Risk, Regulation, and Bank Holding Company Expansion into Nonbanking

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The Federal Reserve System, acting under statutory authority, has permitted bank holding companies (BHCs) to control thousands of nonbank firms. These operate in such diverse lines of business as discount brokerage, credit life insurance underwriting, data processing, futures commission merchanting, and export trading.

The Fed's motivation in expanding the range of permissible activities for BHCs is partly a desire to broaden the supply of consumer services and sharpen competition in those businesses. But the Fed's principal motivation is the belief that when a BHC acquires nonbank subsidiaries the risk of failure of its bank subsidiaries is reduced. This belief is based on two arguments. First, bank subsidiaries are strengthened when a BHC operates nonbanks profitably; yet, should those firms incur losses, bank subsidiaries are protected by the legal separateness of the BHC's corporate structure. Second, going into nonbank activities diversifies the BHC's assets, thus reducing the risk of failure of bank subsidiaries.

An opposing view challenges both of these arguments. First, placing nonbank activities in separate corporations does not insulate bank subsidiaries from failing nonbank subsidiaries; rather, it increases the risk of bank failure because nonbank subsidiaries are less regulated than bank subsidiaries. Second, when a BHC is given more investment opportunities it may decide to take on more risk.

The purpose of this study is to examine empirically the question underlying the second argument. That is, Does diversification into nonbank activities decrease or increase bank risk? As a practical matter, separating the risk of the bank subsidiary from the risk of the entire BHC is extremely difficult. Thus, in this study we have treated BHCs as consolidated organizations which survive or fail as single entities.

The key indicator of risk studied here is a measure of the probability that such an organization will fail. We have also studied components of this measure, including the mean rate of return on consolidated BHC assets and the standard deviation of that rate (a measure of its variability). Consistent with the motivating question, the key measure we have used to explain risk is the degree of a BHC's involvement in nonbank activities.

We have examined the relationship between the degrees of risk and nonbank involvement across a sample of the largest BHCs in the United States, using average BHC data for the period 1971-83. Over this 13-year sample period, we have found no evidence that a BHC's degree of involvement in nonbank businesses systematically increased or decreased its risk of failure. Thus, these data do not seem to support either of the above views.

However, using averages of the entire 1971-83 period could obscure important relationships because the BHCs' environment changed during that period. In the mid-1970s, the Fed substantially altered its regula-

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tory strategy. In response to financial problems involving nonbank subsidiaries, it tightened requirements for nonbank applications and generally expanded its supervision over BHCs, actions that have come to be known as the *go slow policy*. Since these policy adjustments could well have modified the behavior of regulated firms, we have also examined subperiods. Tests of 1971-77—when Fed regulatory policy was less stringent—have found that the degree of involvement in nonbank activities was positively associated with risk. Tests of 1978-83—when Fed regulation of BHCs was substantially tighter—have revealed no strong relationship between the extent of nonbank involvement and risk.

Overall, these results suggest that when BHC nonbank subsidiaries are largely left to their own devices, higher levels of nonbank activity may be associated with a higher, not a lower, risk of failure. We do not know what would cause this association, but it seems to be consistent with the opposing view. Our results also indicate, however, that when BHCs are more stringently regulated, the positive association between nonbank activity and risk may disappear. One plausible interpretation is that the Fed's regulatory tightening can have the intended effect.

The Arguments

The genesis of the debate that motivated this study was the passage of the 1970 amendments to the Bank Holding Company Act of 1956. These amendments authorized the Fed to determine what nonbank activities were permissible for a BHC (defined as a holding company controlling one or more banks), with the restriction that the activities had to be closely related to banking and provide benefits to the public. BHC entry into permissible activities was made subject to prior approval by the Fed.[1]

This broad congressional mandate gave the Fed sole responsibility to develop and implement BHC nonbank policies, and over the years it has done so. Both inside and outside the Fed, however, there has been considerable scholarly debate on the wisdom of expanding nonbank activities. One side has said such expansion will reduce risk; the other side, of course, has said the opposite. Unfortunately, neither side seems to have an indisputable theoretical argument.

Corporate Separateness

One argument justifying the expansion of nonbank activities was developed in the late 1960s and early 1970s, largely within the Fed (Chase 1971, Chase and Mingo 1975). It held that a bank's safety is enhanced when nonbank activities are carried on within a BHC, rather than within the bank itself or a subsidiary of the bank. If these nonbank subsidiaries are profitable, the reasoning went, they can be a source of strength to the bank subsidiaries.[2] At the same time it was recognized that nonbank subsidiaries could suffer losses. But this possibility was seen as demonstrating the theoretical value of the holding company form of organization: Holding company subsidiaries are separate corporations, so in principle, one subsidiary can suffer losses or even fail without affecting the others. Advocates of this view thought regulation could support banks' safety within BHCs by installing one-way valves that facilitate fund flows from a BHC's nonbank subsidiaries into its bank subsidiaries, but thwart flows in the opposite direction.

Various regulatory valves of this type were actually installed. For example, restrictions were placed on upstream bank subsidiary payments (like dividends and management fees) to their parent company, but not on downstream payments from the parent company to bank subsidiaries; and bank subsidiary lending to nonbank subsidiaries was limited, but lending in the opposite direction was not. This structure was expected to let BHC affiliation help banks but not hurt them. Nonbank subsidiaries could therefore be permitted to operate with a minimum of direct supervisory interference.

Critics of this view have pointed out that regulating nonbank subsidiaries less than bank subsidiaries has diminished bank safety because corporate separateness has not always protected the banks from failing nonbanks. Placement of nonbank activities in nonbank subsidiaries, they have argued, is often aimed less at protecting bank subsidiaries than at avoiding risk-constraining regulations. After all, many nonbank

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[1] The Bank Holding Company Act of 1956 defined a BHC as a holding company that owns 25 percent or more of the stock of or is able to control the election of a majority of directors of two or more banks. The act permitted the Fed to allow nonbank activities that were of a financial, fiduciary, or insurance nature as long as they were closely related to banking. Because one-bank holding companies were exempted from the act's provisions, many of them were established during the 1960s in order to acquire nonbank businesses that did not meet the requirements for BHCs. The 1970 amendments closed this loophole by eliminating the distinction based on the number of bank subsidiaries. The amendments expanded the range of nonbank businesses by authorizing the Fed to determine permissible activities subject to the proviso that such activities be closely related to banking and produce public benefits. BHCs owning nonpermissible businesses were generally required to divest by 1980. (For a good treatment of the subject, see Savage 1978.)

[2] The assumption that bank failures result in social costs and so should be avoided by public policies underlies much bank and BHC regulation in this and other countries. Whether or not it is true is a question beyond the scope of this paper.

activities are "nonbank" in name only; they could just as well be housed in banks without violating law or regulation. Moreover, when nonbank subsidiaries suffer losses, BHCs are often motivated to use bank subsidiary assets to cover those losses rather than to isolate bank subsidiaries from them. When this occurs, the risk-constraining objective of bank regulation is effectively circumvented (Eisenbeis 1983a,b).

Events of the early 1970s seem to support this opposing view. In that period, many BHCs experienced severe problems with their real estate investment trust subsidiaries. In addition, several BHCs failed—and with them, their subsidiary banks—due to problems with nonbank subsidiaries or with the parent company itself.[3] These developments showed that the one-way valve system was prone to leakages. In particular, when nonbank subsidiaries got into trouble, BHC managements were loath to let them declare bankruptcy, even when this was a legal option that would leave bank subsidiaries intact. Often the only way to bail out nonbank subsidiaries was to raid the bank subsidiaries. And when BHC managements were intent on diverting bank assets to troubled nonbanks, authorities found stopping them extremely difficult, at least at the level of regulation present in the early 1970s.[4]

In response to such problems, the Fed in the mid-1970s strengthened its regulation of BHCs by implementing the go slow policy. This policy was not put in place all at once, but rather was phased-in over several years, starting in 1974. The Fed slowed the pace of designating permissible nonbank activities and approving BHC applications for nonbank activities. It established capital requirements for BHC applications and denied several applications on the grounds that the proposed nonbank acquisition would not be a source of strength for bank subsidiaries. It expanded BHC reporting requirements. It instituted closer supervision of nonbank subsidiaries and increased its power to enforce examination recommendations (Coldwell 1976, Holland 1974, Lawrence and Talley 1976).

Asset Diversification

Another argument for broadening the range of BHC permissible nonbank activities has been that asset diversification may reduce risk. Several academic studies published in the mid-1970s have used modern portfolio theory to formalize the concept of BHC diversification. One implication of portfolio theory is that, if bank and nonbank returns are less than perfectly positively correlated (which seems very likely), the opportunity exists for reducing risk by diversifying. Moreover, several empirical studies have indicated substantial benefits from diversification into permissible nonbank activities. (The theoretical and empirical studies include Eisemann 1976, Jessee and Seelig 1977, Johnson and Meinster 1974, and Meinster and Johnson 1979.)

The opposing view holds that BHCs confronted with expanded business opportunities may choose to incur more, rather than less, risk. Proponents of this view point out that those studies which found risk-reducing benefits from asset diversification generally report their findings in terms of potentials, not in terms of actual realizations (Boyd, Hanweck, and Pithyachariyakul 1980).[5] That distinction is important because it may be incorrect to assume that, if given the opportunity to diversify so as to reduce risk, BHC managers will necessarily want to do so. Although intuitively plausible, that assumption is theoretically sound only if at least three basic conditions are met: shareholders are strongly averse to risk, they cannot efficiently diversify their asset portfolios in the securities market, and the existing system of deposit insurance does not affect BHC decisionmaking. Proponents of this view argue that these conditions could easily not be met.

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[3] The 1976 failure of Hamilton National Bank, for example, occurred shortly after it had purchased large amounts of substandard loans from its BHC's mortgage banking subsidiary. In 1974, Beverly Hills Bancorp, a BHC, experienced widely publicized financial problems. This culminated in a depositor and creditor run on its banking subsidiary, eventually resulting in intervention by the Federal Deposit Insurance Corporation and a forced merger with another bank.

[4] The one-way valve system may break down for other reasons as well. The practice of using similar names for the BHC and each of its subsidiaries (for marketing purposes) may induce bank customers to question the legal separateness of subsidiaries and thus precipitate bank runs when a nonbank subsidiary gets into trouble. Moreover, total corporate separateness is rarely maintained in BHCs. The subsidiaries can and do borrow from and lend to one another, exchange assets, and centralize services such as data processing, payments, and collections. BHC management often makes the major decisions for the operating subsidiaries that are in the common interests of the BHC as a whole.

[5] Since nearly all the nonbank activities permitted BHCs are also permitted national banks—with the major exceptions of industrial banking and underwriting credit life insurance—some argue that BHC nonbank activities are simply irrelevant to the risk of bank failure. Essentially the same asset configurations can be achieved by independent commercial banks.

These observations, however, overlook two important differences between bank and nonbank subsidiaries. First, when a line of business is located in a BHC's nonbank subsidiary, the BHC escapes the geographic restrictions that apply to banks. The subsidiary can expand into new geographic markets with different risk and return potentials. Second, the activity is likely to be less regulated if it is located outside a bank. Both of these differences make BHC diversification materially different than within-bank diversification, even in the same line of business. A study strongly supports that conclusion, at least during the first half of the 1970s (Boyd, Hanweck, and Pithyachariyakul 1980). Using historical data for bank and nonbank subsidiaries of BHCs, this study found that nonbank return distributions were typically quite different (generally much riskier) than return distributions of banks.

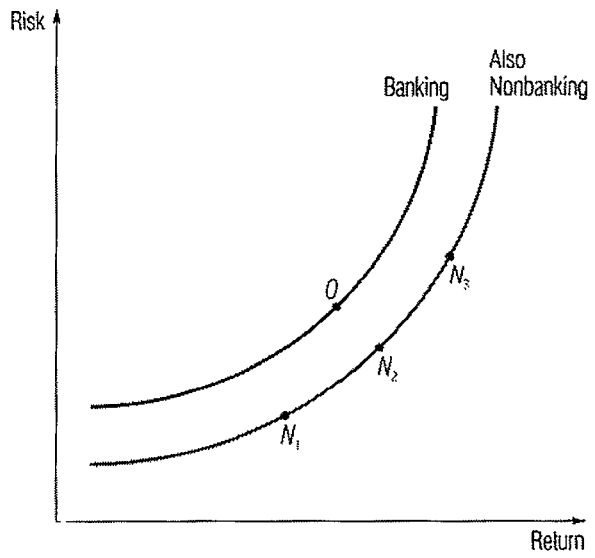
To follow their arguments, consider the accompanying figure, where the left curve represents the best attainable set of risk/return opportunities available in commercial banking. This curve has a positive slope, reflecting the general proposition that in financial markets one must accept higher risk to obtain higher returns. (For now, we do not need a quantitative definition of risk.)The right curve represents an expanded opportunity set for a BHC that may also enter some nonbank lines of business. This curve lies to the right of the banking curve because, with other business opportunities added to that of banking, the BHC may in principle be made better off and can't be made worse off. Some, but not all, of its possible asset configurations will result in less risk than those in commercial banking alone.

Next, consider a *risk-averse* BHC. By that we mean a BHC that dislikes risk and that, if confronted with two investment opportunities with the same expected rate of return, would always choose the one with lower risk. Suppose this BHC, if restricted to banking, chooses to operate at position O in the figure. If regulations let it go into some nonbank activities, it could adopt many new asset configurations. It might choose a new position like N_1 or N_2, both of which are less risky than O, and it would surely do so if its dislike for risk were strong enough. But if it were only mildly averse to risk, it might instead choose a new position like N_3 which is somewhat riskier than O but which compensates the BHC with higher returns.

Many economists are unwilling to assume that banks are even mildly risk averse. According to modern finance and economic theory, risk aversion is an attribute of investors, not corporations. A corporation's only concern is to maximize shareholders' wealth by finding underpriced assets and investing as much as possible in them. Corporations do not need to diversify because their individual shareholders can and will obtain whatever degree of diversification they desire in the securities markets. Banks and BHCs are corporations, of course, and if this theory is correct, diversification per se is not their objective.[6]

Recent literature on the so-called moral hazard problem in banking has shown that the Federal Deposit Insurance Corporation's (FDIC's) current policy for deposit insurance may induce bank managers to seek risky asset/liability structures (Buser, Chen, and Kane 1981; Dothan and Williams 1980; Kareken and Wallace 1978; Merton 1977; Sharpe 1978). This is not because bank managers and shareholders necessarily like risk, but rather because an increase in risk may also increase the returns they can expect. To oversimplify, they are

How Nonbanking Can Change a BHC's Risk/Return Choices



playing a game in which the payoff to shareholders is, Heads, we win; tails, the FDIC loses. Such a payoff is not a feature of most private insurance arrangements, and it can distort incentives so as to induce a preference for risk. This distortion of incentives could also extend to the nonbank activities of BHCs if nonbank losses can be passed along to the FDIC, that is, if the bank deposit insurer ends up actually insuring some or all of the liabilities of nonbank subsidiaries as well. Although we know of no studies explicitly dealing with the moral hazard problem in BHCs, this kind of loss shifting clearly has occurred. (See footnote 3.) Thus, the distortion of incentives due to deposit insurance could af-

[6]This theory assumes that corporate investors are widely and efficiently diversified, an assumption that may not hold for the owner-managers of many smaller banks and BHCs. These individuals often have a substantial fraction of their financial and human capital invested in the firms they manage, so their risk aversion and that of the bank or BHC are essentially the same. (See Boyd 1983 for an analysis of this topic.)

Such small owner-manager BHCs are not included in the sample of firms we have studied, and in principle our findings should not be extrapolated to them. As a practical matter, though, these small BHCs are typically not heavily involved in nonbank activities. As a group they would account for no more than a small fraction of BHC industry nonbank assets.

fect nonbank as well as bank subsidiaries of BHCs.[7]

In summary, what is an intuitively appealing assumption—that risk will be reduced if BHCs can go into nonbank lines of business—is highly suspect. Theoretically, risk could be reduced if BHC shareholders are strongly averse to risk, if they are unable to hold diversified wealth portfolios, and if moral hazard does not affect BHC decisionmaking with respect to nonbank subsidiaries. But if any of these conditions (and perhaps others) are not met, allowing BHCs to go into nonbank lines of business could increase the risk that BHC management undertakes.

Beyond Theory

Whether BHC diversification actually increases or decreases risk seems to be an empirical question. Theory alone does not answer it or strongly support either side of the debate. In this study, therefore, we do not form explicit expectations about the relationship between nonbank activity and risk, nor do we test a particular hypothesis. Rather, our task is to empirically investigate the risk effects of BHC expansion into nonbank businesses since the 1970 amendments were passed. Because the Fed altered its supervisory and regulatory procedures during the 1971-83 sample period, we also examine two subperiods—1971-77 and 1978-83—to see if these policy changes had any discernible effect on BHC behavior.

The Tests: Methodology

BHCs have exhibited varying levels of nonbank activity. Such variations across BHCs are perhaps due to differences in risk preferences, differences in bank and nonbank market opportunities, or even differences in supervision. In any case, we can test how risk measures are related to the level of nonbank activity across BHCs. Such cross-sectional tests will not let us draw strong inferences about risk preferences because we won't know the specific causes of observed cross-sectional differences in nonbank activity levels. However, the tests will at least let us determine how, in particular periods, levels of BHC risk and nonbank activity have been related—positively, negatively, or not at all. The tests may also suggest evidence as to what might happen if BHCs' nonbank investment opportunities were expanded.

The Variables

□ *Risk and Profitability*

We use two indicators of risk and one indicator of profitability as *dependent* variables, that is, variables whose values will be explained by others. The principal indicator of risk, labeled Z, measures the probability that a BHC will fail, or go bankrupt. Although the safety of bank subsidiaries is ostensibly what concerns bank regulators, experience shows that the safety of a BHC and its bank subsidiaries are inextricably related. Thus, we can safely assume that BHCs' risk of failure is a primary regulatory concern.[8]

We study a profitability indicator, labeled r, partly because it enters the definition of the bankruptcy measure Z and we want to know whether r and Z are internally consistent. We are also interested in the relationship between involvement in nonbank activities and profitability per se. Our other risk indicator, labeled S, is the standard deviation of r, that is, a measure of the variability of profit. This is a frequently used measure of risk, but is also of interest because it enters the definition of Z.

The profitability measure used in this study is the return on assets: BHC consolidated after-tax profits divided by BHC consolidated total assets. We could have used another measure of profitability, the return on equity. Both measures have been used in other studies. Our choice was based on our preference for simplicity. (For a discussion of these measures, see Lloyd-Davies 1985.) We label the rate of return on assets measure $\tilde{r}$, a random variable. [Throughout, a tilde (~) over a variable denotes a random variable.]

Let i denote an individual BHC, j denote a year, and n denote the length (in years) of the sample period. Then the empirical mean rate of return measure is

$$(1) \qquad \bar{r}_i = \sum_{j=1}^{n} (\tilde{r}_{ij}/n).$$

Thus, $\bar{r}_i$ is a sample estimate of ρ_i, the true mean of the $\tilde{r}_i$ distribution. (Throughout, a bar over a variable denotes a sample mean.)

Again, the risk measure S is a measure of the variability of the rate of return on assets, or specifically, the standard deviation of r. The estimated standard deviation of r for the ith holding company is

$$(2) \qquad S_i = \left\{\sum_{j=1}^{n} [(\tilde{r}_{ij} - \bar{r}_i)^2/(n-1)]\right\}^{1/2}$$

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[7] While the theory of moral hazard in banking is well developed, little, if any, empirical work has been done on its actual effect on the decisionmaking of bank managers. And for nonbank subsidiaries of BHCs, which are not formally insured by the government, even the theory remains to be developed.

[8] Again, corporate separateness is rare among BHCs. Thus, treating a BHC as a single consolidated entity is not unrealistic and arguably is a useful abstraction for modeling the risk of failure of a multisubsidiary organization. (See footnotes 3 and 4.)

where S_i is a sample estimate of the true standard deviation σ_i.

Finally, the risk indicator z measures the probability of a consolidated bankruptcy, or more precisely, $p(\tilde{\pi} < -E)$, where $p(\cdot)$ is a probability, π is BHC consolidated profits, and E is consolidated equity. Defining $k = -E/A$, where A is BHC consolidated assets, we can restate the probability of consolidated bankruptcy as

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

where ϕ is the probability density function of $\tilde{r}$. For many distributions such as the normal, which are completely characterized by a location and a dispersion parameter, equation (3) may be simplified by changing coordinates. If, for example, $\tilde{r}$ is normally distributed, as we assume, then

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

and

$$z = (k - \rho)/\sigma.$$

Here z is the principal risk measure, except that the sample estimate S is substituted for σ and the sample estimate $\bar{r}$ is substituted for ρ. Then the sample estimate of $-z$ (since z is a negative number) is the risk variable Z.

This Z is an estimate of the number of standard deviations below the mean that consolidated profits would have to fall to make consolidated equity negative. In this sense, it is an indicator of the probability of a consolidated bankruptcy.[9]

□ *Proxies for Nonbank Activity*

In this study, the values of the dependent variables are meant to be explained primarily by the values of the key *explanatory* variable, the degree of BHC nonbank activity. The measure of this variable, labeled Γ, is the ratio of BHC nonbank assets to BHC consolidated assets. Unfortunately, Γ cannot be directly computed with published financial statements because they do not separate the results of operations, assets, and liabilities of individual BHC subsidiaries. We therefore use several proxy measures of Γ.

One proxy is one minus the ratio of the BHC's total bank assets to its total consolidated assets. We label this variable γ:

$$(5) \qquad \gamma = 1 - (\text{Bank Assets}/\text{Total Assets}).$$

We must emphasize that the numerator and denominator in the fraction in (5) come from different sets of books, and the two are hard to reconcile. The main problem is that bank subsidiary assets from condition reports to regulators do not always equal the bank subsidiary assets which are included in the BHC's total assets as published in its consolidated balance sheets. Although we cannot observe the latter, we know this because the ratio of bank assets to consolidated assets sometimes exceeds the supposed upper limit of one.[10]

To obtain another estimate of Γ, we sum BHC consolidated deposits, federal funds purchases, and repurchase agreement liabilities; divide the sum by consolidated total assets; and subtract the ratio from one. In effect, we add up liabilities that are obviously bank-issued to obtain an alternative estimate of bank subsidiary assets. We label this variable γ':

$$(6) \qquad \gamma' = 1 - (\text{Estimated Bank Assets}/\text{Total Assets}).$$

This estimate of Γ can be derived entirely from consolidated balance sheets and so avoids problems in reconciling two different accounting sources. It suffers, however, from the fact that it uses an incomplete proxy for bank assets. Only those liability categories that are clearly distinguishable as banks' enter the numerator, and bank equity is ignored. This variable thus systematically understates the relative amount of bank activity by some unknown amount, and that amount may vary across BHCs.

A third proxy for Γ, γ'', is the ratio of the BHC's book value investment (equity) in its nonbank subsidiaries to

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[9] This Z risk measure has been used in several studies of BHCs and is discussed in detail in Hannan, undated. In our study and others, the actual Z estimates imply extremely low bankruptcy rates, at least assuming normality. (See, for example, Wall 1985.) Our Z estimates range between 12 and 166, with a median of 51. For several reasons, however, these measures surely underestimate the true probability of bankruptcy. The most important is that by this definition a BHC is not bankrupt unless it experiences one-period accounting losses that exceed its consolidated equity. Realistically, large BHCs such as those we study would likely experience depositor runs, liquidity problems, and massive regulatory intervention in much less dire circumstances. Whether they would be technically bankrupt or not is a moot issue.

Our empirical Z estimates do seem to meaningfully reflect risk, at least according to two simple-minded criteria. First, some preliminary tests indicate that the Z values are strongly associated with commercial paper ratings of the parent holding company as reported by Moody's Investors Service. Second, two sample BHCs (Continental Illinois and Crocker) experienced substantial financial difficulties in the 1980s. Both were in the lowest quintile of Z-scores.

[10] We offer two explanations for this finding. One, the most important, is that bank subsidiary assets are reported gross, whereas BHC consolidated assets reflect the effect of consolidation of intersubsidiary accounts. The other is that BHCs and their regulators may differ with respect to the effective date of acquisitions or sales of bank subsidiaries.

that in all its subsidiaries. These data are only available since 1976, a subset of the sample period. We therefore use γ'' only to check the reasonableness of γ and γ', not as an explanatory variable.

□ *Controls: Leverage and Size*

Besides the proxy measures for Γ, we use two other explanatory variables as controls: a measure of financial leverage and a measure of firm size.[11]

Financial leverage is included as an explanatory variable because in theory ρ, σ, and z are all related to it. (By *financial leverage* we mean a BHC's choice of debt versus equity financing.)As a measure of leverage we use the ratio of BHC consolidated total debt (including deposits and all other short-term borrowing) divided by BHC consolidated total assets. We label this ratio L/A.

To see the relationship between leverage and the three dependent variables, first note that the return measure r is net of (after) interest expense. As a result, both $\bar{r}$ and S are functions of financial leverage. Z, of course, is a function of $\bar{r}$ and S. To see these relationships, let A_i = consolidated assets, L_i = consolidated debt, r_{ai} = the rate of return on assets before interest expense, l_i = the rate of interest on debt, and π_i = consolidated profits, all for the ith BHC. Then, ignoring taxes,

$$(7) \qquad \bar{r}_i = \bar{\pi}_i/A_i = \bar{r}_{ai} - \bar{l}_i(L_i/A_i).$$

As the leverage measure L_i/A_i increases (other things held unchanged), the mean asset return $\bar{r}_i$ falls. This occurs, quite simply, because for accounting purposes returns to debtholders (interest payments) are treated as an expense.

Next, let S_i^2, S_{ai}^2, and $S_{l_i}^2$ be estimates of the variance of r_i, r_{ai}, and l_i, respectively, and $\text{cov}(r_{ai}, l_i)$ the estimated covariance between r_{ai} and l_i. Then

$$(8) \qquad S_i^2 = S_{ai}^2 + S_{l_i}^2(L_i/A_i)^2 - 2(L_i/A_i)\text{cov}(r_{ai}, l_i).$$

Obviously, S_i^2 is a function of L_i/A_i. One can easily show that S_i^2 has a minimum in L_i/A_i so that the observed relationship between these variables could theoretically be positive or negative or both, depending on the range of the data over which one tests.

Conceptually, the measure of nonbank activity Γ could influence mean rates of return as measured by $\bar{r}$ and risk as measured by S or Z in two different ways. First, if the before-interest asset rate of return distributions of nonbank activity are systematically different from those of bank activity, Γ may directly affect $\bar{r}_a$, S_a^2, and $\text{cov}(r_a, l)$. Second, if nonbank subsidiaries use systematically different financial leverage than bank subsidiaries and if these differences are not offset at the parent level, Γ will influence L/A. And as we have seen, $\bar{r}$, S, and Z are all related to L/A.

In the tests which follow, however, we ignore the possible indirect leverage effects and treat L/A as a separate control variable, distinct from Γ, even though Γ and L/A are probably related. Unfortunately, we don't know whether variations in Γ cause variations in L/A or vice versa. But this is not a critical problem. Regardless of what determines BHC financial leverage decisions, the risk effects of leverage itself are fairly well understood and susceptible to direct regulatory influence. Thus, to the extent that BHC nonbank activities affect performance indirectly through their effects on financial leverage, these effects are relatively innocuous from a regulatory perspective. What are less well understood are the effects of nonbank diversification on the distribution of r_a, and these effects are what we want to isolate.

We also include an *asset size* measure as an additional explanatory variable because firm size might serve as a rough proxy for bank asset diversification. Some have argued that large BHCs, whether involved in nonbank activities or not, typically have better diversified bank asset portfolios than small BHCs. From casual observation, the loan portfolios of large banks do seem more diversified geographically and by type of loan than those of small banks. If this observation is correct, bank asset diversification could affect our risk measures, S and Z, independently of the effects on S and Z of BHC diversification into nonbank business. Our size measure is the log of consolidated total assets, labeled $\ln(A)$.[12]

The Sample

We limit the sample to large U.S. BHCs for which the necessary data can be obtained from published sources. Our sample includes all domestic BHCs with total assets exceeding $5 billion at the end of 1983. We exclude five firms for which not enough data are available and a sixth which, during the sample period,

[11] These control variables are explanatory variables other than the γ's which may systematically influence the dependent variables. Control variables must be included because they may influence not only dependent variables, but also the observed relationship between the γ's and the dependent variables—the relationship we are really interested in.

[12] The variable A is in dollars and exhibits considerable scale differences across firms in the sample. To avoid problems of heteroskedasticity (error variance systematically related to one or more of the explanatory variables), A is always entered as a natural logarithm. However, coefficients and t-values of other variables are little affected if A'is included as a level.

the FDIC had become involved in managing. A sample of 64 firms remains. The period of study covers 13 years, from 1971 to 1983 (inclusive). The starting point is 1971 because that is the first full year in which the 1970 amendments were in effect. Data for 1984 became available too late for inclusion. The basic data set includes year-end consolidated total assets, deposits, purchased funds, and equity of BHCs; annual consolidated net income of BHCs; and year-end total assets of bank subsidiaries of BHCs.[13]

Relationships Among the Proxies

In Table 1, equations (1a), (1b), and (1c) show strong positive correlations between all three γ's. This gives us some confidence that we are indeed obtaining useful proxy measures of Γ since each of the three proxies is somewhat different and subject to different possible accounting errors. Equations (1d) and (1e) indicate that the relationships between the γ's remain strong even when L/A, the control variable for leverage, and $\ln(A)$, the control variable for size, enter as explanatory variables.

There is some evidence of association between the γ's and both L/A and $\ln(A)$. These relationships depend on whether γ or γ' is used as the dependent variable, suggesting that γ and γ' may contain somewhat different information. Yet we have no reason to prefer either variable. Some of the tests that follow, therefore, will include both as explanatory variables. In these cases, we will also do an F-test against the null hypothesis that coefficients of both γ and γ' are zero. Obviously, if this null were rejected, care would have to

[13] BHC consolidated data for 1976 and following years come from a data base maintained by the Board of Governors of the Federal Reserve System. We use this source for convenience only; these data are publicly available. BHC consolidated data prior to 1976 are from *Moody's Bank and Finance Manual*. Total assets of bank subsidiaries are from the report of condition submitted by banks to their regulators. The total bank assets for each BHC is from the Fed's Board of Governors.

Table 1

Testing for Relationships Among the Measures of BHC Nonbank Activity and the Control Variables in the Full Sample Period, 1971–83

Equation	Dependent Variable	Constant Term	Coefficient of: Nonbank Activity γ	γ'	γ''	Control Variables: Leverage L/A	Size $\ln(A)$	Proportion of Variation Explained $\bar{R}^2$
(1a)	γ	−.0643	—	.5722 (7.189)	—	—	—	.446
(1b)	γ	.0011	—	—	.4416 (9.721)	—	—	.597
(1c)	γ'	.1279	—	—	.4688 (7.266)	—	—	.451
(1d)	γ	−.4357	—	.6343 (7.849)	—	.5498 (1.969)	−.0101 (2.823)	.495
(1e)	γ'	.3872	.7987 (7.849)	—	—	−.5082 (1.605)	.0143 (3.731)	.542

Note: The sample includes 64 large U.S. bank holding companies. The equations are linear, but the variable $\ln(A)$ is a natural log. The numbers in parentheses are t-values.

Table 2

Testing the Full Sample Period, 1971–83, for Relationships Between BHC Nonbank Activity and BHC Profitability and Risk

Dependent Variable	Equation	Constant Term	Coefficient of: Nonbank Activity γ	Nonbank Activity γ'	Control Variables: Leverage L/A	Control Variables: Size $\ln(A)$	Proportion of Variation Explained $\bar{R}^2$	$F(2,59)$ [Significance]*
Profitability	(2a)	.1246	.0020	—	−.1234	−.0001	.663	—
			(.4215)		(8.257)	(.4515)		
(Mean Rate of Return on Assets)	(2b)	.1238	—	.0043	−.1219	−.0001	.668	—
				(1.021)	(8.298)	(.7520)		
$\bar{r}$	(2c)	.1221	−.0029	.0062	−.1202	−.0002	.663	.6057
			(.4275)	(1.017)	(7.882)	(.8481)		[.549]
Risk	(2d)	−.0075	.0011	—	.0139	−.0003	.056	—
			(.3877)		(1.547)	(2.546)		
(Standard Deviation of r)	(2e)	−.0080	—	−.0004	.0144	−.0003	.054	—
				(.1592)	(1.613)	(2.413)		
S	(2f)	−.0066	.0029	−.0023	.0127	−.0002	.046	.2645
			(.7098)	(.6166)	(1.382)	(2.015)		[.769]
	(2g)†	−1.993	1.270	—	11.64	−.2661	.171	—
			(.7213)		(2.190)	(3.876)		
	(2h)†	−1.979	—	−.0259	12.18	−.2666	.164	—
				(.1050)	(2.306)	(3.686)		
	(2i)†	−3.158	2.812	−.3034	10.57	−.2351	.168	.6384
			(1.125)	(.8710)	(1.935)	(3.037)		[.532]
Risk	(2j)	1,760.0	−88.18	—	−2,083.0	17.31	.358	—
			(.7826)		(5.940)	(4.065)		
(Probability of Bankruptcy)	(2k)	1,792.0	—	25.84	−2,120.0	17.16	.352	—
				(.2562)	(6.081)	(3.846)		
Z	(2l)	1,695.0	−220.6	165.8	−1,998.0	14.93	.362	.9842
			(1.379)	(1.163)	(5.598)	(3.169)		[.380]

Note: The sample includes 64 large U.S. bank holding companies. All equations except (2g)–(2i) are linear (see † note below), but the variable $\ln(A)$ is a natural log. The numbers in parentheses are t-values.

†Log-linear equation. Here γ is defined as $1/(1-\gamma)$ because some observations of the explanatory variables are negative and logs of negative numbers don't exist. This redefinition should not materially affect the results.

*The F-test is against the null hypothesis that coefficients of both γ and γ' are zero.

be taken in interpreting the results, since γ and γ' then would likely be capturing something besides variations in Γ.

The Tests: Results

The Full Sample Period

Table 2 first shows the results of tests with $\bar{r}$ the dependent variable. The coefficients of γ and γ' are not significantly different than zero at the 90 percent confidence level or higher when these variables enter one at a time [in equations (2a) and (2b)]. And when both γ and γ' enter [in equation (2c)], the null hypothesis that both coefficients are zero is rejected at about the 50 percent confidence level. This suggests there is little association between the pair (γ, γ') and $\bar{r}$.

More sophisticated instrumental variable tests have also been run, using γ as an instrument for γ' and vice versa. The idea of this procedure, roughly speaking, is to purge poorly measured explanatory variables (such as γ and γ') of undesirable random noise. None of these tests, however, uncover a statistically significant relationship between γ or γ' and $\bar{r}$. Tests using nonlinear specifications produce the same results. Overall, our tests strongly suggest that any association between Γ and $\bar{r}$ that may exist in these data is very weak.

In every specification with $\bar{r}$ the dependent variable, the coefficient of L/A is negative and significantly different than zero at a high confidence level. Given equation (7), this result should not be surprising.

Table 2 also shows the results of tests in which the risk measure S is the dependent variable [equations (2d)-(2i)]. With S dependent, choice of structural form seems to matter, so we have included both linear and log-linear regressions. There is no evidence, though, in either type of equation, of a relationship between either γ or γ' and S. The F-tests are perhaps most instructive, for they suggest there is about a 75 percent or a 50 percent chance [in equations (2f) and (2i), respectively] that coefficients of both γ and γ' are zero. Instrumental variable tests and numerous other specifications unanimously support the same conclusion: There is little evidence of association between Γ and S in these data.

Results with the control variables and S are different. The coefficient of L/A is positive and significantly different than zero at reasonably high confidence levels in the log-linear specifications [equations (2g)-(2i)]. The coefficient of $\ln(A)$ is consistently negative with t-values greater than 2 in all specifications, suggesting that risk is negatively associated with asset size.

Finally, the last rows of Table 2 present the results of tests with the risk measure Z the dependent variable [equations (2j)-(2l)]. Recall that Z is an indicator of the probability of bankruptcy and is a quite different measure of risk than S. Even so, the results of the Z tests are not qualitatively different than those of S. There is no evidence of association between Γ and Z, either in the results shown here or in other regressions, including instrumental variable tests. However, the Z tests indicate a strong negative association between L/A and Z and a strong positive one between $\ln(A)$ and Z. Since higher values of Z signal a lower probability of bankruptcy, the implications are the same as the S tests': Higher risk is associated with higher leverage and with smaller scale of operations.

The Subperiods

The results for the full sample period are consistent and easy to interpret. In essence, the risk and return measures appear to be unrelated to nonbank activity. As discussed earlier, however, the regulatory environment was not constant during 1971-83: Regulation of BHCs was substantially tightened toward the end of this period. Thus, we look at subperiods to see if risk and return measures may have been affected by that tightening. Since our methodology involves computing time series means and standard deviations, and since the overall sample only includes 13 years, the most reasonable way to define subperiods is to simply split the sample period in half; any finer partition would result in subperiods too short to permit much confidence in sample statistics. We look first at 1971-77, then at 1978-83.

The 1971-77 results are presented in Table 3. As with the full sample period, we find little evidence here of association between Γ and $\bar{r}$. The F-test [of equation (3c)] indicates there is about a 50-50 chance that coefficients of both γ and γ' are zero. However, these data do suggest a significant positive relationship between Γ and S and a significant negative relationship between Γ and Z. Both γ and γ' seem to work about equally well, and although we do not present all our tests, results are not very sensitive to specification. With either S or Z dependent, coefficients of γ or γ' or both are significantly different than zero at around the 99 percent confidence level [equations (3f) and (3i)]. Coefficients and t-values of the control variables L/A and $\ln(A)$ are generally of the same sign and magnitude as those in Table 2.

Results for the second subperiod, 1978-83, are presented in Table 4. They are much less clear-cut. In equations (4a) and (4b), $\bar{r}$ is positively associated with both γ and γ', but t-values are not high enough to instill

Table 3

Testing the First Subperiod, 1971–77, for Relationships Between BHC Nonbank Activity and BHC Profitability and Risk

Dependent Variable	Equation	Constant Term	Coefficient of: Nonbank Activity γ	Nonbank Activity γ'	Control Variables: Leverage L/A	Control Variables: Size $\ln(A)$	Proportion of Variation Explained $\bar{R}^2$	$F(2,59)$ [Significance]*
Profitability	(3a)	.1197	−.0039 (.8880)	—	−.1182 (8.267)	−.0001 (.4989)	.662	—
(Mean Rate of Return on Assets)	(3b)	.1216	—	−.0014 (.3113)	−.1203 (8.459)	−.0001 (.4205)	.658	—
$\bar{r}$	(3c)	.1185	−.0056 (.9173)	.0025 (.4008)	−.1172 (8.025)	−.0001 (.5219)	.657	.4690 [.628]
Risk	(3d)	.0029	.0056 (3.269)	—	.0012 (.2228)	−.0002 (2.980)	.253	—
(Standard Deviation of r)	(3e)	−.0004	—	.0058 (3.309)	.0043 (.7978)	−.0002 (3.259)	.256	—
S	(3f)	.0013	.0032 (1.398)	.0035 (1.476)	.0026 (.4694)	−.0002 (3.104)	.268	6.538 [.003]
Risk	(3g)	1,289.0	−467.1 (2.811)	—	−1,540.0 (2.862)	16.99 (2.460)	.210	—
(Probability of Bankruptcy)	(3h)	1,578.0	—	−542.4 (3.247)	−1,804.0 (3.458)	18.51 (2.742)	.239	—
Z	(3i)	1,473.0	−197.4 (.8817)	−403.9 (1.760)	−1,698.0 (3.165)	17.82 (2.618)	.236	5.639 [.006]

Note: The sample includes 64 large U.S. bank holding companies. The equations are linear, but the variable $\ln(A)$ is a natural log. The numbers in parentheses are t-values.

*The F-test is against the null hypothesis that coefficients of both γ and γ' are zero.

much confidence in that conclusion. In equation (4c), the null hypothesis that coefficients of both γ and γ' are zero is only rejected at about the 70 percent confidence level. Also, in equations (4d) and (4e), S is negatively associated with both γ and γ', but again t-values are around 1.5 and the F-test [in equation (4f)] only rejects the null hypothesis that both coefficients are zero at about the 75 percent confidence level. Finally, Z exhibits a weak positive relationship with γ and γ' [in equations (4g) and (4h)], but there is nearly a 50 percent chance [in equation (4i)] that both coefficients are zero.

Using different regression specifications with the

Table 4

Testing the Second Subperiod, 1978–83, for Relationships Between BHC Nonbank Activity and BHC Profitability and Risk

Dependent Variable	Equation	Constant Term	Coefficient of: Nonbank Activity γ	Nonbank Activity γ'	Control Variables: Leverage L/A	Control Variables: Size $\ln(A)$	Proportion of Variation Explained $\bar{R}^2$	$F(2,59)$ [Significance]*
Profitability	(4a)	.1261	.0081 (1.587)	—	−.1239 (6.922)	−.0001 (.6579)	.582	—
(Mean Rate of Return on Assets)	(4b)	.1245	—	.0045 (1.046)	−.1209 (6.633)	−.0002 (.9700)	.572	—
$\bar{r}$	(4c)	.1262	.0079 (1.173)	.0002 (.0380)	−.1238 (6.752)	−.0001 (.5607)	.575	1.238 [.297]
Risk	(4d)	−.0076	−.0055 (1.456)	—	.0112 (.8400)	−.0001 (.7066)	.000	—
(Standard Deviation of r)	(4e)	−.0060	—	−.0051 (1.625)	.0081 (.6077)	.0000 (.0843)	.007	—
S	(4f)	−.0065	−.0027 (.5344)	−.0037 (.8832)	.0091 (.6706)	−.0000 (.0862)	.000	1.447 [.244]
Risk	(4g)	2,019.0	229.1 (1.125)	—	−2,242.0 (3.119)	11.39 (1.307)	.117	—
(Probability of Bankruptcy)	(4h)	1,957.0	—	194.1 (1.137)	−2,123.0 (2.936)	6.548 (.6537)	.117	—
Z	(4i)	1,987.0	136.3 (.5064)	120.0 (.5318)	−2,173.0 (2.960)	8.214 (.7747)	.106	.7661 [.469]

Note: The sample includes 64 large U.S. bank holding companies. The equations are linear, but the variable $\ln(A)$ is a natural log. The numbers in parentheses are t-values.

*The F-test is against the null hypothesis that coefficients of both γ and γ' are zero.

1978–83 data (not shown here) affects the results somewhat, but never makes them clear-cut. After looking at numerous tests, we are left with the same general impression given by Table 4. That is, there may be a weak positive relationship between Γ and $\bar{r}$ and between Γ and Z and a weak negative relationship between Γ and S. However, we would not bet on any of these relationships, given the low significance tests.

The 1978–83 subperiod results are quite a contrast to those of the earlier 1971–77 subperiod, which show little evidence of association between Γ and $\bar{r}$, but strong evidence of a positive association between Γ and S and

a negative association between Γ and Z. The two subperiods obviously were quite different.

Corroborating Evidence

Our results for the 1971-77 subperiod are partially corroborated by another set of findings. It comes from an unpublished 1981 study by Boyd and Pithyachariyakul (hereafter abbreviated BP). The BP study uses confidential data on individual BHC subsidiaries collected by Federal Reserve Banks. By aggregating individual subsidiary data, BP estimate Γ directly, thereby avoiding many of the accounting problems we faced. The BP data include all BHCs with nonbank subsidiaries reporting to the Fed. Data problems reduced the sample to 435 BHCs and 895 nonbank subsidiaries in 1977.[14]

Based on the BP data, Table 5 shows average values of Γ, $\bar{r}$, S, and Z for five groups of BHCs ranked according to Γ. The Γ cutoff values for each group were chosen arbitrarily, except for the requirement that each group include a reasonably large number of firms. For groups 1-4, average values for both $\bar{r}$ and S are about the same, which suggests there is no relationship between these variables and Γ. But in group 5, which includes BHCs with the highest ratios of nonbank activity, the average values of both $\bar{r}$ and S jump sharply. Meanwhile, the average values of Z fall continuously across sample groups.

Formal statistical testing of these data reveals a positive relationship between Γ and $\bar{r}$ and between Γ and S and a negative relationship between Γ and Z. All are statistically significant at high confidence levels. With $\bar{r}$ and S dependent, the best fits are highly nonlinear, increasing with Γ at increasing rates.

In summary, results in the BP study covering the 1971-77 period are in several ways similar to those presented in Table 3. Both find a strong positive association between Γ and S and a strong negative association between Γ and Z. However, BP find a

[14] Sample size and composition changed over time; there was considerable entry and some exit of nonbank subsidiaries during 1971-77.

Table 5

Another View: Profitability and Risk of BHCs Grouped by Level of Nonbank Activity in 1971-77

Group	Level of BHC Nonbank Activity $\left(\Gamma = \frac{\text{Nonbank Assets}}{\text{Total Assets}}\right)$	Number of BHCs	Profitability: Average Nonbank Activity Γ	Profitability: Average Return on Assets $\bar{r}$	Risk: Average Standard Deviation of Return S	Risk: Average Probability of Bankruptcy Z
1	$0 \leq \Gamma_i < .005$	118	.2%	.79	.17	92.7
2	$.005 \leq \Gamma_i < .015$	101	1.0	.81	.22	72.0
3	$.015 \leq \Gamma_i < .025$	60	2.0	.80	.21	68.0
4	$.025 \leq \Gamma_i < .050$	65	3.7	.79	.22	55.4
5	$.050 \leq \Gamma_i$	91	18.0	1.34	1.08	37.3
1-5	$0 \leq \Gamma_i$	435	4.8	.91	.38	67.3

Source: Boyd and Pithyachariyakul 1981

strong positive association between Γ and $\bar{r}$ which we do not. We are not sure what accounts for the difference, although we suspect it is due to differences in sample composition or differences in the way that Γ was estimated.

Another study partially corroborates our findings for the second subperiod. Wall (1985) has investigated 155 BHCs during 1975-84, a sample period not too different from our second subperiod, 1978-83. He uses a Z risk measure much like ours, except that his Z values are estimated using return on equity instead of return on assets. Wall (1985, p. 17) summarizes his findings this way: "While nonbank subsidiaries have tended to reduce the risk of failure, their mean effect on BHC risk is statistically insignificant and quantitatively quite small." This is little different from our interpretation of the 1978-83 subperiod. However, as the above statement suggests, Wall interprets his study (which does not include the first half of the 1970s) as providing at least weak evidence that nonbank activities reduce BHC risk. Our conclusions, based on both his and our results, are less optimistic.

Conclusions

Over the full sample period, 1971-83, we find no evidence of a significant relationship between BHC nonbank activity and any risk or return measures. During the first subperiod, 1971-77, however, our tests suggest that nonbank activity is positively related to risk as measured by the variability of return on assets and the probability of bankruptcy. Both relationships are quite strong. A previous study covering the first subperiod found a positive association between nonbank activity and return on assets, but we find no significant relationship between these variables. We are not sure what explains this discrepancy. In the second subperiod, 1978-83, we find a positive relationship between nonbanking and return on assets and a negative association between nonbanking and both the probability of bankruptcy and the variability of return. The relationships are weak, however, and significance tests are relatively low, so we don't have much confidence in these second subperiod findings.[15]

In combination, results of the statistical tests provide support for at least two conclusions. One is that the risk effects of BHC nonbank activities were very different in the two subperiods. The question now is, Why? While other answers are possible, we think the primary cause of the changed risk relationship must have been the imposition of the Fed's go slow policy. We know many of the procedural changes that this shift in regulatory philosophy led to and the intent behind them: to constrain the risk exposure of BHC nonbank subsidiaries.

One could argue, of course, that Fed policy may have actually been ineffective; perhaps, instead, the mid-1970s saw exogenous changes in the risk of permitted nonbank activities or in the risk preferences of BHC management. We are not aware, however, of any independent evidence supporting such conjectures. A somewhat more appealing alternative explanation is a learning curve effect. This idea is that managers getting involved in new lines of business, including BHC managers, need time to learn the ropes, and during that transitional time profitability may fluctuate sharply. The problem with this explanation, though, is that with few exceptions permitted nonbank activities have been functionally very close to traditional bank activities. And some of the activities that have proven troublesome and often unprofitable for BHCs are ones in which bankers have long-standing expertise (consumer finance and mortgage banking, for example). The most plausible explanation for the empirical findings thus seems to be that regulatory tightening had its desired effect on BHC risk-taking through nonbank subsidiaries. This suggests that regulation and supervision of nonbank activities can be at least partially effective in limiting the risk exposure of BHCs.

The other conclusion the tests support is that some

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[15] We did some tests using yet another risk measure as the dependent variable, the so-called beta of a BHC's common stock (which, vaguely, is a measure of the relationship between a stock's return and the average return in the stock market). The equation below is representative of these tests, in which the dependent variable was beta as reported by the *Value Line Investment Survey:*

$$\beta_{77,83} = \underset{}{.0480} + \underset{(5.082)}{.1106}\ln(A) - \underset{(.6907)}{1.034}L/A + \underset{(3.166)}{2.232}\gamma - \underset{(.1313)}{.0766}\gamma'$$

for which $\bar{R}^2 = .617$ and $n = 38$. In some specifications, we used the beta estimate for 1983, the end of the sample period. In others (including the above) we used a simple average of the 1977 and 1983 beta estimates. All the explanatory variables were computed using the full sample period.

Which beta measure was used in the tests and whether or not control variables were included did not seem to make much difference. The coefficient of γ was always positive and significantly different than zero at a high confidence level. So, too, was the coefficient of γ' if γ was excluded. Beta did not seem to be related to the leverage measure L/A, but was strongly positively related to size, as represented by $\ln(A)$. Other researchers have also reported a positive association between BHC size and beta (Booth, Officer, and Henderson 1985).

Interpreting these results is a problem. Beta is by construction a measure of systematic risk only, and BHCs' portfolio choice is severely restricted by regulation—to the point that they cannot invest in most equities. As a result, they may be exposed to very substantial unsystematic as well as systematic risk. But from a regulatory perspective and from the perspective of this study, what matters is total risk, not just a component of it. Unfortunately, we do not know the relationship between beta and total risk for BHCs.

such regulation and supervision may be needed—at least if public policymakers consider bank failures highly undesirable. We see no evidence that BHC management will voluntarily diversify nonbank assets so as to reduce risk. In the first subperiod, when more dependence was placed on legal separateness and less on regulatory intervention, BHC nonbank activity was strongly associated with higher risk levels, however risk was measured, and this result was obtained in two largely independent sets of tests. In other words, when management was left more to its own devices, those BHCs with above-average nonbank activity also exhibited above-average risk. Overall, our findings seem most consistent with the opposing view discussed above—that is, the pessimistic view of BHC diversification and bank risk.[16]

What does all this say about recent proposals to substantially expand the nonbank powers of BHCs into such areas as insurance underwriting, investment banking, and real estate? Commenting on this question takes us outside the confines of the empirical results and into the realm of conjecture. For what it's worth, though, we are concerned about such proposals. We see little evidence that above-average nonbank activity has been associated with below-average risk; indeed, we see the opposite relationship in the first subperiod. If results of these cross-sectional tests indicate how future cross sections might look after major expansions of nonbank powers, there is reason for caution.

Of course, some degree of supervisory attention could probably control risk-taking. But the proposed activities are further removed from banking than those permitted during our sample period, so presumably would be more difficult for bank regulators to monitor and control. Some of these activities also seem much riskier than traditional commercial banking.

Corporate separateness could somehow be enhanced, too. This would provide better protection for bank subsidiaries, without requiring high levels of regulation and supervision of nonbank subsidiaries. But enforced corporate separateness reduces the appeal of the holding company form to the industry and, if carried to the extreme, renders BHCs redundant. That is, market investors can already choose to invest X percent of their portfolios in a bank stock and Y percent in, for example, an insurance stock. We are not convinced that this approach to expansion of BHC powers holds much promise either.

Finally, our results provide a policy-oriented observation on a peripheral issue. In some of our tests we find evidence of a negative association between asset size and risk, which we tentatively interpret as a bank asset diversification effect. Since this relationship is not central to our study, we have not spent much time investigating it. But it does merit comment, for the effect of size (or scale) is an important policy issue in banking. If our tentative interpretation is correct, large banks may have chosen (or been forced by supervisors) to take advantage of scale in some way so as to reduce risk. This finding does not necessarily conflict with our conclusions about nonbank diversification. Risk/return tradeoffs could be systematically different for banks than for nonbank subsidiaries, as could supervisory scrutiny of asset diversification. In any case, if a negative size/risk relationship were to hold up under further testing, this could be an important finding in its own right. There is little evidence of economies of scale in banks beyond a modest size—say, $50 million or $100 million in total assets. Yet our sample is composed entirely of firms much larger than that, the smallest having consolidated assets over $5 billion in 1983. Previous studies of scale economies have concentrated primarily on costs or profitability as the dependent variable. Possibly, our tests suggest, they should have been looking at risk.

[16] As discussed, we do not think the learning curve is the correct explanation for the empirical results reported here. Even if it were correct, though, it would not overturn our second conclusion, that regulation and supervision of nonbank activities seems warranted. The safety of the banking system should be protected during learning periods, and these can apparently be quite lengthy. Thus, regulation and supervision of nonbank subsidiaries of BHCs would still seem appropriate for a number of years after each new expansion of nonbank powers.

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