

Deregulation and the Opportunities for Commercial Bank Diversification

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Banking legislation and regulation originating in the 1930s prevents commercial banks from being affiliated with nonbank providers of financial services.¹ As a result, competition between financial services providers has been limited. For banks, regulations have during most of the period seemed a double-edged sword, restricting their ability to leverage their financial talents in nonbanking areas but also enhancing their value by reducing competition in the markets for traditional banking services. However, continuing developments in communications and information-processing technology as well as financial theory have severely eroded the barriers that once protected commercial banks. Commercial banks must face increasing competition from nonbank firms with their hands still tied by restrictive legislation.

Many banking organizations, especially larger ones, have pointed to their declining fortunes and asked for such restrictions to be relaxed. Generally sympathetic, bank regulatory agencies have been as flexible as possible in allowing bank entry into nonbank financial fields. However, the same legislation that limits banks also constrains the regulatory agencies. Banks have extended their efforts to Congress, where they have petitioned with increasing urgency for more than a decade for deregulation permitting them to provide nonbanking services. The issues involved in requests for legislative change primarily concern the ways in which deregulation would affect (1) the cost and availability of financial services to domestic consumers, (2) the competitiveness of U.S. financial firms in international markets, (3) systemic risk and the government safety net as nonbank firms continue expansion into the markets for traditional banking services, and (4) bank safety as banks participate in nonbank financial activities.

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Congress has resisted passing legislation deregulating banks largely because of fears that banks might take excessive risks and exploit the federal deposit insurance system, fears fueled in part by the disaster that followed deregulation of the thrift industry and in part by the large number of bank failures in recent years.² The validity of the fears about banks' behavior hinges on several questions. For example, would a portfolio of bank and nonbank activities carry more or less risk than traditional banking activities? Would bank managers adjust operations of nonbank (and bank) activities in ways that would increase or reduce their organizations' overall riskiness? Can financial problems in a nonbank subsidiary be contained so as to minimize the danger of systemic risk and costs to the insurance fund? Assuming that deregulation would also allow nonbank firms to enter banking, how would traditionally nonbank firms manage their bank subsidiaries?

This study focuses first of all on the question of whether deregulating bank activities would increase or decrease banks' riskiness or would be likely to have no impact. More specifically, it examines the portfolio effects of combining bank activities with nonbank activities in which bank participation is either currently impermissible or severely constrained. The approach is to analyze the historic accounting rates of return on various bank and nonbank activities reported to the Internal Revenue Service (IRS). The issues concerning risk as they relate to bank management decisions and to the containment of problems in nonbank subsidiaries are addressed in the boxes on pages 4 and 8, respectively.

Several earlier studies have examined portfolio diversification as it is affected by deregulation of bank activities. Providing a more recent analysis of the IRS data, this study also presents a consistent analysis of the behavior of portfolios that included bank and nonbank activities before the period of deregulation ushered in by the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) in 1980 and the period after its passage. Lastly, in addition to constructing common pairwise portfolio combinations (that is, combining two industries at a time), this analysis also extends and updates Robert E. Litan's (1985) calculations of efficient portfolios consisting of a bank and several nonbank industries. That is, the portfolios that have the lowest level of risk for any given return (or, equivalently, the highest return for any given level of risk) are calculated.

Results indicate that bank risk increased after the passage of DIDMCA, but so did the riskiness of most other financial industries. The analysis of pairwise

combinations found more opportunities for risk reduction than other recent studies using different data sources have found. For example, this study found that forming a combination of banks and securities brokers/dealers may reduce risk if the securities operations constitute no more than 25 percent of the consolidated firm. The analysis of efficient portfolios for the 1981-89 subperiod suggested minimal opportunities for diversification gains in areas closely related to traditional banking such as the thrift industry and personal and business credit. However, the results suggest that portfolios including certain industries in which banks have been seeking to remove barriers to growth, such as insurance and mutual funds, offer significant opportunities for increasing return while lowering risk. The analysis of optimal bank holding company portfolios and nontraditional activities also uncovered two surprises: (1) although the securities brokerage industry can be risk-reducing in pairwise portfolios, it never entered into efficient portfolios, and (2) the real estate subdivider and developer industry enters the efficient portfolio even though it experienced a negative average return on assets during the 1981-89 subperiod. The second finding, which reflects that risk-reduction gains from diversifying into real estate subdivision and development were more important than the negative returns reported by this industry, helps to illustrate the importance of examining portfolios of activities.

Literature Review

A variety of studies have examined the effect of combining bank and nonbank activities into a single portfolio. This section begins with a chronological review of a number of those studies. The review then discusses the wide variety of methodologies used in prior studies and the principal differences and trade-offs involved in using various methodologies. It also suggests that most studies find limited potential for reducing portfolio risk by allowing banks to expand their investments in nontraditional activities.

Prior Studies. Arnold A. Heggstad (1975) used IRS industry earnings data to examine the riskiness of various industries between 1953 and 1967.³ He measured riskiness by the coefficient of variation of return-on-equity for thirteen different industries. In addition, Heggstad correlated industry earnings with returns to banking. He discovered that commercial banking was one of the least risky activities but also found that industries such as leasing, insurance, or real estate offer

attractive risk-reducing diversification potential given their negative correlation with banking.

Roger D. Stover (1982) examined the effect of diversification on the market value of bank holding companies using both industry data and firm-specific data obtained from *Moody's Industrial Manual*, *Moody's Banking and Finance Manual*, and *Compustat* for the 1959-68 period. He began by determining the debt capacity of a portfolio of bank and nonbank assets given a fixed probability of failure. He then assumed that a firm's value increases as its debt capacity increases.

Stover's results have direct implications for portfolio risk. In his model, an increase in debt capacity would imply a decrease in the risk of firm failure, with leverage held constant. He concluded that bank holding company diversification to include activities outside of banking increased the organization's value. His analysis suggests that banks may benefit from diversifying into the following industries: fire and casualty insurance, investment banking, land development, and savings and loan companies.

Litan (1985) used IRS data to examine the portfolio consequences of combining banks with sixteen other financial services industries. He analyzed industry return-on-assets figures for two subperiods, 1962 to 1972 and 1973 to 1981. The first part of the analysis examined the coefficients of variation and correlations of returns and found that the correlations between bank and various nonbank activities are either small positive or small negative values.⁴ However, the risk-reduction opportunities suggested by the correlations are at least partially offset by higher coefficients of variation. Litan then estimated efficient portfolios of the various activities for given return on assets values, a procedure that incorporates differences in mean returns, standard deviations of returns, and correlations of returns. These efficient portfolios always place a substantial percentage of their assets in banks but also place a significant fraction in nonbank activities. The fraction invested in nonbanking for the subperiod from 1973 to 1981 contained from 46 percent in the riskiest portfolio to 12 percent in the least risky portfolio. Litan also considered the impact of individual nonbank firms acquiring a "typical" bank. He found that such an acquisition could increase the risk exposure of some depositories even as it lowers the risk for some nonbank parents.

Elijah Brewer III, Diane Fortier, and Christine Pavel (1988) analyzed the relationship between bank risk and nonbank activities using daily stock market returns for a sample of 325 nonbank firms and 170 banking organizations during three very different economic periods—1980, 1982, and 1986. The nonbank firms were

categorized into thirteen broad industry groups. Brewer, Fortier, and Pavel found that most of the currently authorized nonbank activities—especially mortgage banking and consumer finance companies—are considerably riskier than commercial banking. On the other hand, the variance of daily returns for impermissible activities such as acting as insurance agents and brokers and property/casualty insurance underwriters were relatively low. They conclude that a small investment in a few such comparatively low-risk nonbank activities would actually reduce risk. Furthermore, a limited investment in high-risk security-related activities would not materially increase bank holding company risk.

John H. Boyd and Stanley L. Graham (1988) examined accounting data and stock market returns during the 1971-84 period to determine the impact of nonbank activities on the markets' assessment of bank holding company risk. Using both types of data, Boyd and Graham conducted hypothetical merger simulations in which a risk-of-failure measure or statistic called a z-score is used as the primary measure of risk. The results, while generally consistent with other studies, yielded some significant differences. For example, with stock market returns data the results indicate that mergers with property/casualty insurance companies would reduce bank risk, but the accounting data analysis yielded the opposite results. At the same time, both data sets indicated that diversification into life insurance would reduce overall bank risk.

Richard J. Rosen and others (1989) focused on the portfolio effect of bank diversification into real estate investment over the period from 1980 to 1985. They found that real estate investment trusts (REITs) had a higher mean return on assets, reported returns negatively correlated with bank returns, and experienced far more variable returns than bank returns. They found that despite the higher returns and negative correlation, investments greater than 6 percent of consolidated assets would yield a higher standard deviation of return and coefficient of variation in return. Analyzing portfolios of banks and savings and loan real estate service corporations, they failed to find any benefits to bank diversification into the service corporations.

Peter S. Rose (1989) examined both accounting and stock market returns of a variety of financial and nonfinancial firms during the 1966-85 period. His risk measures included the mean, standard deviation, and coefficient of variation of the various return measures for firms in the different industries. Banks were found to have a lower mean return but also a lower standard deviation and a smaller coefficient of variation of returns than other industries. The correlation of the various

Management Influence

Although studies of the portfolio effect of banks entering currently impermissible nonbanking activities may provide valuable insights into the relative riskiness of various activities, these studies have only limited ability to predict the actual consequences of product deregulation. The problem is that in deriving their statistical results portfolio studies assign (at least implicitly) a passive role to bank managers and owners. In reality, the people controlling banks would determine both the extent of their organizations' entry into nonbanking activities and the postmerger operational policies of their nonbank affiliates. Indeed, some operational changes in the nonbank (and possibly bank) affiliates are almost inevitable. Banks' passive portfolio investment in nonbanking activities is unlikely to generate significant synergies that will make an acquisition valuable from the perspective of an acquiring firm's shareholders.

Portfolio studies fail to consider managerial issues not because researchers are unaware of their implication but rather because such decisions cannot be accurately projected and there is little basis on which to impose related assumptions on models.¹ The only way to know for certain how banks would use expanded powers is to deregulate bank activity. However, some insight may be gained by reviewing the theoretical and empirical evidence on banks' current risk-taking policies.

The theoretical case that banks may use expanded powers to increase their riskiness is made by Boyd and Graham (1986).² They noted that the fixed-rate deposit insurance system that existed in 1986 created a moral hazard problem. That is, the shareholders of banks that invest in high-risk/high-return assets keep the gains if returns are high but if returns are significantly low are allowed to share losses with the FDIC. Brewer and Thomas H. Mondschean (1991) provided evidence from insured thrifts to support this hypothesis. They found that thrifts increased their risk exposure by investing in junk bonds and that the market rewarded the increase in risk through higher stock returns.

Although deposit insurance may give banks an incentive to take more risks, this incentive may be at least partially offset by regulatory pressure and other considerations. For example, bank owners may not always gain from an investment in high-risk assets. Banks make long-term investments in firm-specific capital (such as specialized software) that would be lost if the bank were to fail. Furthermore, bank customers play an important role, and many are willing to enter into long-term relationships (such as interest rate swaps) with a bank only if they are confident that the bank is not engaging in highly risky investments that could cause it to fail. Finally, risk also threatens bank managers' loss of their firm-specific hu-

man capital along with their reputations as good managers if their bank fails.

Two studies suggest that shareholders and managers do not generally prefer riskier policies. Robert A. Eisenbeis, Robert S. Harris, and Josef Lakonishok (1984) studied the formation of one-bank holding companies (OBHCs). OBHC activities, except investment banking, were not regulated prior to the passage of the 1970 Amendments to the Bank Holding Company Act. If OBHCs provided a way to exploit deposit insurance to gain value, then banks' announcements that they were forming OBHCs should have uniformly increased shareholder wealth. However, Eisenbeis, Harris, and Lakonishok found that OBHCs generated unexpectedly large returns only when bank holding company formation created an opportunity for geographic diversification. Thus, contrary to the hypothesis that shareholders prefer increased risk exposure, in this case they appear to have favored reduced risk exposure. Most recently George J. Benston, William C. Hunter, and Larry D. Wall (1993) analyzed 302 U.S. bank mergers during the mid-1980s. Their findings indicate that acquiring banks paid larger acquisition prices for target banks that have a lower variance of return on assets.

Additional evidence concerning the ways in which banks will actually use expanded powers is based on observing the effect of nonbank affiliates on an organization's overall risk. This approach is less than ideal because nonbank affiliates are generally limited to performing activities that banks themselves could perform. However, banks could increase risk by having these nonbank affiliates specialize in the riskier aspects of banking, or they could reduce risk by exploiting affiliates as a means of increasing the organization's geographic diversification.

Using accounting rates of return, Wall (1987) found that the portfolio of nonbank subsidiaries at bank holding companies are on average riskier than bank subsidiaries but that the correlation of the two groups' return on equity is almost zero. When the bank and nonbank subsidiaries are combined into a single portfolio, on average the level of risk is less than that of the banking subsidiaries by themselves. However, Wall also found an economically significant minority of banks for which the nonbank subsidiaries are risk-increasing. He then conducted tests to determine whether the nonbank affiliates tended to accentuate risk (increase it at the riskier bank holding companies) or moderate risk (decrease it at these institutions). This test suggested that nonbank affiliates were risk-moderating. Finally, in examining the riskiest bank holding companies, Wall found that nonbank affiliates also tended to reduce somewhat these organizations'

riskiness. Thus, he concluded that the evidence provided no indication that bank holding companies would use nonbank activities to take on additional risk and offered weak support for the argument that greater diversification would reduce risk.

Brewer (1989) examined the relationship between bank holding company risk and their holdings of nonbank affiliates using risk measures derived from stock returns. He found some evidence that the proportion of bank holding company assets held in nonbank affiliates is inversely related to bank holding company's riskiness. He then split his sample into high- and low-risk bank holding companies. The nonbank activities were inversely related to the riskiness of the high-risk bank holding companies, but there was no significant relationship between nonbank activity and the riskiness of the less risky bank holding companies. Brewer notes that his results tend to support the case for expanded bank powers. However, he urges caution in extending his results to new activities because these activities may be riskier than banks' existing nonbank powers.

Brewer (1990) extended his previous study to examine the effect of the composition of nonbank assets on bank holding company risk as measured by stock returns. He found that an increase in the proportion of bank holding company assets invested in six of the seven nonbanking activity categories that he defines are associated with reduced volatility of bank holding company returns, the one exception being securities brokerage. He also found some weak indications that most of the nonbanking activities are associated with a reduction in the risk of failure. His

results suggest that the riskiness of nonbank activities should not be evaluated independent of the bank holding companies' entire portfolio of assets.

Thus, an important element in evaluating proposals for deregulation is assessing the goals of bank owners and managers if they were to be permitted investment in riskier activities. Banks may use diversification as a method for increasing or decreasing risk. Historically, deposit insurance has created an incentive for banks to take on risk.³ However, these incentives may be offset at many banks by regulatory pressure, managerial risk aversion, or the profitability of being able to make long-lived investments. The existing empirical literature does not support the hypothesis that banks have used their expansion power to increase their overall risk. Hence, the evidence suggests that bank holding company shareholders and managers do not always prefer riskier policies.

Notes

1. The alternative of allowing researchers to choose their own assumptions about owners and managers' behavior would compromise the objectivity of portfolio studies. Researchers could find evidence supporting the position of their choice if they were free to use whatever assumption they wanted about banks' behavior in a deregulated environment.
2. See Kane (1985) for a broader discussion of the incentives created by the deposit insurance system.
3. However, recent legislative changes may have reduced the incentives to take risk that were created by deposit insurance. These changes are discussed in the box on page 8.

return measures with bank returns was generally positive but close to zero. Rose also regressed cash flows on various macroeconomic and financial variables. His finding that the cash flow of a number of industries showed a weaker correlation with various macroeconomic and financial variables than was true of commercial banking suggests that diversification into nontraditional products could reduce risk.

Boyd, Graham, and R. Shawn Hewitt (1993) extend the work of Boyd and Graham by adding portfolio weights so that the nonbank activities are allowed to range from 0 to almost 100 percent of the consolidated entities' total assets. They find that pairwise bank holding company mergers with life and property/casualty insurance firms are most likely to generate diversification gains. Mergers with securities and real estate firms achieved maximum risk reductions at economically insignificant levels of nonbank activities (less than 5 percent of the postmerger firm's pro forma assets).⁵

Evaluation of Prior Studies

The studies discussed above and others have approached analyzing the effects on portfolios of diversification into nonbank activities in a variety of ways. The methodologies used each have significant strengths and weaknesses that it is important to understand in evaluating the current state of the literature.

Measurement of Portfolio Performance. Most studies of the effect of portfolio diversification focus on one of two risk measures: the coefficient of variation of some return measure or the risk of failure calculated using accounting or market data. The coefficient of variation is, as noted above, merely the variability of returns (standard deviation of returns) divided by the expected return. The risk of failure incorporates a firm's equity capital, its expected returns, and standard deviation of returns to provide a measure of the likelihood

that a firm will experience losses that exceed its capital. Risk of failure is a more direct measure of the primary regulatory concern: Would increased participation in nonbank activities make banks more or less likely to fail? However, implicit in the risk-of-failure measure is the assumption that the combined organization's capital structure will be the sum of their individual premerger capital structures, an assumption that may not be appropriate if regulators require higher postmerger capital levels. Further, calculation of the risk of failure requires data on premerger capital structures that may not be available from some data sources.

A further consideration in evaluating portfolio performance is the perspective of bank owners and managers. Most studies focus on risk issues because that is the regulator's concern. Bank owners and managers, however, actually undertake mergers on the basis of the effect of diversification on both the return and risk of the combined organization. Banks may engage in a risk-reducing merger if the reduction in their expected return is not too large, but they may also be willing to undertake higher risk if the increase in expected return is sufficiently large.⁶ Thus, a full analysis of the effect of diversification on returns must consider both the banks' and the regulators' perspectives.⁷

Formation of Portfolios. The various studies of bank mergers take three different approaches to forming the portfolios for analysis. Some studies limit their analysis to three or four statistics: industry-average mean returns, industry-average standard deviations of returns, industry-average coefficients of variation of returns on assets, and the correlation of industry returns with banking returns. Looking at industry statistics alone does not allow an easy determination of the change in risk that results from combining different industries into a single firm. For example, an industry might have a higher standard deviation of returns than banking, but the returns may be negatively correlated with banks' returns. Thus, it is not always clear whether the higher standard deviation of a particular firm from this industry combined with a banking firm will increase the risk to the postmerger organization or its negative correlation with banking will generate less risk.

An alternative to using overall industry statistics is to combine industries in pairs—banks and one nonbank industry at a time. This approach provides for simultaneously considering the effects of expected return, the standard deviation of returns, and the correlation between returns (as well as the capital positions of the two firms, when appropriate). Perhaps most importantly, this approach has the advantage of corresponding with actual bank behavior. Because firms typically en-

gage in one merger at a time, the concern to banks and their regulators at any given point in time is the desirability of a particular pairwise combination.

The third alternative in examining portfolios is to analyze efficient portfolios of banks and several nonbank industries. As discussed above, the term *efficient portfolio* refers to one whose combinations produce the most return for any given level of return variability (or, equivalently, the least return variability for any given return). These portfolios may contain firms operating in only two industries (or in some cases a single industry). However, as Litan found, some efficient portfolios are likely to contain multiple industries. Examining portfolios of unique service products is advantageous because it is the approach that banks should take from a portfolio risk and return perspective. Thus, basing public policy solely on the risk effects of pairwise mergers may impose significant social costs if it results in policies that prevent the formation of efficient portfolios of bank and nonbank firms.

Timing of Aggregation to Industry Level. The various studies take two approaches to the aggregation of firm data into industry statistics. Some studies combine individual firms into a single industry before conducting any analysis, and others calculate the mean and variability of returns for individual firms (and across pairs of firms) and then aggregate the figures across all firms in the industry (or in the pair of industries). The major disadvantage of the first approach is that individual firms enter into mergers with specific firms, not with broad industries. On the other hand, industry aggregate figures may be a better proxy for the expected future distribution of returns to the extent that two conditions hold—that is, if within-industry differences primarily arise from regional economic conditions and if firms within the industry are combining across regions. Another advantage of using industry aggregates is that spurious results in the formation of portfolios may be less likely. An efficient portfolio is formed by looking at an individual entity's "assets" to determine the combinations that produce an efficient set of portfolios. These assets may be defined as entire industries or as individual firms within industries. Obviously, the number of separate assets for inclusion in an efficient portfolio will increase dramatically if individual firm returns are used rather than industry returns. In general, an increase in the number of assets is likely to increase the chances of identifying lower-risk portfolios. Thus, Boyd, Graham, and Hewitt argue that random chance favors the possibility that a risk-reducing portfolio will be found using individual firm data even if there is not a real opportunity for diversification to reduce risk.

Use of Market or Accounting Data. Banks' and nonbank firms' returns may be measured using accounting or financial market data. The drawback to using accounting data is that they are not perfectly correlated with economic returns. Firms often try to smooth accounting data through time, producing reported returns that are deliberately low in the good years and high in the bad years. If firms across different industries have unequal ability to smooth their accounting earnings, then accounting-based risk measures may not provide accurate interindustry comparisons of risk. Using accounting data has some appeal, however. First, market data is typically available only for the largest firms in an industry, so it clearly is more limited than accounting data. In addition, regulators rely heavily on accounting figures in their evaluation of a bank's financial condition.

Studies that rely on accounting data use two sources of information: accounting data from the individual firm's public financial statements prepared according to generally accepted accounting principles (GAAP) and accounting data published by the Internal Revenue Service for all firms in an industry prepared according to IRS accounting rules. Each data set has its advantages. GAAP rules are intended to fairly present a firm's performance over time, whereas IRS rules also reflect a number of public policy decisions. For example, to encourage banks to hold state and local government obligations, IRS rules allowed banks to understate their income by excluding the interest from holding these obligations.⁸ Another advantage of using GAAP data is that they are available at the individual firm level, and IRS data are available only for an entire industry. On the other hand, IRS data reflect a broad cross-section of firms in an industry while public financial statements are only available for the largest firms.

Overall Evaluation of Prior Studies. As the above discussion suggests, there appears to be no single "correct" methodology. Each has advantages and disadvantages. Ideally, the different approaches would produce consistent results confirming that individual findings were not the result of a unique methodology. The majority of the studies do in fact seem to reach a consensus: pairwise combinations of banks and nonbanks seldom significantly reduce banking organizations' risk exposure. The best opportunity for diversification gains appears to be bank mergers with firms engaged in some aspect of the insurance industry.

The strongest challenge to the emerging consensus in the literature comes from Litan's analysis of efficient portfolios of multiple industries, in which he finds significant gains from combining banks with a number of

other industries. Moreover, Litan's findings that there may be more diversification benefits is consistent with portfolio theory, which suggests that combinations of multiple assets may be more efficient than any single asset or unique pair of two assets. Thus, his results should not be easily dismissed.

New Research

The study reported on here provides a bridge between Litan's findings and those of other studies in two important respects. First, this analysis is the first to analyze both pairwise combinations and efficient portfolio formation using the same data set and time period. Doing so makes it possible to evaluate the implications of the two methodologies. Second, this discussion updates Litan's IRS data set. His data set ends in 1981 while that of the present study extends to 1989. This timeframe allows comparison of the portfolio gains of bank entry into nonbanking activities in the period after deregulation and with gains prior to deregulation. In addition, the use of IRS data permits a comparison with Litan. However, there are at least three limitations to the work: First, there are the limitations inherent in using IRS accounting data rather than market data or GAAP accounting figures, described above. Further, the IRS data are aggregated to the industry level before the analysis. Finally, the coefficient of variation of return is analyzed but not the risk of failure because the IRS data do not provide information on equity capital.

Data Source and Methodology

The data used in this study were taken from the Internal Revenue Service publication *Corporate Income Tax Returns* for the major sector entitled "Finance, Insurance, and Real Estate" (Major Group 60) for selected years from 1971 to 1989. Although the publication contains a number of data series for different industries, only two variables were consistently available over the entire data period: total assets and net income. The publication reports data in two columns, one labeled "Net Income" and the other "Deficit." The column for net income shows total net income, as previously defined, for corporations reporting positive earnings for the year. The deficit column lists total losses incurred by corporations reporting losses for the

Containing Risks

Suppose that banks are given authority to enter currently impermissible activities and one of these new nonbank affiliates experienced severe financial problems. Could the problems in a nonbank affiliate be contained so that they do not generate substantial social costs? If the answer is positive, then advocates of deregulation would argue that risk considerations should not limit bank holding company expansion into nonbank activities; bank holding companies should be allowed to expand regardless of whether the new activities will increase or reduce risk.

The primary social costs of a banking organization's failure are its potential for creating systemic risk and the cost to the FDIC and the Fed (through its discount window) of protecting the banks' creditors. Systemic risk arises if the failure of one or more banks impairs the operation of the financial system to such a degree that the real (nonfinancial) economy is adversely affected to a significant degree. The failure of individual institutions may propagate through the banking system in a variety of ways, such as contagious bank runs, credit losses on interbank liabilities that cause other banks to become insolvent, and the failure of major payments networks to settle.

The solution to systemic risk situations since the 1930s has been for the government to provide a safety net for commercial banks: the Federal Reserve provides liquidity to problem institutions through the discount window while the FDIC absorbs losses as a result of having provided deposit insurance. The combined actions of the Fed and the FDIC apparently have prevented bank failures from generating systemic risk. However, this solution has in effect socialized bank losses, which in turn creates two social costs. First, in this framework the government has a direct financial stake in preventing banks from becoming highly insolvent and then failing. The economic and political costs of a bailout can be high. Second, FDIC coverage of losses means that private owners keep all the gains if their gamble is successful, but the government shares in the losses if a bank fails. As noted in the box on page 4, most banks have good reasons for not taking excessive risk to exploit the government safety net. However, the thrift debacle has shown that it only takes a few institutions implementing high-risk policies to create enormous deposit insurance losses.

This box begins with a review of the issues associated with containing the riskiness of nonbank activities in the period preceding the FDIC Improvement Act of 1991 (FDICIA). An understanding of the issues during that time is important in part because most discussions of this topic were written prior to FDICIA. Moreover, virtually all empirical studies of risk associated with deregulation rely on pre-FDICIA data, and having a clear picture of the pre-FDICIA rules is valuable in interpreting these studies' results. The box continues with a review of the changes put in place by FDICIA. These new rules may significantly reduce

the potential social costs associated with the failure of a nonbank affiliate.¹

Pre-FDICIA Rules

The failure of a nonbank subsidiary could pose both a direct and an indirect threat to its bank holding company bank affiliates.² The most direct threat to the bank affiliates would occur if the creditors of the nonbank affiliate could "pierce the corporate veil" and usurp bank resources to satisfy their claims on the nonbank affiliate.³ However, most analysts have suggested that this threat is remote provided that the bank holding company and its affiliates followed correct legal operating procedures.

Another direct threat to the bank affiliates was that the bank holding company's management would divert bank resources to prevent the failure of a nonbank affiliate. Bank holding company management might seek to prevent the failure of a nonbank affiliate to preserve its organization's credibility in the financial markets. If a bank holding company were to abandon a failing subsidiary, its remaining affiliates would experience a higher cost of funds and reduced market clout.

Regulators could use a number of tools to prevent bank holding companies from withdrawing excessive funds from their bank affiliates. The dividend payments of most banks were limited, with a common restriction being that a bank might not pay more than its current year's earnings plus the sum of the previous two years' additions to retained earnings without prior regulatory approval. Section 23A of the Federal Reserve Act limited the diversion of funds through the mispricing of interaffiliate transactions by requiring that all interaffiliate transactions occur at "arms' length" prices. The regulators could also use capital adequacy standards to prevent banks from reducing their capital to unsafe levels. Finally, the regulators had the general power to order banks to cease any banking practice deemed unsafe or unsound.

The methods by which nonbank affiliates might directly threaten the bank holding company were therefore controlled. However, nonbank problems could pose indirect threats harder to block. For example, the bank holding company may order its bank affiliates to invest in high-return/high-risk assets in an attempt to boost earnings and thereby increase dividends. If the bank regulators perceived such an action by the bank holding company a number of supervisory tools were available to prevent the bank affiliates from becoming riskier.

Another indirect way in which the banking affiliates could be threatened by a nonbank affiliate's problems lies in the fact that bank depositors who confuse the identity of the bank and nonbank affiliates may demand withdrawal of their funds upon hearing of the problem. Further, even more sophisticated depositors may withdraw funds if they interpret the problems in the nonbank affiliate as a measure of the

quality of the banking affiliates' management. The Federal Reserve could prevent a run on a solvent bank from creating a systemic risk situation by lending to all affected banks through the discount window.

Thus, in pre-FDICIA days banks were substantially but not totally isolated from their nonbank affiliates. The regulators could slow the withdrawal of bank capital and prevent obvious attempts to exploit the bank affiliates in order to save nonbank operations. However, they could not guarantee that a determined and ingenious bank holding company management would not exploit the bank nor could they prevent nonbank affiliate problems from causing a run at their bank affiliates.

Post-FDICIA

FDICIA contains a number of provisions to limit the government's deposit insurance exposure.⁴ Probably the two most important provisions are those for prompt corrective action (PCA) and for least costly resolution. The PCA provision instructs regulators to manage problem-bank situations in a manner that minimizes the cost to the FDIC. The least costly resolution provisions generally require that failed banks be resolved in the least costly manner to the FDIC. As a practical matter, the latter is intended to tightly limit the number of cases in which the FDIC has to protect uninsured depositors and other creditors from losses.

The PCA provision specifies five levels of capital adequacy, with regulatory restrictions increasing as a bank's capital level drops. The intent of these guidelines is to discourage banks from taking excessive risks and to address problems before they threaten a bank's viability. However, if a bank's viability is seriously jeopardized, PCA provides for early bank closure before the bank's accounting net worth is depleted.

In the study that laid the basis for PCA, Benston and George G. Kaufman (1988) presented a proposal designed to eliminate totally the risk of loss to the FDIC. Under their plan banks that would be classified under PCA as well capitalized would be allowed to engage in currently impermissible activities without exposing the FDIC to significant risk. Although Congress adopted most of the Benston and Kaufman plan in FDICIA, legislators did not adopt their recommendation that banks be provided increased benefits or incentives that would encourage them to seek "well-capitalized" status.

The restrictions providing for least costly resolution are important because they encourage market discipline on the part of bank creditors. Least costly resolution reduces the regulator's discretion in providing de facto deposit insurance coverage, thereby encouraging large depositors to evaluate their banks more carefully before making a deposit and providing strong incentives to withdraw funds before their bank fails. The policy of least costly resolution may reinforce the early-closure provisions of PCA and help force the closure of failing banks before they can create substantial FDIC losses.

A possible concern regarding least costly resolution is that the policy may actually encourage deposit runs at banks whose nonbank affiliates are having financial problems. The threat of these runs may be beneficial before a bank makes its investment decision in that it could discourage the bank holding company from following high-risk policies with its nonbank affiliates. However, once a nonbank affiliate has encountered problems, regulators may need to take action to prevent a bank run from becoming a systemic crisis. Although FDICIA imposes some limitations on the Fed's ability to lend to banks, the Fed still has the power to lend to viable banks and can do so as needed to prevent problems at a nonbank affiliate from turning into a systemic crisis.

Conclusion

Before FDICIA a number of limitations were placed on banking organizations to protect bank affiliates from nonbanking problems. These limitations were unlikely to provide total protection but could be expected to slow the spread of the problem. By enhancing the regulators' ability to aggressively address problems in the banking subsidiaries and by increasing market discipline, FDICIA may substantially reduce the implicit value of the subsidy provided by deposit insurance to high-risk banking organizations. The reduction in the deposit insurance subsidy should discourage banking organizations from taking excessive risks through nonbank affiliates and hence reduce the probability that the problems of the nonbank affiliates will generate significant losses to the FDIC. The combination of the pre-FDICIA rules plus FDICIA itself should significantly reduce the risks to banks and the FDIC from nonbank activities. It is important to keep in mind, however, that regulation that is strict enough to eliminate risk totally may significantly limit the very synergies financial firms seek in combining bank and nonbank activities.

Notes

1. The analysis in this section presumes that systemic risk problems would arise only if a nonbank subsidiary created problems for its bank affiliates. If the failure of the nonbank subsidiary could generate systemic risk, then that problem would deserve separate analysis. However, if the failure of a nonbank subsidiary could cause a systemic problem, then the failure of another large but independent firm in the same industry may also give rise to systemic risk, and an analysis of the entire industry would be justified.
2. See Wall (1984) for a more detailed discussion of the pre-FDICIA environment.
3. The creditors of one corporation ordinarily lack the power to take the assets of another corporation to satisfy the creditors' claims, even if the two corporations are affiliated. However, under certain circumstances the courts will let creditors "pierce the veil" and take assets from affiliated corporations.
4. See Carnell (1992), Pike and Thomson (1992), Todd (1992), and Wall (1993).

year. To provide a comprehensive picture of industry performance, this study calculated aggregate industry profits for the year by subtracting the deficit figure from the net income figure. The appendix identifies the types of firms that make up the various industries. A portfolio optimization software package entitled "Asset Allocation Package" (Release 1.1), written by Steve Gladin and Robert Radcliffe, was used to estimate efficient bank and nonbank portfolios. Although the program can calculate efficient frontiers for as many as fifty securities or asset classes, the presence of highly correlated returns in the IRS data limited the number of asset classes to approximately twelve.

Returns, Volatility, and Correlations with Bank Holding Companies

The IRS divides the broad category of finance, insurance, and real estate into several industry groups, which are further broken down into narrower industries. Each of the broad industry groups is presented in Table 1 with their respective mean returns on assets, coefficient of variation of return on assets (volatility), and the correlation of return on assets between each industry and the bank holding company industry category. The results are further broken down into the prederegulation period, from 1974 to 1980, and the deregulation period, from 1981 to 1989.

The broad category of banking (which includes bank holding companies, mutual savings banks, and other banks) has one of the lowest returns on assets of the seven industry groups in both subperiods (0.29 and 0.24, respectively). If it is assumed that banks typically maintained a 5 percent equity capital-to-assets ratio during this period, then banking would be yielding only a 5 percent to 6 percent return on equity to its shareholders over the two subperiods.⁹ On the other hand, the industry has one of the lowest coefficients of variation of return on assets despite its low return on assets indicating minimal variability in returns. However, the insurance agents, brokers, and service industry and the holding and other investment companies industries both showed higher returns on assets and lower coefficients of variation during the 1981-89 subperiod.

Given that bank holding companies are a major component of the broad banking industry category, it is not surprising that the banking industry is the industry category most highly correlated with these institutions. Two industries have significant negative correlations with banking during the 1981-89 period: (1) securities,

and commodity brokers and services, and (2) holding and other investment companies.¹⁰

Analyzing the stability of the various risk and return measures over the two subperiods suggests that banking became riskier in the second subperiod, but so did most of the other industries. Although the relative rankings in the different categories are generally stable over time, some significant changes did occur. Perhaps the most notable are in the correlations with bank holding companies, where some correlations changed signs across the two subperiods (but never from being significant with one sign to being significant with the opposite sign).

The mean return on assets, coefficient of variation of return on assets, and correlation of returns on assets with bank holding companies for the narrow industry definitions are presented in Table 2 for the subperiod from 1974 to 1980. The narrow bank holding company category, like the broad banking category, has a low return on assets and a low variability of returns. Assuming a 5 percent equity-to-asset ratio, bank holding companies earned a return on equity of less than 5.5 percent. To the extent that IRS income accurately measures economic returns, this rate of return to bank holding company owners is clearly inadequate.

Seven industries seem to have presented good diversification opportunities with bank holding companies between 1974 and 1980 in that they have both higher returns on assets and lower coefficients of variation: other banks, business credit institutions, life insurance, insurance agents and brokers, lessors of mining and oil properties, regulated investment companies, and other holding and investment companies. Furthermore, a number of these industries reported earnings that were negatively correlated with banking.

Table 3 presents similar statistics for the 1981-89 subperiod. Bank holding companies' return on assets dropped and their coefficients of variation increased, but in both cases their ranking improved. Only regulated investment companies and other holding and investment companies had both a better average return on assets and lower coefficient of variation during this subperiod. However, eight industries had negative correlations (not all of which are statistically significant) with bank holding companies, raising the possibility that bank holding company diversification into these industries could result in a lower variability of returns.

Only three of the industries improved their returns on assets during the 1981-89 subperiod: condominium management and co-ops, regulated investment companies, and real estate investment trusts. Similarly, only three industries reduced their coefficients of variation of return on assets in the latter subperiod: commodity

brokers/dealers, regulated investment companies, and real estate investment trusts. The rankings of mean return on assets and return on assets variability in the later subperiod are positively correlated with those in the first subperiod, but some significant shifts occurred. The signs of the bank holding company industry correlations with other industries tend to be consistent over time but changed in a few industries.

There are only two clear patterns across both subperiods: In the broad category of other holding and investment companies, performance of the various industries improved relative to all other industries, and returns to industries in that category became less correlated with banking. One may speculate that these changes resulted less directly from deregulation in these industries than from banks' continuing inability to make a substantial entry into other industries. While the financial sector was moving from deposit-based to securitized financing, banks were unable to follow their customers adequately.

Pairwise Portfolio Formation

The analysis presented above of individual industry returns and their correlation with bank holding companies suggests potentially beneficial combinations. However, the more definitive way to analyze potential pairwise combinations is to examine actual hypothetical combinations, as in Table 4. The approach follows that of Boyd, Graham, and Hewitt in examining combinations of bank holding companies and one other industry using assets from the two industries in combination in various percentages.

Evaluating the results in Table 4 requires a standard for judging the extent to which bank holding companies should be allowed to diversify into other activities. One of several standards that seem reasonable is that bank holding companies should be allowed to diversify to the extent that doing so minimizes their risk as measured by the coefficient of variation in return on assets.

Table 1
Industry Volatility and Correlation Analysis^a

Industry	Period	Mean ROA		Volatility		Corr. w/BHCs	
		Value (%)	Rank ^b	Value (%)	Rank ^c	Value	Rank ^d
Banking (Broad category)	(a) 1974-80	.29	7	25.2	2	.87*	6
	(b) 1981-89	.24	5	65.3	3	.96*	7
Credit Agencies (Other than banks)	(a) 1974-80	.35	6	89.2	7	.27	2
	(b) 1981-89	-.40	7	163.7	6	.68*	6
Insurance (Broad category)	(a) 1974-80	1.48	4	36.6	3	.85*	5
	(b) 1981-89	.61	3	78.6	5	.66	5
Insurance Agents, Brokers, Service	(a) 1974-80	7.15	1	21.8	1	.76*	4
	(b) 1981-89	3.74	2	54.5	2	.63	4
Real Estate (Broad category)	(a) 1974-80	1.61	3	63.3	6	.94*	7
	(b) 1981-89	.20	6	237.5	6	-.43	3
Security, Commodity Brokers and Services	(a) 1974-80	1.29	5	52.1	5	-.23	1
	(b) 1981-89	.59	4	69.3	4	-.70*	2
Holding and Other Investment Companies	(a) 1974-80	4.66	2	37.6	4	.60	3
	(b) 1981-89	6.40	1	19.2	1	-.90*	1

^a Higher-ranking activities indicate a more desirable merger partner for bank holding companies.

^b Industries with higher ROAs receive a higher ranking.

^c Industries with lower earnings volatility are ranked higher.

^d Industries with large negative correlations with bank holding companies are ranked higher.

* Indicates that the correlation coefficient is statistically significant at the 5 percent level or better.

Table 2
Banking Industry Volatility and Correlation Analysis for 1974-80

Industry	Mean ROA		Volatility		Corr. w/BHCs	
	Value (%)	Rank	Value (%)	Rank	Value	Rank
Bank Holding Companies	.27	19	30.6	8	1.00*	23
Mutual Savings Banks	.20	21	131.4	19	.16	7
Other Banks (Not MSBs or BHCs)	.34	17	22.3	3	.62	14
Savings and Loans	.26	20	116.0	17	.23	8
Personal Credit Institution	1.34	12	58.9	13	.23	9
Business Credit Institution	1.47	11	29.3	7	.69	15
Other Credit Agencies	.29	18	100.6	15	.47	11
Life Insurance	1.56	10	12.5	1	.52	13
Mutual Insurance (except life)	1.29	13	144.0	20	.76*	17
Other Insurance	1.21	14	126.0	18	.83*	20
Insurance Agents, Brokers, Service	7.51	2	21.8	2	.76*	18
Real Estate Operators and Lessors of Buildings	1.85	6	34.2	10	-.94*	1
Lessors of Mining, Oil Properties	10.93	1	26.4	5	-.20	4
Lessors of Railroad Properties	1.67	8	31.7	9	-.16	5
Condominium Management and Co-ops	-1.67	23	48.5	11	-.45	3
Subdividers and Developers	.90	16	220.2	22	.96*	22
Other Real Estate	1.79	7	109.0	16	.71	16
Security Brokers, Dealers	1.20	15	58.9	12	-.08	6
Commodity Brokers/Dealers	2.27	5	92.4	14	-.54	2
Regulated Investment Companies	5.90	3	28.1	6	.51	12
Real Estate Investment Trusts	-.28	22	799.0	23	.43	10
Small Business Investment	1.61	9	170.3	21	.84*	21
Other Holding and Investment Companies	3.71	4	25.4	4	.81*	19

*Indicates that the correlation coefficient is statistically significant at the 5 percent level or better.

Table 3
Banking Industry Volatility and Correlation Analysis for 1981-89

Industry	Mean ROA		Volatility		Corr. w/BHCs	
	Value (%)	Rank	Value (%)	Rank	Value	Rank
Bank Holding Companies	.26	15	34.4	3	1.00*	23
Mutual Savings Banks	.05	17	1,884.1	23	.79*	19
Other Banks (Not MSBs or BHCs)	.27	14	79.2	10	.95*	22
Savings and Loans	-.60	22	128.8	15	.56	15
Personal Credit Institution	.84	9	104.5	14	.38	11
Business Credit Institution	-.04	18	1,248.9	21	.48	13
Other Credit Agencies	.22	16	200.5	17	.91*	21
Life Insurance	.60	11	83.0	11	.31	10
Mutual Insurance (except life)	.39	13	340.1	18	.60	16
Other Insurance	.62	10	155.2	16	.66	18
Insurance Agents, Brokers, Service	3.73	3	54.5	8	.63	17
Real Estate Operators and Lessors of Buildings	1.10	8	64.0	9	-.86*	2
Lessors of Mining, Oil Properties	8.32	1	48.5	5	-.65	4
Lessors of Railroad Properties	1.53	7	53.8	7	-.30	6
Condominium Management and Co-ops	-1.22	23	98.7	13	.55	14
Subdividers and Developers	-.28	21	406.3	19	.84*	20
Other Real Estate	-.09	19	903.5	20	.41	12
Security Brokers, Dealers	.52	12	84.2	12	-.71*	3
Commodity Brokers/Dealers	1.78	5	51.6	6	.12	9
Regulated Investment Companies	7.63	2	22.6	1	-.93*	1
Real Estate Investment Trusts	3.34	4	41.2	4	-.22	7
Small Business Investment	-.10	20	1,687.4	22	-.33	5
Other Holding and Investment Companies	1.63	6	31.9	2	-.04	8

*Indicates that the correlation coefficient is statistically significant at the 5 percent level or better.

Table 4
Impact of Diversification on Bank ROA
Pairwise Portfolios, 1981-89
(Percent of Diversification)

Industry Combination (BHCs combined with)	5 Percent		10 Percent		25 Percent		50 Percent		75 Percent		90 Percent	
	Average ROA	Coefficient of Variation										
Banking												
Mutual Savings Banks	.25	51.5	.24	71.7	.20	147.7	.16	344.6	.11	736.1	.07	1,233.1
Independent Banks	.26	36.4	.26	38.6	.26	45.1	.26	56.4	.26	67.8	.27	74.7
Credit Agencies												
Savings and Loans	.22	51.0	.17	79.2	.04	503.3	-.17	245.3	-.38	154.2	-.51	145.2
Personal Credit Institutions	.29	37.9	.32	44.1	.41	62.5	.55	83.3	.70	96.0	.79	101.5
Business Credit Institutions	.24	40.1	.23	48.0	.19	85.9	.11	230.1	.04	965.7	-.007	5,699.2
Other Credit Agencies	.26	40.0	.26	47.6	.25	108.9	.24	108.9	.23	152.6	.22	180.8
Insurance												
Life Insurance	.28	34.5	.30	36.3	.34	46.0	.43	61.9	.52	74.0	.56	79.7
Mutual Insurance (except life)	.27	50.7	.27	69.9	.29	127.5	.32	211.6	.35	281.4	.37	317.8
Other Insurance	.28	44.0	.30	54.5	.35	82.8	.44	116.5	.53	139.1	.58	149.3
Insurance Agents, Brokers, Service	.43	38.9	.61	43.1	1.13	49.0	2.00	52.4	2.87	53.7	3.39	54.2
Real Estate												
Real Estate Operators and Lessors of Buildings	.30	19.1	.34	11.8	.47	26.0	.67	46.1	.88	57.1	1.01	61.6
Lessors of Mining, Oil Properties	.66	24.1	1.06	33.4	2.27	42.5	4.30	46.3	6.30	47.8	7.52	48.2
Lessors of Railroad Properties	.32	25.5	.39	24.9	.58	34.0	.90	44.8	1.21	50.4	1.40	52.7
Condominium Management and Co-ops	.18	69.1	.11	159.5	-.11	309.7	-.48	130.6	-.85	107.7	-1.08	101.6
Subdividers and Developers	.23	58.0	.21	89.5	.13	267.9	-.01	7,812.1	-.14	606.3	-.22	457.3
Other Real Estate	.24	44.0	.23	58.9	.17	132.6	.09	470.1	.00	9,999.0	-.05	1,367.7

likely stem from three methodological differences: (1) the use of IRS accounting data aggregated to the industry data rather than the firm-specific GAAP accounting and market value data that Boyd, Graham, and Hewitt use, (2) use of the coefficient of variation of return on assets rather than the risk-of-failure measure, and (3) differences in the sample periods. However, the results focus attention on a question that Boyd, Graham, and Hewitt do not fully address: What standard should be applied to judge the value of potential diversification? The question is an important one because each standard has different implications. The risk-minimizing standard is far more restrictive, for example, than one that would allow banks into any activity that is not riskier than activities currently permitted.

Efficient Portfolios of Activities

While studying pairwise combinations offers some interesting insights into the potential portfolio effects of bank holding company diversification, this analysis is not able to determine which portfolios of multiple activities are most efficient—that is, which portfolios offer the highest return for the lowest standard deviation of return on assets. For example, the pairwise analysis may suggest that a bank holding company's investment in certain industries would reduce returns and increase risk. However, when multiple industries are combined into efficient portfolios, those same industries may enter into at least some of the portfolios.

Given the limitations imposed by multicollinearity in the data set, the efficient portfolio analysis focuses on two sets of firms. The first is the set of conventional credit-granting industries that bank holding companies can currently enter without limitation: mutual savings banks, savings and loans, personal credit institutions, and business credit institutions.¹⁶ The second includes industries that at least some commercial banks have frequently taken a strong interest in entering: securities brokers and dealers; commodity brokers and dealers; life insurance; insurance agents, brokers, and servicers; regulated investment companies; real estate operators and lessors of buildings; and real estate subdividers and developers.¹⁷

Table 5 presents the results of forming portfolios of these traditional credit-granting intermediaries over the 1974-80 subperiod. The first efficient portfolio is formed at the mean bank holding company return on assets for the period, .27. Thereafter, the portfolios begin with a return on assets of .3 and increase incremen-

tally by .1. Bank holding companies dominate the portfolios with the lowest standard deviations but decline in importance as the means and standard deviations of return on assets increase. Mutual savings banks enter into only the lowest risk portfolio while savings and loans do not enter any of the efficient portfolios. Business credit dominates at higher return levels, with the share of personal credit institutions also increasing. Although the standard deviations of return increase uniformly with the mean (as expected in a set of efficient portfolios), the coefficients of variation of return are remarkably stable at around 25 percent. Thus, the coefficients of variation for these portfolios is consistently below that of bank holding companies by themselves. This result could be interpreted as suggesting that there should have been no limits on these activities during the 1974-80 subperiod.

Table 5 also presents the efficient portfolios of traditional credit-granting industries for the 1981-89 subperiod. In contrast to the earlier subperiod, only bank holding companies and personal credit institutions enter the efficient portfolio in this later period. Furthermore, the coefficient of variation in return on assets consistently increases as the share devoted to nonbank holding company industries increases. The implication is that any significant diversification out of the bank holding company industry will increase the portfolio's riskiness. In answer to those who believe that bank holding companies should not be allowed to expand into any activity that increases risk, these results argue that bank holding companies should not have been allowed to invest in any of these traditional credit-granting activities during the 1981-89 period.

The portfolios of activities that bank holding companies would like to enter is presented in Table 6. For the first subperiod, 1974-80, more than 80 percent of the assets are devoted to bank holding companies for the two portfolios that have a return on assets standard deviation of 0.06, which is lower than the standard deviation for bank holding companies by themselves. The efficient portfolio with the same standard deviation of return as bank holding companies, 0.08, places only 46 percent of its assets in bank holding companies. Furthermore, bank holding companies' share of the assets in the efficient portfolio drops to zero when the portfolio standard deviation reaches 0.14. Note also that all of the efficient portfolios have a substantially lower coefficient of variation than the bank holding companies by themselves. Life insurance becomes a dominant part of the portfolio at intermediate return values. Insurance agents dominate the portfolio at higher levels of return.¹⁸ Only two industries never appear in the first sub-

period's efficient portfolio: real estate operators, and real estate subdividers and developers.

The bank holding company's efficient portfolios and the activities they would like to enter for the 1981-89 subperiod are also presented in Table 6. Once again, bank holding companies are the dominant portion of portfolios that have a lower standard deviation than bank holding companies by themselves (that is, less than 0.09 percent). However, as the portfolio return and standard deviation increase, banks' share of the portfolio falls dramatically. The efficient portfolio for a standard deviation of 0.09, which equals the bank holding companies standard deviation for this period, places only 54 percent of its assets in bank holding companies. The three main nonbank holding company activities in the portfolio are life insurance, regulated investment companies, and real estate subdividers and developers. The only industry that never enters the efficient portfolio is securities brokers and dealers. All efficient portfolios are less risky than banking as measured by the coefficient of variation of return on assets.

Because the real estate subdividers and developers industry is the only one to report a negative average return on assets during this period, it is interesting that the industry is included in the efficient portfolios during the second subperiod. The negative return on assets suggests that the industry could only be included in the efficient portfolio if it produced offsetting reductions in risk via a negative correlation with other elements of the portfolio. This conjecture is supported by an examination of the (unreported) correlation matrix, which shows a -0.88 correlation between real estate subdividers and developers and regulated investment companies.¹⁹ The inclusion of real estate subdividers and developers in the efficient portfolio indicates the benefit of considering a wide variety of assets in forming efficient asset portfolios.²⁰

One important point that emerges from comparing the 1974-80 tables with the 1981-89 tables is that the results depend in part on the time period and industry changes that may occur. For example, life insurance was a dominant part of the low-risk portfolio in the 1974-80 period, but it became much less important in the low-risk portfolio for 1981-89 subperiod. While the historical data used in this study provides some insight into the relative returns and risks of different types of portfolios, one cannot definitely say which portfolios will perform the best during the 1990s because no one knows exactly how the various financial services industries will perform.

Overall, analyzing efficient portfolios of bank holding companies plus selected nonbanking activities sug-

gests that in the two periods studied, nontraditional activities would have provided better diversification than traditional credit-granting industries. The traditional activities apparently added very little to bank performance during the later subperiod, whereas the restricted activities—those that banks want to expand into—would have generated substantially improved portfolio performance.

Efficient Portfolios Using Bank Holding Company Regulatory Returns

A potential criticism of the above results is that bank holding companies' average return on assets using IRS data is unreasonably low, with an average return on assets between 1981 and 1989 of only 0.26. The low return on assets may reflect parts of the tax code that allow taxable earnings to be significantly less than GAAP earnings. For example, excluding the interest on state and local government obligations reduced the return on assets of bank holding companies reporting to the Fed by somewhere between 0.20 and 0.36 percentage points between 1981 and 1989.

As a check on the findings based on IRS data, the efficient portfolios for the 1981-89 subperiod were recalculated, replacing the IRS's reported average return on assets with the average pretax return on assets for all consolidated bank holding companies filing with the Federal Reserve System in the relevant year. Previous casual inspection of Federal Reserve and GAAP figures suggests that the two sources generally report similar after-tax net income and total assets. Unfortunately, no similarly comprehensive measure was available for the other industries in our sample. Hence, it was necessary to continue using IRS data for these industries although GAAP accounting returns for these industries are likely to differ somewhat from IRS accounting returns. If other industries also receive special tax breaks their IRS reported net income may also be less than their accounting net income, and the use of IRS data for every industry except bank holding companies may bias these results in favor of including a larger proportion of bank holding companies in the efficient portfolios.

The use of figures reported by the Federal Reserve produced a higher average return on assets of 0.72 for the 1981-89 subperiod. However, the standard deviation of returns also increased, leaving the coefficient of variation of return on assets essentially unchanged at 36 percent. One surprise is that the correlation between

Table 5
Efficient Portfolios
Traditional Bank-like Activities

1974-80													
Efficient Risk and Return Combinations													
Mean ROA (%)	0.27	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40
Standard Deviation ROA (%)	0.08	0.08	0.10	0.13	0.15	0.17	0.20	0.22	0.25	0.27	0.30	0.32	0.35
Coefficient of Variation ROA (%)	29.63	26.66	25.00	26.00	25.00	24.29	25.00	24.44	25.00	24.55	25.00	24.62	25.00
Associated Portfolio Allocations													
Bank Holding Companies	95.44	97.34	88.79	80.24	71.69	63.14	54.59	46.04	37.49	28.94	20.39	11.84	3.29
Mutual Savings Banks	4.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Savings and Loans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Personal Credit Institutions	0.00	1.46	3.46	5.46	7.46	9.46	11.46	13.46	15.46	17.46	19.46	21.45	23.45
Business Credit Institutions	0.00	1.20	7.75	14.30	20.85	27.40	33.95	40.50	47.05	53.60	60.15	66.70	73.25
1981-89													
Efficient Risk and Return Combinations													
Mean ROA (%)			0.26	0.30	0.40	0.50	0.60	0.70	0.80				
Standard Deviation ROA (%)			0.09	0.12	0.25	0.39	0.54	0.68	0.83				
Coefficient of Variation ROA (%)			34.62	40.00	62.50	78.00	90.00	97.14	103.75				
Associated Portfolio Allocations													
Bank Holding Companies			100.00	93.10	75.86	58.62	41.38	24.14	6.90				
Mutual Savings Banks			0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Savings and Loans			0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Personal Credit Institutions			0.00	6.90	24.14	41.38	58.62	75.86	93.10				
Business Credit Institutions			0.00	0.00	0.00	0.00	0.00	0.00	0.00				

Note: An infinite number of efficient portfolios exist with different levels of return and risk (mean returns and standard deviations). In Tables 5, 6, and 7 each column represents a different efficient portfolio. The portfolios were selected by first specifying a desired rate of return. The computer program then identified combinations of assets that minimized the risk for that level of return. The risk (standard deviation) and resulting coefficient of variation were then calculated. For example, in the 1974-80 period the third column presents the results when the program was asked to calculate the efficient portfolio with a return of 0.40. The efficient portfolio for a return of 0.40 invests 88.79 percent of its assets in bank holding companies, 3.46 percent of its portfolios in personal credit institutions, 7.75 percent in business credit associations, and makes no investment in mutual savings banks or savings and loans. The standard deviation associated with this minimum risk portfolio is 0.10 percent. The coefficient of variation given these return and standard deviation values is 25 percent.

Table 6
Efficient Portfolios
Nontraditional Activities IRS Bank Holding Company Returns

1974-80

Efficient Risk and Return Combinations

Mean ROA (%)	0.47	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00
Standard Deviation ROA (%)	0.06	0.06	0.08	0.09	0.14	0.25	0.36	0.48	0.59	0.71	0.83	0.95	1.07	1.23	1.45
Coefficient of Variation ROA (%)	12.77	12.00	8.00	6.00	7.00	10.00	12.00	13.71	14.75	15.78	16.60	17.27	17.83	18.92	20.71

Associated Portfolio Allocations

Bank Holding Companies	84.67	82.66	46.23	13.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Security Brokers/Dealers	2.48	2.73	6.75	9.68	8.25	7.17	6.08	5.00	3.91	2.83	1.74	0.66	0.00	0.00	0.00
Commodity Broker/Dealers	2.23	2.27	2.88	3.39	4.57	6.50	8.43	10.36	12.30	14.23	16.16	18.09	18.14	7.52	0.00
Life Insurance	10.62	12.34	43.21	70.44	77.90	68.01	58.12	48.23	38.34	28.45	18.56	8.68	0.00	0.00	0.00
Ins. Agents, Brokers, Serv.	0.00	0.00	0.00	0.00	2.76	9.95	17.15	24.35	31.54	38.74	45.94	53.14	60.69	69.85	88.00
Regulated Investment Co.	0.00	0.00	0.93	2.90	6.53	8.37	10.21	12.06	13.90	15.75	17.59	19.44	21.17	22.63	12.00
Real Estate Operators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subdividers and Developers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1981-89

Efficient Risk and Return Combinations

Mean ROA (%)	0.54	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
Standard Deviation ROA (%)	0.03	0.05	0.09	0.13	0.18	0.23	0.31	0.40	0.50	0.61	0.73	0.88	1.04	1.30	1.63
Coefficient of Variation ROA (%)	5.56	5.00	6.00	6.50	7.20	7.67	8.86	10.00	11.11	12.20	13.27	14.67	16.00	18.59	21.73

Associated Portfolio Allocations

Bank Holding Companies	93.34	76.66	54.26	31.86	9.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Security Brokers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commodity Broker/Dealers	0.00	0.99	1.71	2.42	3.14	6.74	12.45	18.16	23.86	25.97	16.07	6.17	0.00	0.00	0.00
Life Insurance	0.00	6.38	13.63	20.88	28.13	26.58	18.61	10.64	2.67	0.00	0.00	0.00	0.00	0.00	0.00
Ins. Agents, Brokers, Serv.	0.00	1.31	3.47	5.63	7.79	11.22	15.57	19.92	24.27	28.55	30.59	32.62	29.05	16.20	3.34
Regulated Investment Co.	3.45	9.31	15.06	20.81	26.56	31.02	34.54	38.06	41.58	45.48	53.34	61.21	70.95	83.80	96.66
Real Estate Operators	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subdividers and Developers	0.00	5.35	11.87	18.39	24.92	24.44	18.83	13.23	7.63	0.00	0.00	0.00	0.00	0.00	0.00

Table 7
Efficient Portfolios, 1981-89
Federal Reserve Bank Holding Company Returns

Traditional Bank-like Activities

Efficient Risk and Return Combinations

Mean ROA (%)	0.55	0.55	0.60	0.65	0.70	0.75	0.80
Standard Deviation ROA (%)	0.17	0.17	0.17	0.17	0.18	0.21	0.56
Coefficient of Variation ROA (%)	30.09	30.09	28.33	26.15	25.71	28.00	70.00

Associated Portfolio Allocations

Bank Holding Companies	67.92	67.97	70.55	74.60	79.12	75.00	33.33
Mutual Savings Banks	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Savings and Loans	2.99	2.95	0.57	0.00	0.00	0.00	0.00
Personal Credit Institutions	10.19	10.22	12.16	13.98	15.76	25.00	66.67
Business Credit Institutions	18.89	18.85	16.72	11.42	5.12	0.00	0.00

Nontraditional Activities

Efficient Risk and Return Combinations

Mean ROA (%)	1.77	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
Standard Deviation ROA (%)	0.14	0.15	0.18	0.23	0.31	0.40	0.50	0.61	0.73	0.88	1.04	1.30	1.63
Coefficient of Variation ROA (%)	7.91	7.50	7.20	7.67	8.86	10.00	11.11	12.20	13.27	14.67	16.00	18.57	21.73

Associated Portfolio Allocations

Bank Holding Companies	37.54	28.66	9.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Security Brokers/Dealers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commodity Brokers/Dealers	0.00	0.00	0.00	6.74	12.45	18.16	23.86	25.97	16.07	6.17	0.00	0.00	0.00
Life Insurance	18.15	20.85	26.73	26.58	18.61	10.64	2.67	0.00	0.00	0.00	0.00	0.00	0.00
Ins. Agents/Brokers/Serv.	4.17	5.10	7.12	11.22	15.57	19.92	24.27	28.55	30.59	32.62	29.05	16.20	3.34
Regulated Investment	17.01	20.26	27.33	31.02	34.54	38.06	41.58	45.48	53.34	61.21	70.95	83.80	96.66
Real Estate Operators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subdividers and Developers	23.14	25.13	29.46	24.44	18.83	13.23	7.63	0.00	0.00	0.00	0.00	0.00	0.00

IRS returns on assets and Federal Reserve returns on assets is statistically insignificant. This increase in variance and the insignificant correlation suggests that differences in return on assets are caused by more than just the tax treatment of municipal securities. Unfortunately, the IRS data lack sufficient detail for determining other contributing factors.

Table 7 gives the results of recalculating efficient portfolios using IRS data. The results are quite similar to those in Table 6, with perhaps the biggest difference being that the lowest reported standard deviation of returns in Table 7 exceeds those reported in Table 6. The reason for this change is that the standard deviation of bank holding companies' return on assets increased as calculated for Table 7 so that very low-risk portfolios were no longer feasible.

Bank holding companies continue to dominate the portfolios of traditional banking activity in Table 7 for the 1974-80 period. Personal credit and business credit still enter into at least some efficient portfolios, but bank holding companies account for more than two-thirds of most of the efficient portfolios. The dominance of bank holding companies fades only when the mean return on assets reaches 0.8. Moreover, the coefficient of variation of return on assets increases substantially when the mean return goes to 0.8.

In terms of nontraditional activities, Table 7 indicates that bank holding companies enter into the lowest-risk portfolios, but their proportion of the portfolio quickly drops to zero at higher levels of return. Commodity brokers, the life insurance industry, insurance agents, regulated investment trusts, and real estate subdividers and developers all enter into at least some of the efficient portfolios. Security brokers and real estate operators are not included in any efficient portfolio.

Conclusion

An important issue in the debate over expanded bank holding company powers is whether diversification would increase or decrease risk for these institutions. The emerging consensus in the literature using pairwise combinations of individual firm data was that deregulation would at best provide insignificant portfolio diversification gains in return on assets and would at worst increase bank holding companies' risk. The primary challenge to this consensus has been Litan's analysis of efficient portfolios using IRS industry data. The research reported here found greater benefits for larger combinations of industries than Litan found. A direct

comparison is not readily accomplished, however, because Litan did not calculate pairwise combinations.

This study sought to reconcile the analysis of pairwise combinations with efficient portfolio analysis and to update Litan's analysis. It was found that using the IRS industry data produces more risk-reducing pairwise combinations than seem to occur in studies using other data. These differences may develop directly from the use of IRS data or the use of the coefficient of variation in return on assets. Further work seems desirable for pinning down why the results of this study vary from those of others using pairwise industry combinations.

Another finding of this analysis is that some efficient multiple-activity portfolios generate substantially higher returns and with lower risk (as measured by the coefficient of variation in return on assets) than does investing all assets in bank holding companies or in pairwise combinations of bank holding companies and a nonbank industry. For example, the least risky pairwise combination between 1981 and 1989 consisted of 95 percent bank holding company and 5 percent regulated investment companies. This portfolio had a coefficient of variation of 5.1 percent and a return on assets of 0.63. The lowest-risk (lowest coefficient of variation) efficient portfolio contained bank holding companies; commodity brokers/dealers; life insurance; insurance agents, brokers, and servicers; regulated investment companies; and subdividers and developers. This efficient portfolio had a marginally lower coefficient of variation of 5.0 percent, and a substantially higher return on assets of 1.00 percent. Thus, the finding of diversification gains is not solely a function of the use of IRS data. Furthermore, the results are confirmed by the attempt to correct for the biases in IRS measurement of bank holding company income by substituting Federal Reserve pretax income figures for bank holding companies.

As noted in the introduction, it is important that policymakers consider more than the portfolio risk effect of allowing bank holding companies to enter into and to expand their operations in traditionally nonbank activities. These results in combination with those of other studies appear to indicate a problem for policymakers who emphasize the benefits of portfolio diversification. Financial conglomerates are built one merger at a time, and the pairwise studies suggest that many combinations would, at least temporarily, increase the riskiness of bank holding companies. If regulators permit certain pairwise mergers, then a bank holding company may be riskier, especially if it chooses not to make further acquisitions or if conditions prevent it

from merging with additional industries. On the other hand, a bank holding company that has merged with several nonbank firms may have a substantially higher return and lower risk than one restricted to traditional banking activities. Regulators face the difficult problem

inherent in knowing that a bank holding company will never be able to form this efficient portfolio of activities without being allowed to engage in pairwise mergers that may individually cause at least a temporary increase in risk.

Appendix Finance, Insurance, and Real Estate Industry Breakdown

The IRS corporate returns publication breaks the general finance, insurance, and real estate sector down into twenty-three minor industry groups as follows (a brief description of some industries is included as an aid to readers):

Banking

- Mutual savings banks
- Bank holding companies—including both one-bank and multibank holding companies
- Independent banks—excluding mutual savings banks and bank holding companies

Credit Agencies

- Savings and loan associations
- Personal credit institutions—establishments primarily engaged in providing loans to individuals and establishments engaged in financing retail sales by installment plan and in automobile financing
- Business credit institutions—establishments engaged in making loans to business and agricultural enterprises, such as short-term business credit institutions (commercial finance companies), accounts receivable and commercial paper factoring, direct financing of working capital, captive automobile finance companies (for example, GMAC), mercantile financing, and so forth

Insurance

- Life insurance companies
- Mutual insurance companies—excluding life or marine and certain fire or flood insurance companies

Insurance Agents and Brokers

- Agents and brokers dealing in insurance, and organizations offering services to insurance companies and policyholders, such as insurance claim adjusters

Real Estate

- Real estate operators and lessors of buildings—including firms that operate and lease but do not develop real

property, such as operators of commercial and office buildings, retail establishments and shopping centers, and so forth

- Lessors of mining, oil, and similar properties
- Lessors of railroad property—including firms such as airport leasing offices, landholding offices, and others
- Condominium management and cooperative housing associations
- Subdividers and developers—including firms engaged in subdividing real property into lots and in developing them for resale on their own account

Security, Commodity Brokers and Services

- Security brokers, dealers, and flotation companies—establishments engaged in the purchase, sale, and brokerage of securities and those, generally known as investment bankers, that originate, underwrite, and distribute securities issues
- Commodity contract brokers and dealers, security and commodity exchanges, and allied services—firms that buy and sell commodity contracts on either the spot or future basis for their own account or the account of others or that provide investment advice regarding securities to companies and individuals on a contractual or fee basis, and so forth

Holding and Other Investment Companies (excludes bank holding companies)

- Regulated investment trusts—a wide range of firms such as open and closed-end investment funds, money market mutual funds, unit investment trusts, and so forth
- Real estate investment trusts—firms engaged in closed-end real estate investments or related mortgage assets that meet the requirements of the amended Real Estate Investment Act of 1960, such as mortgage investment trusts, mortgage and realty trusts, and real estate investment trusts
- Small business investment trusts

Notes

1. See Benston (1990) for an analysis of the evidence supporting the restrictions on bank involvement in securities activities. These restrictions were reinforced by limits incorporated in various pieces of legislation, with perhaps the two most important pieces being the Bank Holding Company Act of 1956 and the Act's 1970 amendments.
2. Although the problems with thrift deregulation are frequently cited as an argument against any additional deregulation of insured depositories, the argument contains a number of flaws. First, thrifts had suffered massive losses in their traditional business of home mortgage lending in the early 1980s. Second, one of the biggest deregulatory measures, the elimination of interest rate restrictions on consumer deposits, was forced by the high interest rate environment of the late 1970s and early 1980s. The alternative to deregulation was a drastic shrinkage in the size of both the thrift and commercial banking industries as funds flowed out to unregulated money market mutual funds. Third, the credit losses that occurred in nontraditional activities were due in no small part to the fact that the regulators were loosening capital requirements, thereby encouraging rapid expansion at financially weak thrifts. The commercial bank regulators in contrast progressively tightened their capital regulations during the 1980s.
3. Other studies from the 1970s include Johnson and Meinster (1974) and Eisemann (1976). Wall and Eisenbeis (1984) also use IRS data to examine the portfolio effect of banks' diversification into selected nonbanking activities. Unfortunately, the study is limited to firms with positive income and hence not as comprehensive as these results.
4. The coefficient of variation is the standard deviation of return on assets divided by the mean return on assets. Industries with higher coefficients of variation are riskier. The correlation of returns captures the relationship between the returns on assets of different industries and bank holding companies. If the correlation is positive, the nonbank industry would tend to experience high returns when bank holding companies have high returns and low returns when banks have low returns. If the correlation is negative, the nonbank industry would tend to experience high returns when banks have low returns, and low returns when banks have high returns. If the correlation is zero, there is no relationship between the returns of the nonbank industry and bank holding companies. Bank holding companies are more likely to gain diversification benefits from combining with industries that have a low positive or a negative correlation of returns with bank holding companies.
5. That is, Boyd, Graham, and Hewitt created a new firm with 95 percent of the assets coming from the bank and 5 percent from the nonbank firm.
6. See Boyd and Graham (1986) for a discussion of the issue of managerial incentives.
7. Boyd, Graham, and Hewitt point out that an important issue in evaluating the effect of a merger is the purchase price paid for the target by the acquiring organization. Virtually all studies of historical data implicitly assume that no premium will be paid to the target. Researchers use this assumption not because it is realistic but because they have no good basis for determining the likely magnitude of the takeover premium.
8. Banks' ability to deduct the interest from municipal securities was severely constrained by the Tax Reform Act of 1986. For a summary of the changes see "A Farewell to Municipal and Other Tax Effects," *ABA Banking Journal* (February 1987): 35-36.
9. The banking regulators are currently requiring most banking organizations to maintain a minimum equity-capital-to-assets ratio of 4 percent to 5 percent.
10. The holding and other investment company category includes regulated investment trusts (which includes mutual funds), real estate investment trusts, and small business investment trusts.
11. The set of possible portfolios with each industry includes a portfolio of 100 percent bank holding company assets. Thus, if a portfolio containing a 5 percent investment in the non-bank holding company industry has a coefficient of variation exceeding that of bank holding companies alone—34.4 percent, for example—then the maximum investment allowed in that industry would be less than 5 percent. Note also that it is not possible to specify the exact percentage of assets that a bank holding company should be able to hold in a non-banking industry because the analysis looks at diversification only at selected points. Thus, the finding that the risk-minimizing portfolio contains a 10 percent investment in an industry is consistent with the actual risk-minimizing point lying between 5 percent and 25 percent diversification.
12. The four that are risk-minimizing at the 5 percent level are lessors of mining and oil properties, commodity brokers/dealers, regulated investment companies, and real estate investment trusts. At the 10 percent level the four that are risk-minimizing are real estate operators and lessors of buildings, lessors of railroad properties, security brokers/dealers, and other holding and investment companies.
13. Bank holding companies would generally be allowed to invest somewhat more than these stated maximums because these figures are based on consideration of only a limited number of portfolio alternatives. For example, the maximum investment in security brokers/dealers would be the point at which the risk of the pairwise portfolio equaled that of bank holding companies alone—somewhere between 25 percent and 50 percent.
14. The two that are no riskier than bank holding companies at the 10 percent level are lessors of mining and oil properties and commodity brokers/dealers; at the 25 percent level, real estate operators and lessors of buildings, lessors of railroad properties, security brokers/dealers, and real estate investment trusts. The two that are less risky at the 90 percent level are regulated investment companies and other holding and investment companies.
15. The ten industries are independent banks; insurance agents, brokers, and service; real estate operators and lessors of buildings; lessors of mining and oil properties; lessors of railroad

- properties; security brokers/dealers; commodity brokers/dealers; regulated investment companies; real estate investment trusts; and other holding and investment companies.
16. Mutual savings banks and savings and loans would generally have to convert to stock institutions before they could be acquired by commercial banks.
 17. Looking at historical accounting returns, the real estate subdivider and developer industry was an unprofitable activity according to IRS data. However, the industry was included anyway because some banks showed a strong interest in it given their substantial volume of lending to subdividers and developers.
 18. Note that if efficient portfolios were formed the total assets of the combined firm would likely have to shrink as the proportion devoted to insurance agency increased.
 19. A positive correlation exists between the profitability of bank holding companies and real estate subdividers and developers. Thus, it is not surprising that this industry fails to enter the lowest risk portfolio that contains predominately bank holding companies and includes only a minimal investment in regulated investment companies.
 20. One note of caution should be considered in interpreting Table 6. Some of the industries in the table—for example, insurance agents and regulated investment companies—use proportionately far fewer of their own assets than bank holding companies do to generate a similar amount of revenue. Thus, increasing the proportion of the portfolio invested in these industries may also imply shrinking the total size of the firm.

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