the variance of such earnings based on the bank's own experience, or from that of a class of similar banks.

Changes in the Ratio of Capital

Net worth may increase or decrease compared with assets for several reasons. A bank has an expected rate of return on its assets. This may be estimated from prior periods' earnings adjusted for any major shifts in portfolio. Some of these earnings will be paid out in dividends. Additional capital may be raised in the market.

As noted, risk depends not on the amount of capital, but on its ratio to net earning assets. Therefore, along with expected changes in capital, the volume of net earning assets must be projected. It is the expected capital/

asset ratio that is pertinent in determining a fair insurance premium. While a good deal more study is required, either simple techniques of projections from past trends or more complex forecasts of the type detailed in chapter 11 can be used for this purpose.

7.3.4 Calculating Insurance Premiums

Fair insurance premiums depend upon balancing capital/asset ratios and the risk of insolvency. A bank's estimated risk and expected capital must be merged to get a fair premium. Examples of such calculations and tables of trade-offs are found in chapters 5, 10, and 15. Although any number of specific premiums could be charged, initially only a limited number of different premium classes, perhaps five to ten, might be optimum. The object should be to give a wide enough range of classes so that rates vary significantly from the high to the low. On the other hand, there should be a wide enough spread of risk within each class so that no undue impression of exactness is implied.

Initially, ratings and premium charges would have to be somewhat arbitrary. For this reason, it might be well if each bank were allowed to choose its own risk class, based on a form and calculations of the type just detailed. However, each bank should be experience-rated retrospectively. Penalties that increase rapidly with the extent of underestimates should be charged if, upon the date of the next examination, the bank falls into a higher risk class than the one it paid for at the start of the period.

7.3.5 Retrospective Experience Rating

In retrospective rating, it would be important to differentiate between those changes in net worth that were included in the original insurance calculation and have already been paid for and those the bank created as a result of shifting its risks and becoming riskier between examinations, or from wrongly estimating the growth in its capital or earning assets.

It is because risks are not linear that the penalties for shifting risk classes should rise more rapidly the larger the underestimate. For purposes of evaluation, it might be sufficient to compare the estimated interest rate risk of the beginning and ending portfolio and the change in the capital/asset ratio resulting from the movements in net earning assets and retained earnings or added capital. While the amount of variation to allow without penalty requires detailed analysis, as an example, no penalty might apply if the ending portfolio's risks were no more than 10 percent larger than those on which premiums were paid. Similarly, a capital/asset ratio 10 percent less (i.e., no penalty if the initial agreed-on ratio was 5 percent and the final was 4.5 percent) might not be subject to penalty. If risk was added or capital/asset ratios declined, each 5 percent greater error would be paid for at increasing rates.

There should be no penalty for changes in net worth from unanticipated interest rate movements because these would already be paid for in the insurance premium. It is added average risk duration of the portfolio that creates added risk. Given the 10 percent leeway, if the risk duration average rose from 3.0 to 3.3, there would be no penalty. However, if the risk duration rose from 3.0 to 3.4 there would be an extra fee, since the bank would have increased its interest rate risk by extending the average maturity of its portfolio.

In experience rating, it would not be necessary to consider separately loan losses above those anticipated, a drop in other revenues, or an increase in costs. These are already paid for in the initial risk estimates. However, unexpected changes in dividends or excess growth would lower the anticipated capital/asset ratio and therefore could increase the actual risk. Some leeway, such as a 10 percent variation above estimated risk, is logical because the insurance premium already anticipates that some variance will occur as a result of unexpected events. The fee should be increased only if the bank assumes added risk not included in the projection for which it paid. Such added risk could reflect faster than projected growth, riskier types of loans, longer maturities, or a failure to retain earnings.

7.4 Other Knowledge

The suggestion of a variable insurance premium is only one form of increasing the objectivity of regulatory standards. Other techniques can be used by both bankers and regulators to measure risk and to make certain that risks are not accepted unknowingly and without adequate capital to offset them.

Some observers believe that, given the rapid decrease of the risk of insolvency as the ratio of capital rises, rather than changing the insurance system, it may be more efficient to enforce minimum capital asset ratios strictly. What is an adequate minimum level of capital clearly depends upon what is a maximum level of risk that an individual bank assumes in any period. This means that a risk/capital measurement form of the type just described is necessary for this type of change also.

It may be argued that the regulatory system in effect at present attempts to set a minimum of capital adequacy. It does this, however, in an extremely awkward, arbitrary, and subjective manner. A key point of this volume is that the existing examination and regulatory system is not estimating the level of capital adequacy very efficiently. It retains inadequate concepts of illiquidity, diversification, and capital. It fails to make optimum use of knowledge gained through examinations.

We recognize that this volume is only an introduction to ways of improving our thinking about and measuring each of the relevant con-

cepts. More work is needed both to clarify the analysis and to measure the pertinent risk distributions. The techniques that have been outlined do, however, seem capable of solving many of the problems. The methods of measuring risk and capital can be improved. Through the models introduced, the relationship between risk and capital adequacy can be far more explicit and easier to understand than it has been under current practice.

II Research Studies