The Profitability and Risk Effects of Allowing Bank Holding Companies to Merge With Other Financial Firms: A Simulation Study

John H. Boyd* Research Officer
Stanley L. Graham Economist

Research Department
Federal Reserve Bank of Minneapolis

Perhaps the hottest debate in banking today is the one about letting bank holding companies (BHCs) engage in certain financial lines of business outside of commercial banking.[1] Large BHCs have vigorously argued for lowering barriers to entry into investment banking, full-service securities brokerage, the insurance business, and real estate investment and development. These BHCs point out that nonbank financial firms such as securities firms and insurance companies have been permitted into traditional bank activities. They argue that lowering the entry barriers into nonbank activities would not only be equitable—by leveling the playing field—but would also bring some needed competition into nonbank activities.[2]

Critics of expanded BHC powers argue that if BHCs enter currently prohibited activities, the risk to bank subsidiaries will increase. They argue that many of the sought-after nonbank financial activities are riskier than commercial banking. Therefore, if BHCs are permitted to expand into those activities, they say, the incidence of commercial bank failure—or its common analogue, the Federal Deposit Insurance Corporation (FDIC) rescue—will quite likely increase.

Proponents of expanded powers for BHCs, of course, have very different opinions about the impact of expansion on BHC risk. They offer two principal views of what would happen if BHCs became involved in nonbank financial activities. One is that risk, as measured by the variability of BHC profits, would decrease because of the effect of asset diversification. The other view is that such risk might increase, but that increase would be more than compensated for by an increase in

*Also Adjunct Professor of Finance, University of Minnesota.

[1]The authority to permit BHCs to engage in nonbank activities resides in the Federal Reserve System. The Bank Holding Company Act of 1956 and its subsequent amendments authorize the Fed to determine what nonbank activities, other than those specifically prohibited by law, are permissible for a BHC (defined as a holding company controlling one or more banks). The basic criteria are that a permissible activity must be closely related to banking and that it must provide net public benefits. A BHC's entry into permissible activities requires prior approval by the Fed.

The nonbank activities that BHCs are specifically denied by law include (most prominently lately) the insurance and securities businesses. The Bank Holding Company Act and the Garn–St Germain Depository Institutions Act of 1982 prohibit BHCs from engaging in most insurance activities. And the Glass-Steagall sections of the Banking Act of 1933 separate commercial banking from investment banking.

These prohibitions are being reconsidered today. In early 1987, for example, the Fed approved several BHC applications to underwrite a limited volume of third-party commercial paper, mortgage-backed securities, consumer receivable–related securities, and municipal revenue bonds. In August 1987, in response to the Fed's actions and other actions which tested the federal prohibitions, the U.S. Congress passed the Competitive Equality Banking Act of 1987 which imposed a moratorium on bank and BHC expansion into securities activities. Although that moratorium has expired, the specific actions taken by the Fed have been stayed by a court and are now under appeal before the U.S. Supreme Court. At the end of March 1988, with strong backing from the administration and bank regulatory agencies, the Senate passed a bill that would permit BHCs to enter some currently prohibited securities activities. By early June 1988, though, the House had not yet acted on this issue.

[2]Until recently, nonbank firms were able to exploit a loophole in the Bank Holding Company Act which let them own a firm that acted like a bank as long as it did not offer both demand deposit and commercial loan services. If a firm did not offer one of those services, it was not considered a bank under the Bank Holding Company Act. Firms that exhibited these characteristics were commonly referred to as *nonbank banks*. This loophole was closed by the Competitive Equality Banking Act of 1987, which redefined a *bank* to include any financial firm whose deposits are insured by the Federal Deposit Insurance Corporation (FDIC). Nonbank banks established before March 1987 were exempted from this law.

average profitability. As a result, the incidence of bank failure would decrease.[3]

Resolution of the debate about these two views is essentially an empirical matter. Surprisingly, though, few formal studies have provided empirical evidence on the likely risk/return consequences of permitting BHC expansion into the other lines of business.

A major objective of this study is to partially fill that void. The question we address is, Will the risk of bankruptcy decrease or increase if BHCs are permitted to engage in the securities, insurance, and real estate businesses? We use a measure of the risk of failure (bankruptcy risk) that takes into account average rates of return, the variability of rates of return, and the level of capitalization. This lets us make explicit, and empirically test, the second view, that mergers between BHCs and nonbank financial firms would reduce the risk of failure because increased average rates of return would offset increased variability of rates of return. And since the first view is a subset of the second, our analysis effectively addresses both views.

Our study has two parts. First we analyze the risk/return characteristics of the various existing industries. Using data for 249 publicly traded bank and nonbank financial firms during 1971–84, we compute sample risk and rate of return statistics for each industry. This analysis provides an objective look at the historical relative risk and profitability in these industries. It also provides a basis for comparison with the second, hypothetical part of our study. There we analyze the effects of BHC expansion into currently prohibited activities by simulating mergers between actual BHCs and nonbank firms as if such mergers had been permitted. This approach lets us generate sample risk and return statistics for hypothetical industries like the BHC–life insurance industry. To see the effects of the mergers, these statistics are compared to risk and return statistics for the unmerged BHC industry. All tests are done with accounting (book) data and with market (stock price) data. Accounting data results appear in the paper; market data results, in Appendix A.

Regardless of which data are used, the results of the existing industry analysis are unambiguous. In the sample period, the securities industry has been more profitable than most of the other financial industries, including banking. However, BHCs have not been consistently less profitable than other financial firms. In terms of profitability, BHCs rank about in the middle—behind some industries, but ahead of others. In terms of risk, BHCs rank even better. The industry data indicate that, among financial firms, securities and real estate firms are the riskiest and BHCs and insurance firms are the least risky.

The results of the hypothetical merger industry analysis, based on both types of data, are also clear. The merger simulations suggest that when BHCs combine with securities firms or real estate developers, the volatility of returns increases and so does the risk of failure. For these combinations of firms, therefore, neither the first nor the second view of expansion proponents is supported. For combinations of BHCs and life insurance companies, though, both views are supported: these combinations seem to reduce both the volatility of returns and the risk of failure, suggesting the potential for risk-reducing diversification. The answer to our central question about what will happen to risk if BHCs can enter other financial industries thus appears to be, It depends on which industries they enter.

Methodology

Measures of Profitability and Risk

In this study, we use one measure of profitability and two measures of risk. The profitability measure is the rate of return on average accounting equity, *R:*

---

[3]A third view is that whether or not risk would increase doesn't really matter because bank subsidiaries can be legally protected against adverse results that originate in nonbank subsidiaries. As we have argued in Boyd and Graham 1986, this third view about risk is fundamentally flawed. The essence of the view is that legal walls can be built around the commercial bank subsidiary to insulate it from any risky activity conducted by a nonbank subsidiary. But relying on legal walls, or corporate separateness, is not likely to be an effective way to shelter bank subsidiaries of BHCs from risk. Theoretically, as long as corporations have a common parent, they will also have a commonality of interests—imposed from the top if not from within. Inevitably, this commonality will produce incentives for cross-subsidization among firms. Indeed, it can be shown that, under quite general conditions, policies that maximize the profits of each subsidiary individually do not maximize total consolidated profits and vice versa. Thus, if total consolidated profits are actually maximized, this must be at the expense of profits of one or more of the individual affiliates.

Incentives for intercorporate cross-subsidization can be very strong, particularly if an affiliate is in financial distress. Resources can be moved among corporations that have a common management in a myriad of ways, some of which are undoubtedly still waiting to be discovered. The history of Fed supervision in this area suggests that when management is determined and creative, thwarting such interaffiliate transfers is extremely difficult.

We recognize that it is possible to impose such an extreme degree of corporate separateness that problems in one affiliate simply could not spread to another. For example, regulation might prohibit all interaffiliate transactions, cross-selling, and sharing of management. However, such restrictions would also preclude any advantages in combining banking with nonbank lines of business. Besides, investors can already create such combinations themselves, by buying shares in a bank, a life insurance company, a brokerage, and so on. It seems fair to say that no one views total corporate separateness as a desirable approach. What is sought, instead, is a system that lets BHC affiliates operate much like a single consolidated firm, except that nonbank affiliate losses cannot be transmitted to bank affiliates. We doubt that creating such a system is possible. For more on this topic, see Chase 1971; Chase and Mingo 1975; Talley 1975; Lawrence and Talley 1976; Jessee and Seelig 1977; Rose 1978; Savage 1978; and Eisenbeis 1983a, b.

$$(1) \quad \tilde{R}_j = 2\tilde{\pi}_j/(E_j + E_{j-1})$$

where π is net income after taxes, E is total equity, and the subscript j denotes the time period. [Here and throughout a tilde (~) denotes a random variable.]

The first risk measure, S, is a measure of the volatility of the rate of return on equity or, more precisely, the standard deviation of R. The empirically estimated standard deviation of R is defined as

$$(2) \quad S = \{\textstyle\sum_{j=1}^{n}(\tilde{R} - \bar{R})^2/(n-1)\}^{1/2}$$

where n is the number of sample periods and $\bar{R}$ is the sample mean of the R_j. One reason we use the measure S is that it is popular in the banking and finance literature. Another reason is that this risk measure tests the first view of BHC expansion proponents—that BHC expansion into new financial business lines would reduce the volatility of rates of return because of asset diversification.

The second risk measure, Z (or Z-score), is an indicator of the probability of bankruptcy. *Bankruptcy* is defined as the situation where losses (negative profits) exceed equity, or $\tilde{\pi} < -E$. If A = total assets, $\tilde{r} = \tilde{\pi}/A$, and $k = -E/A$, then the probability of bankruptcy can be written as

$$(3) \quad p(\tilde{\pi} < -E) = p(\tilde{r} < k) = \textstyle\int_{-\infty}^{k} \phi(r)\, dr$$

where $p(\cdot)$ is a probability and $\phi(r)$ is the probability density function of r. If r is normally distributed, as we assume, then (3) may be rewritten as

$$(4) \quad p(\tilde{r} < k) = \textstyle\int_{-\infty}^{z} N(0, 1)\, dz$$

$$(5) \quad z = (k - \rho)/\sigma$$

where ρ is the true mean of the r distribution, σ is the true standard deviation, and z is the number of standard deviations below the mean by which profits would have to fall in order to eliminate equity.[4] In this sense, z is an indicator of the probability of bankruptcy. Here we substitute sample estimates for ρ and σ in (5) and give the estimated value of $-z$ (since z is a negative number) the label Z:

$$(6) \quad Z = \big(\{\textstyle\sum_{j=1}^{n}[2\tilde{\pi}_j/(A_j + A_{j-1})]\}/n + \{\textstyle\sum_{j=1}^{n}[(E_j + E_{j-1})/(A_j + A_{j-1})]\}/n\big)/S_r$$

where S_r is the estimated standard deviation of r.

Note that high values of Z are associated with low probabilities of failure. The Z-score increases with the ratio of equity to assets, $-k$, and with the mean rate of return on assets, ρ; it decreases with the volatility of asset returns, σ. One reason we use the risk measure Z is that, from a public policy perspective, the risk of failure of bank subsidiaries is the primary concern regarding BHC product line expansion. Another reason we use Z is that it directly tests the second view of proponents of BHC expansion—that increases in volatility of rates of return, as represented by σ, would be offset by increases in rates of return, ρ, resulting in a lowered risk of failure.[5]

Aggregating From Firms to Industries

We report industry sample statistics for the profitability measure and the two risk measures. To do this, first we compute $\bar{R}$, S, and Z for each firm. Then we compute the medians of the firm statistics for each industry.[6] We don't compute risk measures for an industry based on its aggregate profits, assets, and equity. That method would lower estimates of the industry risk measures by some unknown amount. We are interested in the riskiness of the average firm in the industry, not the riskiness of the industry average.

Comparing median industry values of the risk measures S and Z is not a conceptually valid way of investigating the risk effects of BHC diversification into the nonbank industries; this is why we also conduct merger experiments. Even so, the industry-based risk measures are of considerable interest and value in themselves. Unlike simulation results, they require no complicated computer manipulations of the underlying data and no simplifying assumptions. The industry measures may therefore be viewed as representing the distributions underlying the more elaborate simulation

---

[4] Even if $\tilde{r}$ is not normally distributed, z is still a useful risk measure as long as ρ and σ exist. We can invoke the Bienaymé-Tchebycheff inequality and $p(\tilde{r} \le k) \le \{\sigma/(\rho - k)\}^2$. Then z is the upper-bound, or worst-case, probability of bankruptcy. See Roy 1952.

[5] Note that in computing Z we treat a BHC as a single consolidated organization which survives or fails as an entity. The Z-score indicates the probability that consolidated total losses will exceed consolidated total equity. In using this approach, we dismiss corporate separateness and thus ignore the possibility that one or more BHC subsidiaries could survive the failure of another subsidiary. This is admittedly a simplification, one that lets us use a single value of Z to indicate the probability of bankruptcy. However, it is consistent with our view that corporate separateness is at best a poor device to protect banking affiliates of BHCs. See note 3.

[6] We summarize all results using median statistics instead of the more common mean statistics because the median is not heavily influenced by one or a few outlying observations as the mean is. Still, in only a few instances are the two statistics much different in our sample results.

results. Fortunately, both sets of tests lead to much the same conclusions.

Simulating Mergers

The risk effects of combining a BHC with a firm from one of the other industries depend not only on the standard deviation of returns in each industry, but also on the covariance between returns.

Assume, for example, that a BHC acquires a life insurance firm. Post-merger consolidated assets can be represented by x percent bank assets and $1-x$ percent insurance assets. The rate of return on post-merger consolidated assets (or equity) will be a simple weighted average of the rates of return on bank assets (equity) and on insurance assets (equity). However, the variance (or squared standard deviation) of post-merger rates of return will be a more complicated nonlinear expression. Consider the variance of the rate of return on post-merger consolidated assets, σ_c^2. If σ_b^2 = the variance of the rate of return on BHC assets, σ_i^2 = the variance of the rate of return on insurance assets, and $\sigma_{b,i}$ = the covariance between these two rates of return, then

$$(7) \qquad \sigma_c^2 = x^2\sigma_b^2 + (1-x)^2\sigma_i^2 + 2x(1-x)\sigma_{b,i}.$$

Clearly, knowledge of the two variances is insufficient to determine the variance of consolidated returns, σ_c^2.

One way to estimate σ_c^2 is to separately estimate each component in (7), that is, the two variances, the covariance, and the proportions of bank and nonbank assets. As we have learned, however, this may not be a valid procedure. (See Boyd, Hanweck, and Pithyachariyakul 1980 and Boyd and Graham 1986.) The underlying distributions of industry returns often do not exhibit desirable statistical properties. For example, they are often not joint-normal or time-stationary, and they may exhibit significant firm effects within an industry. (Those firm effects simply reflect the imprecision of industry definitions, but they still complicate the process of estimation.)

To avoid these problems, we use a very different method of estimating the riskiness (and profitability) of BHC–other financial firm combinations. Instead of estimating each component of (7) from the industry data, we use historical data on individual firms to simulate hypothetical mergers between actual BHCs and actual firms from the other industries. The merger partners—for each merger, one BHC and one nonbank firm—are chosen randomly, with replacement. For each hypothetical firm created by a simulated merger, assets, equity, and profits are consolidated. From these data, a time series of returns is generated and estimates of $\bar{R}$, S, and Z are made for each hypothetical firm. For each type of nonbank financial firm that BHCs are merged with, 100 hypothetical firms—each with its own $\bar{R}$, S, and Z—are produced, so that six new, hypothetical industries are created. From these data, median estimates of $\bar{R}$, S, and Z for the hypothetical industries are obtained.

This hypothetical merger method is based on simple assumptions. In effect, we assume that the merged firm is simply the sum of the two individual firms. We merge the firms based on their accounting (book) values. Consolidated total assets, equity, and profits for the hypothetical firm are obtained by summing the assets, equity, and profits of the merging firms. We thus ignore synergies that might result from the combination, as well as out-of-pocket merger costs, merger premiums, and changes in capitalization associated with the combination. Obviously, these assumptions are not realistic. Some of the assumptions will bias results in favor of expansion; others will have the opposite effect. However, this simplicity is defensible: It avoids the subjectivity inherent in the determination of hypothetical merger terms on a case-by-case basis and thus lets us computer-simulate a large number of mergers.

The Sample

All of our data cover the years 1971–84 and come from Standard and Poor's COMPUSTAT tapes. This source provides both types of data we need—accounting and market data—for publicly traded firms, which tend to be the larger firms in their industries. Included in the sample are 146 BHCs, 11 securities firms,[7] 30 life insurance companies, 15 property/casualty insurance firms, 5 insurance agent/broker firms, 31 real estate development companies, and 11 other real estate firms. (Industry classifications are determined by Standard and Poor's.) Not all sample firms have data in all sample periods, but we required that each sample firm have at least five years of data. The size distribution of the sample firms is in Table 1, and a list of the firms is in Appendix C.

Obviously, BHCs are much more heavily represented in the sample than are firms from the other financial industries. This was not our decision, but rather simply reflects the data available on COMPU-

[7] In this study, we use the term *securities* to represent all the activities engaged in by firms in this industry, including investment banking and brokerage.

Table 1

The Sample

Number and Size of Sample Financial Firms, 1971–84

Industry	Number of Firms	Assets ($ million)			
		Median	Smallest	Largest	Mean
Property/Casualty Insurance	15	2,590	62	16,501	3,546
Bank Holding Company	146	2,567	307	86,267	6,455
Life Insurance	30	1,004	13	28,196	3,051
Insurance Agent/Broker	5	553	108	584	407
Securities	11	472	84	12,159	3,677
Other Real Estate	11	129	16	831	252
Real Estate Development	31	112	6	772	137

Source: Standard and Poor's Compustat Services, Inc.

STAT. However, our merger simulations are not based on the proportion of any type of firm in the sample. Therefore, the relatively large number of BHCs should not bias the results. Still, for some industries (especially for the insurance agents/brokers) the small sample size reduces the reliability of our results.

Results

Unmerged Industries

□ *Profitability*

According to our sample, BHCs are neither the most nor the least profitable financial firms. Table 2 shows that the highest median rates of return on equity in 1971–84 belong to insurance agents/brokers, which have a return of 20 percent, and securities firms, which have a return of 16.5 percent. BHC rates of return, at 13.1 percent, are roughly comparable to those of life insurance and property/casualty insurance firms. The lowest returns belong to real estate development and other real estate firms, which have returns of 10 percent and 0.7 percent, respectively.

□ *Risk*

According to both measures of risk, BHCs are the least risky financial firms. As is clear in Table 3, their risk measures, both S and Z, are fairly close to those of life insurance firms. (Recall that the Z-score and risk are inversely related.) Also clear is that, by both measures, the riskiest financial firms are the securities and real estate firms.[8]

Hypothetically Merged Industries

□ *Profitability*

Results of the merger simulations are shown in Tables 4 and 5. For purposes of comparison, statistics for the unmerged BHC industry are also shown there. Recall that median returns on equity for firms created by the simulated mergers are linear combinations of the median rates of return among the underlying industries. According to Table 4, BHCs could generally have increased this measure of profitability by going into the

[8]The Z-scores computed with accounting data are so large that, if the distributions of returns are normal, then the Z-scores imply infinitesimal probabilities of failure. For several reasons, however, we think these risk measures underestimate the true probabilities of bankruptcy. First, visual inspection of the return distributions suggests that they may not be normally distributed. Second, our definition of bankruptcy is too restrictive. According to it, a BHC is not bankrupt unless it experiences a one-period loss that exceeds its consolidated equity. Actually, large BHCs would experience depositor runs, liquidity problems, and massive regulatory intervention in much less dire circumstances; whether or not they were technically bankrupt would be a moot issue. Moreover, with our definition, failure cannot occur a little bit at a time, spread over several years. Third, and finally, smoothing of the accounting earnings is very likely occurring, with the result that the estimated earnings volatility is downward biased. That may be seen by comparing the accounting risk measures presented in the paper with the market risk measures presented in Appendix A. The market data produce returns that are much more volatile and Z-scores that are much lower and arguably more plausible. Note, though, that with regard to the relative profitability and risk in these industries the two sets of measures generally agree. For more on the use of Z-scores, see *Wall 1986*.

Tables 2–5

Measuring Profitability and Risk in Banking and Other Financial Industries

Tables 2 and 3

Historically, 1971–84

Table 2 **Profitability**

Industry	Median R^*
Insurance Agent/Broker	19.98%
Securities	16.52
Property/Casualty Insurance	13.44
Bank Holding Company	13.12
Life Insurance	12.82
Real Estate Development	10.03
Other Real Estate	.65

Table 3 **Risk**

Industry	Median S^{**}	Median Z†
Bank Holding Company	.0245	43.36
Life Insurance	.0261	36.79
Property/Casualty Insurance	.0467	24.56
Insurance Agent/Broker	.0554	15.97
Securities	.0909	13.33
Other Real Estate	.0925	12.98
Real Estate Development	.1382	8.66

Tables 4 and 5

If a Bank Holding Company Could Have Merged With One Nonbank Financial Firm

Table 4 **Profitability**

Industry§	Median R^*
BHC–Insurance Agent/Broker	15.59%
BHC–Securities	14.06
BHCs Alone	13.12
BHC–Property/Casualty Insurance	12.97
BHC–Life Insurance	12.95
BHC–Other Real Estate	12.46
BHC–Real Estate Development	10.08

Table 5 **Risk**

Industry§	Median S^{**}	Median Z†
BHC–Life Insurance	.0201	49.30
BHCs Alone	.0245	43.36
BHC–Other Real Estate	.0256	37.86
BHC–Insurance Agent/Broker	.0302	33.28
BHC–Real Estate Development	.0419	28.82
BHC–Property/Casualty Insurance	.0432	25.28
BHC–Securities	.0480	24.93

*Rate of return on equity

**Standard deviation of return on equity

†Measure of bankruptcy risk

§Each hypothetical industry includes 100 firms created by merging 2 randomly selected firms from our 1971–84 sample of publicly traded financial firms.

Source: Standard and Poor's Compustat Services, Inc.

insurance agent/broker and securities industries. Going into real estate development, though, would likely have reduced BHC profitability.

Perhaps the most striking feature of the profitability data in Table 4, however, is that the effects of mergers on rates of return are relatively small. This can be explained by two factors. Either rates of return for BHCs are not much different than rates of return in the other industries, or BHCs' share of consolidated assets after merger is large. (See Table 6.) These numbers clearly reflect the size of sample BHCs compared to that of most sample firms in the other industries.

Table 6

Bank Holding Companies' Share of Assets in Simulated Mergers

Hypothetical Industry*	Median BHC Share
BHC–Other Real Estate	97%
BHC–Real Estate Development	94
BHC–Insurance Agent/Broker	91
BHC–Securities	79
BHC–Life Insurance	71
BHC–Property/Casualty Insurance	62

*Each hypothetical industry includes 100 firms created by merging 2 randomly selected firms from our 1971–84 sample of publicly traded financial firms.

Source: Standard and Poor's Compustat Services, Inc.

☐ *Risk*

The sheer size of banking will tend to limit profit opportunities for BHC expansion into other financial industries. However, the risk effects of hypothetical mergers may be substantial even though the nonbank merger partner is relatively small. Table 5 shows estimates of the risk measures, *S* and *Z*. For purposes of comparison, these risk measures are also shown for the unmerged BHC industry.

The results for the two measures are the same. Risk increases substantially (that is, is much higher compared to the unmerged BHC industry) in mergers with securities firms, property/casualty insurance firms, and real estate development firms. Risk increases minimally in mergers with other real estate and insurance agent/broker firms. Only in mergers with life insurance firms does risk decline, and there it doesn't decline much.

Charts 1–6 are a different way of looking at the risk measure *Z*. Rather than just displaying the median *Z*-score, these charts also show the entire frequency distribution of *Z*-scores for the combinations of BHCs and firms in the other six industries. Each chart includes the *Z*-scores for 100 simulations of hypothetically merged firms. The objective is to be sure that the median is conveying meaningful information about the relative riskiness of the various combinations.

The charts suggest that, in general, this is true. Consider, for example, the BHC–securities industry (Chart 1) versus the BHC–life insurance industry (Chart 3). Clearly, as their median *Z*-score would suggest, the BHC–life insurance combinations place much more mass on the right (low-risk) end of the scale than do the BHC–securities combinations. Further, the life insurance combinations have 13 *Z*-scores greater than 90 and off the right end of the scale whereas the securities combinations have only 1. Chart 6 does reveal one type of merger combination for which the median *Z*-score may be a misleading indicator: BHC–other real estate. According to Table 5, the median *Z*-score for this combination is 37.86, making it the second least-risky combination (after BHC–life insurance). Yet the *Z*-score distribution for this combination places a lot of mass on low *Z*-scores, at the left (high-risk) end of the scale. Aside from this combination, though, the frequency distributions support the median results: BHC–life insurance combinations are relatively low risk whereas BHC–securities combinations are relatively high risk.

☐ *Summary*

In summary, then, we find that mergers between BHCs and securities firms are likely to increase profitability. However, they are not likely to result in the reduced risk of failure that advocates of such mergers have predicted. If anything, such mergers are likely to increase BHC risk. That conclusion about risk is also true for BHC mergers with real estate development and property/casualty insurance firms. It is not true, though, for BHC mergers with life insurance firms: they may reduce the risk of BHC failure. These conclusions are based on both the median risk measures and the frequency distributions of *Z*-scores for the hypothetically merged industries.[9]

Possible Sources of Bias

Our findings hinge on the nature of the experiments, the assumptions, and the sample data. Some of those factors may tend to bias our results for BHC expansion, thus supporting the views of its proponents; other factors may have the opposite effect.

Bias For BHC Expansion

☐ *Random Mergers?*

The logic of picking merger partners randomly, as we did, might seem questionable to some. They might argue that smart BHC managers would not intention-

[9]For a limited analysis of the potential risk effects of BHCs merging with more than one type of nonbank financial firm, see Appendix B.

Charts 1–6

Another Look at the Risk of Bankruptcy If a Bank Holding Company Could Have Merged With One Nonbank Financial Firm

Frequency Distributions of Z-Scores and Median Z-Scores of Hypothetical Industries*

Chart 1 BHC–Securities

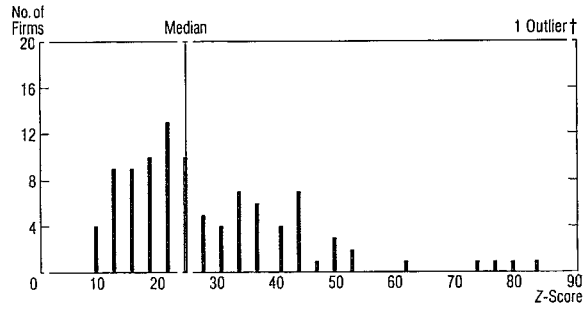


Chart 2 BHC–Property/Casualty Insurance

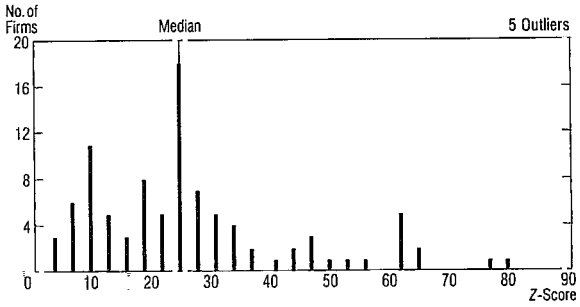


Chart 3 BHC–Life Insurance

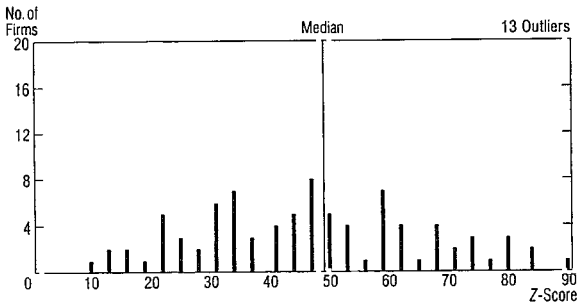


Chart 4 BHC–Insurance Agent/Broker

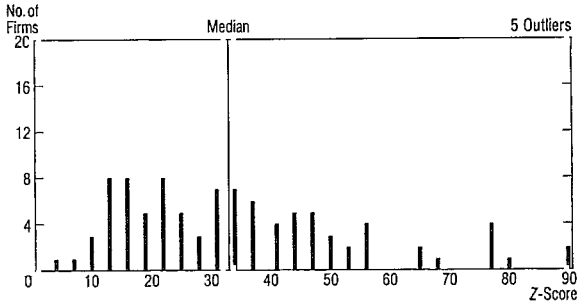


Chart 5 BHC–Real Estate Development

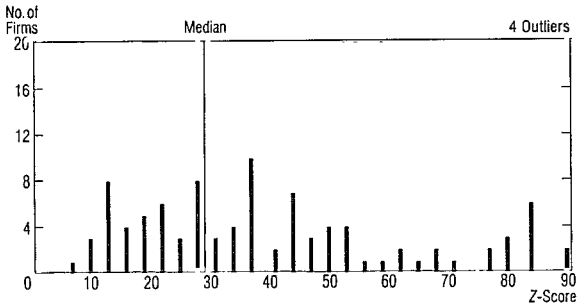
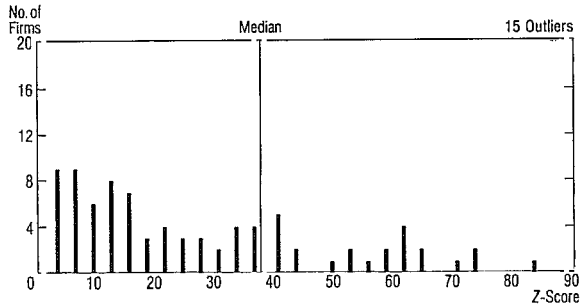


Chart 6 BHC–Other Real Estate



*Each hypothetical industry includes 100 firms created by merging 2 randomly selected firms from our 1971–84 sample of publicly traded financial firms. The Z-score and risk are inversely related.

†*Outliers* are merged firms with Z-scores greater than 90.

Source: Standard and Poor's Compustat Services, Inc.

ally merge their firm with a low-profit or high-risk nonbank firm. Rather, rational BHC managers might be expected to pick out the better merger partners from each nonbank industry. Thus, our results, this argument would suggest, understate the profitability and overstate the risk of BHC mergers with other financial firms.

This argument seems plausible, to be sure, but it overlooks several important facts. One is that each industry has a limited number of firms for which data are available. When the high-profit/low-risk candidates have been picked off, the firms that remain must have less desirable characteristics. Studying a limited number of the most desirable mergers would be misleading, especially since (with the advantage of hindsight) we can determine exactly what the best merger combinations would have been.

Another relevant fact is that those nonbank firms with exceptional risk/return characteristics are likely to be attractive to all investors, not just to BHCs. This fact would generally be reflected in share prices as well as in merger premiums. That would reduce their expected profitability and, thus, their Z-score in a way our study does not take into account.

Finally, it is not obvious that BHC managers want to diversify asset holdings in order to decrease risk. (We shall return to this point when we discuss moral hazard below.)

☐ *Unrepresentative Sample?*

Another objection to our study might be that the small sample of firms in some nonbank financial industries (for example, 5 insurance agent/broker firms and 11 securities firms) is too small to be representative of those industries. In addition, these results do not necessarily hold for BHC acquisitions of small nonbank financial firms or for de novo expansion (creating rather than acquiring nonbank firms).

We cannot deny that in some industries our sample size is small. But we did not intentionally limit sample size; that was determined by the number of firms listed on COMPUSTAT. We specifically chose this data source because it includes only firms whose stock is publicly traded. That was important because many of our empirical tests (discussed in Appendix A) require stock price data. Thus, a small sample size for an industry simply reflects the fact that that industry does not have many publicly traded firms. All we assert here is that our results are representative of publicly traded firms.

Of course, results of a study like ours could be quite different for BHC acquisitions of small nonbank firms or for de novo expansion. Whether results would be better or worse, though, is an open question. Again, we do not claim that our results can be extrapolated to situations we did not study.

☐ *No Economies of Scale or Scope*

Admittedly, any potential for economies of scale or scope (synergies) is ignored in our simulations. These might seem significant omissions to some, since many think they are major reasons why BHCs want to expand into other financial industries. Presumably, such economies would result in higher profits and higher Z-scores than those we obtained.

We seriously question the existence of economies of scale in banking and related financial businesses. Most studies indicate they have not been detected beyond a rather modest size, and some have even found diseconomies of scale. (See, for example, Berger, Hanweck, and Humphrey 1987.)

We do recognize the potential gains stemming from synergies between different financial lines of business. However, our methodology simply cannot capture such effects.[10]

Bias Against BHC Expansion

☐ *No Failed Sample Firms*

Our sample has a form of selection bias: It does not include any firms that failed during the sample period. Undoubtedly, some nonbanks did fail during this period since, unlike banks, nonbanks do not have a regulatory safety net. The sample does, however, include some BHCs (First Pennsylvania and Continental Illinois, for example) that might have failed without FDIC intervention. This selection bias thus makes our results understate the risk of nonbanks compared to that of BHCs.

☐ *No Merger Premiums or Costs*

Our methodology also does not take account of merger premiums or out-of-pocket merger costs, both of which would tend to decrease the profitability and increase the risk (Z-scores) of merged firms. Merger premiums, especially, may be substantial, but they depend on the type of merger—exchanges of shares or cash buy-outs, for example—and thus are difficult to build into our simulations.

---

[10]Other studies have found that some types of newly acquired nonbank subsidiaries are systematically less profitable than their unaffiliated peers. This could suggest that scope economies are unimportant or even that there are diseconomies. Alternatively, it could simply reflect a period of learning that firms often experience when they enter a new line of business. See Rhoades 1975, 1980; Rhoades and Boczar 1977; and Talley 1976.

☐ *Conservative Capitalization*

We have taken the building-block approach to post-merger capital structure: By assumption, the merged firm's capital is just the sum of the capital of the two merging firms. This is an extremely conservative assumption. As Table 7 (and Table A5 in Appendix A) shows, the capital-to-asset ratios of all the nonbank financial industries in our study are much higher than that required for BHCs. Therefore, in our simulations, the post-merger capital ratio must be higher than the ratio of the BHCs alone. Actually, though, BHC managers might well choose to reduce the post-merger capital ratio back to the regulatory minimum—unless, of course, the authorities prohibited them from doing so. That, however, would require that regulators adhere to the building-block standard and prohibit the double-leveraging of nonbank acquisitions, neither of which has been strictly enforced before. Because of our conservative assumption regarding capitalization, our simulations likely understate BHC merger risk, as measured by both S and Z.

☐ *No Moral Hazard*

One more way our study may understate risk is by ignoring what is known as *moral hazard.* This problem arises because the structure of FDIC deposit insurance may induce bank managers to seek risky balance sheet configurations. (See, for example, Merton 1977; Kareken and Wallace 1978; Sharpe 1978; Dothan and Williams 1980; or Buser, Chen, and Kane 1981.) The problem is not that these managers necessarily like risk per se, but rather that the deposit insurance system distorts payoffs in such a way that risk-taking is more than fairly compensated. This distortion may extend to BHC nonbank affiliates, too, if the FDIC ends up insuring, de facto, some or all nonbank liabilities, as it has in some cases. The presence of moral hazard suggests that assuming that BHC managers want to diversify to reduce risk may not be correct. They may instead prefer to take advantage of expanded asset powers to increase risk.

Conclusions

The results of this analysis (using both accounting data and market data) challenge two major assertions made by proponents of expanded powers for BHCs. One is that BHC expansion into other financial industries would necessarily reduce the volatility of BHC profits. We found some evidence that this is true for the life insurance industry. But our results suggest it is not true for the securities or real estate development industries; indeed, our results suggest that entering those lines of business would increase the volatility of BHC profits.

The other assertion our results challenge is that any increased volatility that might result when currently prohibited activities became permissible would be fully offset by increased average profitability. We tested this view using a measure of bankruptcy risk that nets out the offsetting effects of increased mean and variance of returns. The results do not support the view for BHC mergers with securities or real estate development firms. For BHC mergers with life insurance firms, however, the estimated risk of bankruptcy does decline.[11]

In our judgement, these results understate the potential risk resulting from expanded powers for BHCs. That is because of the unavoidable bias in our methodology. The largest bias, we believe, is that attributable to the assumptions of no merger premiums and conservative post-merger capitalization of BHC acquisitions. In net, we would expect this bias to quantitatively overwhelm all others, and it makes BHC mergers with

Table 7

Capitalization of Bank Holding Companies and Other Financial Firms in 1971–84

Industry	Median Capital/Asset Ratio
Bank Holding Company	5.80%
Securities	20.05
Life Insurance	20.55
Property/Casualty Insurance	22.06
Other Real Estate	24.41
Real Estate Development	27.49
Insurance Agent/Broker	37.28

Source: Standard and Poor's Compustat Services, Inc.

[11] To repeat: all of these results were obtained with both accounting data (those in the paper) and market data (those in Appendix A). Some other results, however, depend on which data base is used. This is true of the risk effects of simulated BHC mergers with property and casualty insurers, insurance agents/brokers, and other real estate firms. As discussed in Appendix A, we have somewhat more confidence in the accounting measures than in the market measures. And the accounting measure results are clear: BHC mergers with all firms except life insurance companies increase BHC risk—both the volatility of profits and the risk of bankruptcy.

nonbank financial firms appear less risky than they might actually be. Thus, even the finding of risk-mitigating effects of BHC–life insurance mergers may be suspect.

We recognize that our assessment of the net effect of bias could be challenged. Less subject to challenge, however, are our findings regarding the relative effects of BHC mergers with firms from the different industries. Whatever the actual net effect from the various sources of bias, there is no reason to believe that it should affect the various industry combinations differently. And the findings on relative risk effects are, in themselves, potentially of great importance for public policy. Suppose policymakers are concerned about the risk of failure of BHC-affiliated banks and are less-than-completely confident about corporate separateness as a device to shelter such banks from risk. Then they should be aware that the risk implications of BHC–securities firm mergers, for example, appear to be quite different than those of BHC–life insurance mergers. And they should be more concerned about the former than the latter.

Appendix A
Accounting Data vs. Market Data

Some controversy exists about which type of data provides better measures of risk and return: accounting (book) data or market (stock price) data. This controversy is not inconsequential. Our data show that market returns are much more volatile than accounting returns for all industries studied. As may be seen by comparing Tables 3 and A2, the standard deviations of rates of return estimated with market data are roughly from five to ten times larger than those estimated with accounting data. Similarly, market estimates of Z-scores are from five to ten times smaller than accounting estimates. Since all our risk measures depend, directly or indirectly, on the volatility of profits, this is a potentially important problem for our study.

Each type of data has advantages and disadvantages. A widely recognized problem with accounting data, for example, is the intentional smoothing of reported profits. Market returns as reflected in stock prices are not intentionally smoothed. But regulators let commercial banks, for instance, value assets and liabilities at acquisition (historical) costs rather than at market values. (That is, they do not mark to market.)

Market data have their own problems. The volatility of market returns, for example, may reflect random noise or at least some kind of exogenous shocks which are unrelated to the true profitability of the firm. Indeed, no one as yet has satisfactorily explained why market returns are consistently as volatile as they are (Mehra and Prescott 1985). Market data also have a dating problem, which has been called *look-ahead bias.* Market prices have been found to respond to published accounting data. The publication date of financial data typically lags the end of the reporting period by two or three months. Therefore, computing market returns based on stock prices for the same date as the end of the accounting period may imply that the investor is able to forecast without error. (See, for example, Banz and Breen 1986.)

In sum, neither sort of data appears to be, in theory, unambiguously better. We have, therefore, used market data to replicate all the tests described in the accompanying paper. Since the results are not all the same, we have also done one more set of tests, to try to determine which type of data might be better for our purposes. The results of these tests seem to favor the accounting data.

Methodology

The profitability, or rate of return, measure used is R^m:

$$\text{(A1)} \quad \tilde{R}_j^m = \{\tilde{P}_j - P_{j-1} + \tilde{D}_j\}/P_{j-1}$$

where R^m is the market rate of return on equity, P is price per share of common stock, D is cash dividends per share, and j

is, again, the time period. Both P and D are adjusted for stock splits and stock dividends.

The first risk measure, S^m, is the standard deviation of R^m defined as in the paper's equation (2).

The second risk measure, Z^m, requires that the sample firms' balance sheet and income statement items be restated in market value terms, using market prices of common stock.

The market proxy for net income after taxes is π^m:

$$\text{(A2)} \quad \tilde{\pi}_j^m = \tilde{R}_j^m (c_j + c_{j-1})/2$$

where c is the number of common shares outstanding, adjusted for stock splits and dividends. The market value of total equity is E^m:

$$\text{(A3)} \quad E_j^m = c_j P_j.$$

And the market value proxy for total assets is A^m:

$$\text{(A4)} \quad A_j^m = E_j^m + L_j^a$$

where L^a is the accounting value of total debt plus preferred stock, which we use as an estimate of market value. This is, admittedly, a rough approximation because preferred stock is included and some of the debt is long term.

The market-based estimate of z, Z^m, can now be defined:

$$\text{(A5)} \quad Z^m = \left(\{\Sigma_{j=1}^n [2\tilde{\pi}_j^m/(A_j^m + A_{j-1}^m)]\}/n + \{\Sigma_{j=1}^n [(E_j^m + E_{j-1}^m)/(A_j^m + A_{j-1}^m)]\}/n\right)/S^m$$

where S^m is the estimated standard deviation of the rate of return on assets, $2\pi_j^m/(A_j^m + A_{j-1}^m)$.

A third risk measure is commonly used in the finance literature, one which can only be computed with market data. It is the beta coefficient of a firm's common stock, a measure of the relationship between the rate of return on the stock and the average rate of return to the market. Here, beta is obtained by estimating the time-series regression

$$\text{(A6)} \quad R_j^m = \alpha + \beta(R_j^{SP}) + u_j$$

where α is an intercept term; β is an estimate of the beta coefficient; R^{SP} is an estimate of the return to the total market, which is based on the value of Standard and Poor's 500-stock price index, P^{SP}:

$$\text{(A7)} \quad \tilde{R}_j^{SP} = (\tilde{P}_j^{SP} - P_{j-1}^{SP})/P_{j-1}^{SP}$$

and u is an error term.

Results

Unmerged Industries

Market rates of return on equity and risk statistics for the seven individual industries during the sample period are shown in Tables A1 and A2. The highest median rates of return are scored by the securities and real estate development firms at 28.7 percent and 20.1 percent, respectively. Median returns to property and casualty insurance, BHC, other real estate, and life insurance firms are all around 15 percent. Returns to insurance agents/brokers are lowest at 10.2 percent. The biggest difference between these results and those from the accounting data is the marked drop in the ranking of insurance agents/brokers, from highest to lowest, and the marked rise in the returns of both real estate industries. Otherwise, the market and accounting return results are generally the same: Returns to securities firms are quite high, and BHCs are roughly in the middle of the pack.

The market and accounting risk measures are similar, too, in terms of rankings. All three market measures of risk agree with the accounting measures that real estate and securities are the high-risk industries. BHCs and the insurance industries are fairly close, according to all these measures, but with market data BHCs are no longer the lowest risk; insurance agents/brokers are. What is most significant about the market risk measures, though, is the wide spread between the real estate and securities firms at the high end and insurance firms and BHCs at the low end.

Hypothetically Merged Industries

Shown in Tables A3 and A4 are market return and risk statistics for BHCs and for the six hypothetical industries formed by merging one BHC with one firm from another industry. Clearly, the highest median rates of return belong to the BHC–securities combinations; the lowest, to BHC–insurance agents/brokers. These results simply reflect the ordering of the unmerged industries.

Both market risk measures, S^m and Z^m, suggest that the highest-risk BHC mergers are those with securities firms and real estate development firms. According to both measures, risk is higher for those mergers than it is for BHCs alone. The lowest-risk BHC mergers are those with insurance agents/brokers, property/casualty insurers, and life insurers. These three mergers appear to mitigate BHC risk.

For the hypothetical industries, the principal risk differences between market and accounting data are the results for the BHC–property/casualty insurance and BHC–insurance agent/broker mergers. When accounting data are used, these mergers increase BHC risk; when market data are used, they decrease it.

Testing the Bankruptcy Risk Measures

Since the market and accounting risk measures disagree about the effects of some mergers, we devised a method to test which of these data types is better at measuring risk.

Basically, we compare our two sets of Z-scores to the debt ratings assigned to the BHCs in our sample. The debt rating agencies use accounting data, market returns, and, indeed, all publicly available information about firms whose debt they evaluate. Moreover, they are primarily interested in the likelihood of failure, which is the kind of risk our Z-scores are intended to capture. Thus, debt ratings are arguably a useful alternative risk measure against which to test our Z-scores.

Tables A1–A4

Using Market Data to Measure Profitability and Risk in Banking and Other Financial Industries

Tables A1 and A2

Historically, 1971–84

Table A1 Profitability

Industry	Median R^{m*}
Securities	28.65%
Real Estate Development	20.12
Property/Casualty Insurance	15.79
Bank Holding Company	15.62
Other Real Estate	15.46
Life Insurance	14.64
Insurance Agent/Broker	10.23

Table A2 Risk

	Median		
Industry	S^{m**}	Z^{m}†	β‡
Insurance Agent/Broker	.2458	4.036	.31
Property/Casualty Insurance	.2499	4.124	.57
Bank Holding Company	.2703	3.916	.83
Life Insurance	.2924	3.906	.76
Securities	.5248	1.954	1.69
Other Real Estate	.6430	1.885	1.40
Real Estate Development	.6441	1.744	1.77

Tables A3 and A4

If a Bank Holding Company Could Have Merged With One Nonbank Financial Firm

Table A3 Profitability

Industry§	Median R^{m*}
BHC–Securities	21.56%
BHC–Real Estate Development	15.82
BHCs Alone	15.62
BHC–Life Insurance	15.30
BHC–Other Real Estate	14.82
BHC–Property/Casualty Insurance	14.77
BHC–Insurance Agent/Broker	12.11

Table A4 Risk

	Median	
Industry§	S^{m**}	Z^{m}†
BHC–Insurance Agent/Broker	.2029	5.468
BHC–Property/Casualty Insurance	.2218	5.137
BHC–Life Insurance	.2366	4.646
BHCs Alone	.2703	3.916
BHC–Other Real Estate	.2766	3.978
BHC–Real Estate Development	.3006	3.596
BHC–Securities	.3636	3.279

*Market rate of return on equity

**Standard deviation of market return on equity

†Measure of bankruptcy risk

‡Beta coefficient of a firm's common stock

§Each hypothetical industry includes 100 firms created by merging 2 randomly selected firms from our 1971–84 sample of publicly traded financial firms.

Source: Standard and Poor's Compustat Services, Inc.

We obtained Moody's commercial paper ratings for all BHCs in the sample that were rated at the end of 1984, the last year of our time series. There were 71 altogether, 48 with paper rated P1—the highest rating—and 23 with paper rated P2 and lower. We then did two simple tests. The first was a two-way analysis of variance of Z-scores against the commercial paper ratings. With accounting data, the mean Z-scores were 60.8 for P1 firms and 44.5 for P2 firms. According to the standard *F*-test, these means were significantly different at the 95 percent confidence level. With the market data, the comparable mean Z-scores were 4.2 and 4.0, respectively, with only about 44 percent confidence that the true means were different.

Table A5

Market Measure of Capitalization of Bank Holding Companies and Other Financial Firms in 1971–84

Industry	Median Capital/Asset Ratio
Bank Holding Company	5.00%
Life Insurance	17.97
Securities	22.42
Property/Casualty Insurance	27.19
Real Estate Development	29.17
Other Real Estate	30.22
Insurance Agent/Broker	49.86

Source: Standard and Poor's Compustat Services, Inc.

Next, we used the two sets of *Z*-scores to classify BHCs into low-risk and high-risk groups and compared the results to groups based on the commercial paper ratings. Only outlying BHCs, those with *Z*-scores more than one standard deviation from the mean, were used in this procedure. The accounting *Z*-scores correctly classified more than 88 percent of the firms (15 out of 17), whereas the market *Z*-scores correctly classified only 47 percent (7 out of 15).

In sum, the accounting *Z*-scores appear to convey much of the information that is in commercial paper ratings, while the market *Z*-scores do not. To the extent, therefore, that commercial paper ratings are useful measures of bankruptcy risk, *Z*-scores computed with accounting data are better than those computed with market data.

Appendix B
Simulating Three-Industry Mergers

Proponents of expanded BHC powers might argue that the prospects for risk reduction increase with the number of new industries that BHCs are allowed to enter. Our limited examination of this issue suggests that they might be wrong.

The possible combinations of BHCs with other industries are far too many to analyze using our methodology. With seven sample industries, there are 63 possible combinations of BHCs and one or more other industries. Our simulations require many computations, and examining all possible combinations would simply cost too much. Moreover, examining all possible combinations could produce what appeared to be a good combination merely by chance.

Instead, we examine three-industry mergers involving combinations of a BHC, a securities firm, and a firm from one of the five other industries. We selected these combinations because much of the recently proposed legislation specifically involves opening up the securities industry to BHCs. The idea was to see if, by adding a third industry, the undesirable risk effects of BHC–securities mergers (discovered in the accompanying paper) could be reversed.

The answer, apparently, is no. Tables B1–B3 show the results of these simulated three-firm mergers, based on accounting data. Not surprisingly (considering the relatively high profitability of the securities industry), all the new industries' profitability measures are higher than that measure for BHCs alone. But all the three-firm risk measures also turn out to be higher than those for BHCs alone.

Tables B1 and B2

Measuring Profitability and Risk If a Bank Holding Company Could Have Merged With a Securities Firm and One Other Nonbank Financial Firm

Table B1 Profitability

Industry§	Median R*
BHC–Securities–	
Insurance Agent/Broker	17.45%
Property/Casualty Insurance	14.53
Real Estate Development	14.19
Life Insurance	14.02
Other Real Estate	13.38
BHCs Alone	13.12

Table B2 Risk

Industry§	Median S**	Median Z†
BHCs Alone	.0245	43.36
BHC–Securities–		
Life Insurance	.0311	34.26
Property/Casualty Insurance	.0397	27.01
Insurance Agent/Broker	.0453	23.17
Other Real Estate	.0508	23.53
Real Estate Development	.0516	20.79

*Rate of return on equity

**Standard deviation of return on equity

†Measure of bankruptcy risk

§Each hypothetical industry includes 100 firms created by merging 3 randomly selected firms from our 1971–84 sample of publicly traded financial firms.

Source: Standard and Poor's Compustat Services, Inc.

Table B3

Bank Holding Companies' Share of Assets in Simulated Three-Firm Mergers

Hypothetical Industry*	Median BHC Share
BHC–Securities–	
Other Real Estate	74%
Insurance Agent/Broker	68
Real Estate Development	61
Life Insurance	51
Property/Casualty Insurance	40

*Each hypothetical industry includes 100 firms created by merging 3 randomly selected firms from our 1971–84 sample of publicly traded financial firms.

Source: Standard and Poor's Compustat Services, Inc.

Appendix C
Sample Firms

Bank Holding Companies (146)

Affiliated Bankshares of Colorado, Inc.
Allied Bancshares, Inc.
American Fletcher Corporation
American Security Corporation
Ameritrust Corporation
Amsouth Bancorporation
Arizona Bancwest Corporation
Atlantic Bancorporation
Banc One Corporation
Banco Popular de Puerto Rico
BancOklahoma Corp.
Bancorp Hawaii, Inc.
BancTEXAS Group Inc.
Bank of Boston Corp.
Bank of New England Corporation
Bank of New York Company, Inc.
Bank of Virginia Company
BankAmerica Corporation
Bankers Trust New York Corporation
Banks of Iowa, Inc.
Banks of Mid-America Inc.
Barnett Banks of Florida, Inc.
BayBanks, Inc.
Boatmen's Bancshares, Inc.
Centerre Bancorporation
Central Bancorporation, Inc.
Central Bancshares of the South, Inc.
Central Fidelity Banks, Inc.
Centran Corp.
The Chase Manhattan Corporation
Chemical New York Corporation
Citicorp
Citizens and Southern Georgia Corporation
Citizens Fidelity Corporation
Citizens First Bancorp, Inc.
Colorado National Bankshares, Inc.
Comerica Incorporated
Commerce Bancshares, Inc.
Commerce Union Corporation
Continental Bancorp, Inc.
Continental Illinois Corporation
CoreStates Financial Corp
Cullen/Frost Bankers, Inc.
Deposit Guaranty Corp.
Dominion Bankshares Corporation
Equimark Corp.
Equitable Bancorporation
European-American Bancorp
Fidelcor, Inc.
First Alabama Bancshares, Inc.
First American Corp.
First Atlanta Corporation
First Bank System, Inc.
First Bankers Corp. of Florida
First Chicago Corporation
First City Bancorporation of Texas, Inc.
First Empire State Corporation
First Fidelity Bancorporation
First Florida Banks, Inc.
First Hawaiian, Inc.
First Interstate Bancorp.
First Kentucky National Corporation
First Maryland Bancorp
First National Cincinnati Corp.
First of America Bank Corporation
First Oklahoma Bancorporation, Inc.
First Pennsylvania Corporation
First Security Corporation
First Tennessee National Corporation
First Union Corporation
First Virginia Banks, Inc.
First Wisconsin Corporation
First Wyoming Bancorp.
Fleet Financial Group, Inc.
Florida National Banks of Florida, Inc.
General Bancshares Corp.
Hartford National Corp.
Horizon Bancorp
Huntington Bancshares, Incorporated
Indiana National Corporation
Interfirst Corporation
Intrawest Financial Corp.
Irving Bank Corporation
IVB Financial Corp.
J. P. Morgan and Co. Incorporated
Key Banks Inc.
Landmark Bancshares Corp.
Manufacturers Hanover Corporation
Manufacturers National Corporation
Marine Corp.
Marine Midland Banks, Inc.
Marshall & Ilsley Corp.
Maryland National Corporation
MCorp
Mellon Bank Corp.
Mercantile Bancorporation, Inc.
Meridian Bancorp, Inc.
Michigan National Corp.
Midlantic Banks Inc.
Money Management Corp.
Moore Financial Group Inc.
National Bancshares Corp. of Texas
National City Corporation
NBD Bancorp, Inc.
NCNB Corporation
Norstar Bancorp Inc.
Northern Trust Corporation
Northwestern Financial Corp.
Norwest Corporation
Old Kent Financial Corp.
Old Stone Corp.
Pan American Banks, Inc.
PNC Financial Corp
Rainier Bancorporation
Republic New York Corporation
Republicbank Corporation
Riggs National Corporation
RIHT Financial Corporation
Security Pacific Corporation
Shawmut Corp.
Society Corporation
South Carolina National Corp.
Southeast Banking Corporation
Southtrust Corporation
Sovran Financial Corporation
State Street Boston Corp.
Sterling Bancorp New York
Suburban Bancorp
Suntrust Banks, Inc.
Sunwest Financial Services, Inc.
Texas American Bancshares, Inc.
Texas Commerce Bancshares, Inc.
Third National Corp.
Union Natl. Corp. (PA)
Union Planters Corp.
United Banks of Colorado, Inc.
United Jersey Banks
United Missouri Bancshares, Inc.
United Virginia Bankshares, Incorporated
U.S. Bancorp
U.S. Trust Corporation
Valley National Corporation
The Wachovia Corporation
Wells Fargo & Company
Worthen Banking Corp.
Zions Utah Bancorporation

Life Insurance Firms (30)
Aetna Life & Casualty Co.
American Family Corporation
American General Corporation
American Heritage Life Invest Corp.
American National Insurance Co.
Business Men's Assurance Co. of America
Capital Holding Corporation
Colonial Life & Accident Insurance Co.
Colonial Penn Group, Inc.
Combined International Corp.
I.C.H. Corp.
Independent Insurance Group, Inc.
Jefferson-Pilot Corporation
Kansas City Life Insurance Co.
Lamar Life Corp.
Laurentian Capital Corp.
Liberty Corp.
Lincoln National Corporation
Manhattan National Corp.
Monarch Capital Corp.
Monumental Corporation
Northwestern National Life Insurance Co.
Protective Life Corp.
Provident Life and Accident Insurance Co.
Torchmark Corporation
The Travelers Corporation
United Companies Financial Corp.
Uslico Corp.
USLIFE Corporation
Washington National Corporation

Property/Casualty Insurance Firms (15)
American International Group, Inc.
American Plan Corp.
AVEMCO Corp.
Chubb Corp.
CIGNA Corp.
CNA Financial Corp.
Continental Corp.
Geico Corp.
General Re Corp.
Hartford Steam Boiler Inspection and Insurance Co.
Mission Insurance Group, Inc.
Orion Capital Corp.
SAFECO Corporation
The St. Paul Companies, Inc.
USF&G Corporation

Insurance Agent/Broker Firms (5)
Alexander & Alexander Services, Inc.
Corroon and Black Corp.
Equifax Inc.
Hall (Frank B.) & Co., Inc.
Marsh & McLennan Companies, Inc.

Real Estate Development Firms (31)
AMREP Corp.
Calprop Corporation
Campanelli Industries, Inc.
Centennial Group Inc.
Christiana Companies, Inc.
Deltona Corp.
Development Corp. of America
Fairfield Communities, Inc.
First City Industries Inc.
FPA Corp.
Gulfstream Land & Development Corp.
ITI Corp.
Kaufman & Broad, Inc.
Key Co.
Killearn Properties, Inc.
Koger Properties, Inc.
Leisure & Technology, Inc.
Lennar Corp.
Maxxam Group
M.D.C. Corp.
Nelson (L.B.) Corp.
Newhall Land & Farming Co.
Oriole Homes Corp.
Pulte Home Corp.
Punta Gorda Isles, Inc.
Radice Corp.
Royal Palm Beach Colony, Limited Partnership
Seligman & Associates, Inc.
Standard-Pacific Corp.
Starrett Housing Corp.
U.S. Home Corp.

Other Real Estate Firms (11)
Angeles Corporation
Arlen Realty & Development Corp.
Bay Financial Corp.
British Land of America
Grubb & Ellis Company
Horizon Corp.
New Mexico & Arizona Land Co.
PHH Group Inc.
Southmark Corp.
Weingarten Realty, Inc.
Wheeling and Lake Erie Realty Co.

Securities Firms (11)
Diversified Industries, Inc.
Dreyfus Corporation
Edwards (A.G.), Inc.
Fidata Corp.
First Boston, Inc.
Hutton (E.F.) Group Inc.
Integrated Resources, Inc.
Inter-Regional Financial Group, Inc.
Merrill Lynch & Co., Inc.
Paine Webber Inc.
Phibro Salomon Corporation

Source: Standard and Poor's Compustat Services, Inc.

References

Banz, Rolf W., and Breen, William J. 1986. Sample-dependent results using accounting and market data: Some evidence. *Journal of Finance* 41 (September): 779–93.

Berger, Allen N.; Hanweck, Gerald A.; and Humphrey, David B. 1987. Competitive viability in banking: Scale, scope, and product mix economies. *Journal of Monetary Economics* 20 (December): 501–20.

Boyd, John H., and Graham, Stanley L. 1986. Risk, regulation, and bank holding company expansion into nonbanking. *Federal Reserve Bank of Minneapolis Quarterly Review* 10 (Spring): 2–17.

Boyd, John H.; Hanweck, Gerald A.; and Pithyachariyakul, Pipat. 1980. Bank holding company diversification. In *Proceedings of a conference on bank structure and competition,* pp. 105–21. Chicago: Federal Reserve Bank of Chicago.

Buser, Stephen A.; Chen, Andrew H.; and Kane, Edward J. 1981. Federal deposit insurance, regulatory policy, and optimal bank capital. *Journal of Finance* 36 (March): 51–60.

Chase, Samuel B., Jr. 1971. The bank holding company as a device for sheltering banks from risk. In *Proceedings of a conference on bank structure and competition,* pp. 38–49. Chicago: Federal Reserve Bank of Chicago.

Chase, Samuel B., Jr., and Mingo, John J. 1975. The regulation of bank holding companies. *Journal of Finance* 30 (May): 281–92.

Dothan, Uri, and Williams, Joseph. 1980. Banks, bankruptcy, and public regulation. *Journal of Banking and Finance* 4 (March): 65–87.

Eisenbeis, Robert A. 1983a. How should bank holding companies be regulated? *Economic Review* 68 (January): 42–47. Federal Reserve Bank of Atlanta.

_____. 1983b. Bank holding companies and public policy. In *Financial services: The changing institutions and government policy,* ed. George J. Benston, pp. 127–55. Englewood Cliffs, N.J.: Prentice-Hall.

Jessee, Michael A., and Seelig, Steven A. 1977. *Bank holding companies and the public interest: An economic analysis.* Lexington, Mass.: D. C. Heath and Company, Lexington Books.

Kareken, John H., and Wallace, Neil. 1978. Deposit insurance and bank regulation: A partial-equilibrium exposition. *Journal of Business* 51 (July): 413–38.

Lawrence, Robert J., and Talley, Samuel H. 1976. An assessment of bank holding companies. *Federal Reserve Bulletin* 62 (January): 15–21.

Mehra, Rajnish, and Prescott, Edward C. 1985. The equity premium: A puzzle. *Journal of Monetary Economics* 15 (March): 145–61.

Merton, Robert C. 1977. An analytic derivation of the cost of deposit insurance and loan guarantees: An application of modern option pricing theory. *Journal of Banking and Finance* 1 (June): 3–11.

Rhoades, Stephen A. 1975. The effect of bank-holding-company acquisitions of mortgage bankers on mortgage lending activity. *Journal of Business* 48 (July): 344–48.

_____. 1980. The performance of bank holding companies in equipment leasing. *Journal of Commercial Bank Lending* 63 (October): 53–61.

Rhoades, Stephen A., and Boczar, Gregory E. 1977. The performance of bank holding company–affiliated finance companies. Staff Study 90. Board of Governors of the Federal Reserve System.

Rose, John T. 1978. Bank holding companies as operational single entities. In *The bank holding company movement to 1978: A compendium,* pp. 69–93. Washington, D.C.: Board of Governors of the Federal Reserve System.

Roy, A. D. 1952. Safety first and the holding of assets. *Econometrica* 20 (July): 431–49.

Savage, Donald T. 1978. A history of the bank holding company movement, 1900–78. In *The bank holding company movement to 1978: A compendium,* pp. 21–68. Washington, D.C.: Board of Governors of the Federal Reserve System.

Sharpe, William F. 1978. Bank capital adequacy, deposit insurance and security values. *Journal of Financial and Quantitative Analysis* 13 (November): 701–18.

Talley, Samuel H. 1975. Bank holding company financing. In *Proceedings of a conference on bank structure and competition,* pp. 124–35. Chicago: Federal Reserve Bank of Chicago.

_____. 1976. Bank holding company performance in consumer finance and mortgage banking. *Magazine of Bank Administration* 52 (July): 42–44.

Wall, Larry D. 1986. Nonbank activities and risk. *Economic Review* 71 (October): 19–34. Federal Reserve Bank of Atlanta.

The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.