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MULTIBANK HOLDING COMPANIES AND BANK BEHAVIOR

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Introduction

The most dramatic development in banking in recent years has been the rise of bank holding companies. More than 1,750 of these banking organizations now control most of America's bank assets and deposits. For example, Chart 1 shows that Virginia bank holding companies control almost 80 percent of the state's deposits. Twelve of these Virginia bank holding companies are multibank holding companies (MBHCs), that own a total of more than 110 banks. Clearly, therefore, MBHCs have the potential to influence banking over as much as a statewide area, where they are allowed to operate.[1]

Bank regulators thus should possess empirical evidence showing how MBHC banks differ from "independent" ones in important respects, to guide their decisions. Do MBHCs create external and internal benefits that justify their acquisition of additional banks? Do their affiliates essentially resemble independent banks with similar characteristics, as implied by the emphasis some MBHCs place on decentralized local decision-making and management? Alternatively, do MBHCs operate their banks as semi-monopolists, by creating or exploiting an anticompetitive banking climate, as some independent bankers believe [6]?

This study seeks to shed new light on these questions, particularly since recent developments in bank regulation may encourage further MBHC expansion. The 1970 amendments to the Bank Holding Company Act [2] removed the regulatory advantages of one-bank holding companies. Many previous one-bank holding companies have been acquiring other banks. This trend should continue, particularly if the economy recovers. Moreover, some bankers and bank regulators have proposed that MBHC acquisitions of banks in states other then those in which the MBHC's principal office is located be

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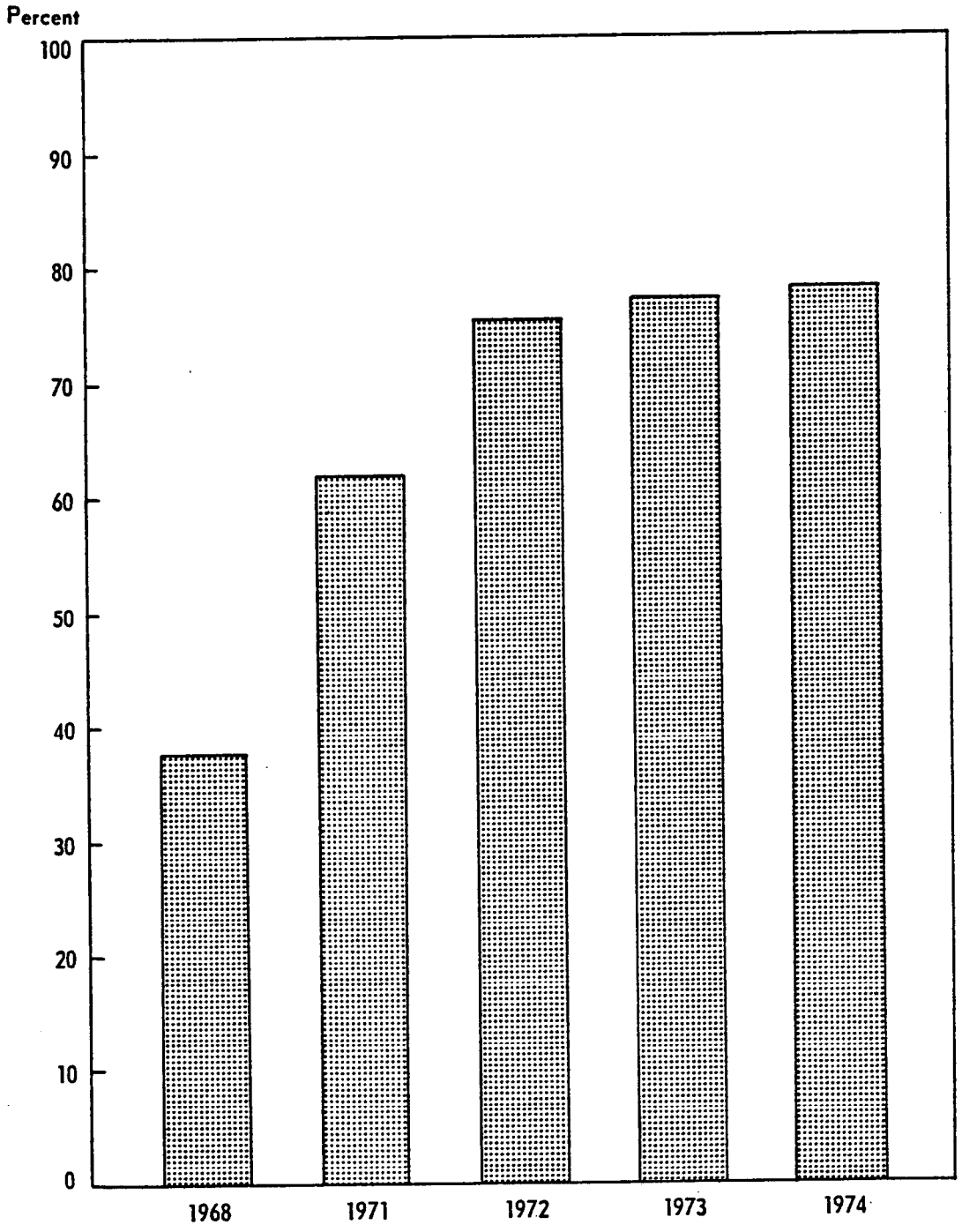
[1] 276 MBHCs controlled 2,122 banks with 8,887 branches, which held 38.41% of all U.S. commercial bank deposits as of December 31, 1974. Federal Reserve Bulletin, June, 1975, pp. A76-A79. Details of bank holding company regulation are presented in [2].

Chart 1

PERCENTAGE OF VIRGINIA BANK DEPOSITS CONTROLLED BY VIRGINIA BANK HOLDING COMPANIES



SOURCE: Federal Reserve Bank of Richmond.

allowed--or even encouraged if problem banks are for sale.

Preview

This study briefly examines some theoretical implications of MBHC affiliation for bank behavior. It then reviews previous research concerning these implications, and their shortcomings. The main part of the paper examines the specific implications of MBHC affiliation for bank behavior using three techniques of analysis, based on a large sample of banks over time. The major emphasis of the analysis is the examination of differences in six bank performance ratios that may be associated with MBHC affiliation. Finally, the study concludes with a summary of its findings and their implications for bank regulation.

How MBHC Control Affects Banks: Theory

MBHC affiliates, as components of banking organizations larger than most independent banks, may experience significant economies of scale.[2] These economies may reflect both "real" economies of management and "pecuniary" economies of portfolio diversification. MBHCs generally have a larger asset base and serve a larger geographical territory than most independent banks. These banking organizations thus may facilitate operating efficiencies that are available only from large-scale production, such as the provision of advertising, auditing, corporate planning, data processing, specialized lending, and trust services to their affiliates. If these internal services allow MBHC banks to reduce their costs for a given level of output then, ceteris paribus, their profitability should rise. The prices of their services

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[2] The theoretical relationships between capital, cost, reserves, risk, and size in banking are rigorously explored in Ernst Baltensperger, "Economies of Scale, Firm Size, and Concentration in Banking," Journal of Money, Credit, and Banking, August, 1972, and Baltensperger, "Costs of Banking Activities-Interactions Between Risk and Operating Costs," Ibid.

may also decline, if prices are based on costs and are used as a competitive strategy by these banks.

It is also possible that MBHC control may impose another layer of managerial superstructure on a bank, which could reduce a MBHC bank's profits--as management and service charges paid to its parent MBHC raise its costs. This extra layer of management may also reduce a MBHC bank's competitive flexibility, i.e. its ability to meet local conditions.

MBHC banks should theoretically benefit from the spreading of operating and portfolio risk within a MBHC. The pooling of funds made possible by affiliation will tend to reduce the MBHC's overall cash requirements, hence, those of most of its subsidiaries. A MBHC bank should thus need relatively little nonearning cash--particularly correspondent balances. MBHC banks, able to draw on their BHC or their sister banks if they need cash, can afford to lend a larger proportion of their deposits than nonaffiliated ones. This increased supply of credit should, ceteris paribus, lower their loan interest rate, if the demand curve for loans has a negative slope. Alternatively, the lower portfolio risk of a diversified MBHC may allow its subsidiaries to seek out assets with higher risk and yield (e.g., consumer loans) than independent banks would pursue.[3]

The reduced portfolio risk possible within MBHCs should alter the "capital" requirements of affiliated banks. Logically, with the variance of the MBHC's overall portfolio repayment distribution reduced relative to most independent banks, in both the sources and uses of funds, MBHC affiliates feel that they should "require" a lower protective cushion of equity capital than their competitors, if they do not extend excessively risky loans (such as credit to real estate investment trusts.)

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[3]Imperfect competition in banking may allow competitors to charge different prices, or to restrict the extent of their services by choosing their "product mix", in the same area.

MBHCs claim that their banks can have a larger equity base than independent ones, because of superior MBHC access to stock markets. But although MBHC banks may have this ability to raise capital, they should require less capital for any level of risk assets than independent banks, as found by [10]. In turn, this more leveraged financial position should raise the profitability of MBHC banks.

Some bankers believe that MBHCs run their banks "anticompetitively" [20, p. 3]. If MBHCs behave as the oligopolists or partial monopolists that this viewpoint postulates, then their banks may exhibit one or more of the following: higher loan rates, lower time and savings deposit interest rates, higher pretax asset returns, or higher profitability, than other banks. (See [6].) In particular, most MBHC banks would have lower loan/deposit ratios than independent banks if they were to restrict output anticompetitively--contrary to the previous reasoning.

How MBHC Control Affects Banks: Previous Evidence

Most of the theoretical arguments for or against MBHCs also apply to the issue of the desirability of large versus small banks, particularly branching systems versus unit banks. Accordingly, much of the evidence that bankers cite when discussing the desirability of MBHCs is drawn from studies of bank branching and bank size that were made without specific reference to MBHC control of the banks studied. Several studies, however, have attempted to measure the direct effects of MBHC control on bank behavior. Most of them attempt to control for the effects of bank size, branching, market demand, etc. on bank behavior, by pairing an independent bank with a roughly comparable MBHC bank.

These studies differ in their conclusions. Some find that MBHC banks differ significantly from independent ones, while others find that the two types of banks resemble each other strongly. The most important results of these papers can be summarized below, where they bear on issues examined in this study.[4]

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[4]This comparison treats studies that use different analytical techniques, sampled banks, and time periods. For further comparisons among them, see [16].

The studies suggest that MBHC banks' prices may differ from those of other banks. Two studies find that MBHC control does not raise loan interest rates significantly [12, 17], while four studies find that it has possibly mixed effects on loan rates [4, 5, 10, 19], and one paper finds that it depresses loan rates [3]. Moreover, three investigators show that MBHC affiliation raises time and savings deposit interest rates at a nonsignificant level [4, 11, 17], one researcher finds that it causes mixed effects on these interest rates [19], while another writer shows that it lowers deposit interest rates at a nonsignificant level [3].

Most of these studies show that MBHC affiliation does affect bank portfolios, though. MBHC banks tend to hold fewer cash items and U.S. Government securities than other similarly-sized banks. In turn, they should be able to invest these "excess" internal reserves in earning assets, such as loans. Hence, their loan to asset (or loan to deposit) ratio may be significantly greater than that of non-MBHC banks [10, 12, 15, 17], although two studies find that their loan ratio is not significantly higher than that of nonaffiliated banks [3, 19].

The internal net effect of MBHC affiliation for a bank may be summarized by two measures: revenue earned on assets and profitability. Because MBHC banks put their excess cash to work, their operating revenue/assets ratio exceeds that of other banks [10, 12, 19]. The rise in costs that is typically associated with MBHC affiliation [10] seems to prevent the higher revenues of MBHC banks from flowing through into profitability, however. According to the evidence of several studies, the profitability of individual banks does not seem to depend on whether they belong to a MBHC or not [4, 12, 15, 17, 19]. Indeed, MBHCs may acquire banks not to improve the profitability of the banks themselves,[5] but to attain such corporate goals as statewide deposit share

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[5] An explanation of why MBHCs may even be willing to incur lower earnings per share in the short run by acquiring banks appears in [18].

growth by acquiring instant deposits [13]. MBHCs may acquire banks to reduce their own level of operating and portfolio risk through diversification of assets, liabilities, and service areas, as discussed above, although this reduction in risk will not appear in the nominal profitability framework of bank accounting. MBHCs may even acquire banks solely to take advantage of the relatively low price of independent banks' stock relative to that of MBHC stock in a normal stock market.

Criticisms of MBHC Studies

The studies cited above, however, may be distorted by "...differences in bank size and in the basic characteristics of the banks compared" [15, p. 163]. Moreover, Piper recognizes that contiguous paired banks are not totally independent, so that:

> ...the introduction of new services or pricing changes or portfolio shifts by one bank frequently induces some response by the competitor. Thus, affiliation might result in significant operating changes both by the acquired bank and by the competing institution. Under such conditions, use of paired bank comparisons could be misleading [15, p. 165].

Johnson and Meinster [9, 10] criticize studies of MBHC influences on banking even more sharply. They, also, recognize that differences in bank size may cause effects that could be attributed to MBHC affiliation by specification error. Moreover, Johnson and Meinster believe that MBHC influences on acquired banks may take longer than one year to become important. Johnson and Meinster also emphasize that the well-known problem of multicollinearity in banking analysis may plague these studies. In other words, banking and related variables interact with each other in complex ways that may invalidate conventional tests of differences between means, or even more rigorous analyses of the effects of banking influences [8]. Finally, they criticize a possibly low level of statistical significance in some studies.

Methodology

In order to avoid these difficulties, this study does not match paired contiguous banks. Rather, it analyzes averaged yearly ratios for 1,644 banks located

throughout 44 states for the years 1969, 1970, and 1971.[6] About 20% of these banks are MBHC affiliates, while the rest of the sample consists of independent banks or one-bank holding company affiliates.[7] This study combines numerical ratios for these banks with theoretically relevant banking, regulatory, and socioeconomic traits for analysis by three techniques: correlation, factor analysis, and regression.[8] The study thus compares MBHC banks with non-MBHC banks over a three-year period, with the MBHC banks having been affiliated with a MBHC since 1968 or earlier.

Correlation Results

Traditional analysis of MBHC influences on banking uses univariate comparisons among BHC banks and independent banks. Following this tradition, the first analysis computes simple correlation coefficients between MBHC affiliation and selected banking variables. (MBHC affiliation is defined below as a dummy variable: 1 if the banks are MBHC affiliates, 0 if they are not. The BMD computer program package is used throughout).

Table 1 (p.9) shows that MBHC control is associated with several important banking traits. The variable representing MBHC affiliation is positively correlated at the 0.01 level of significance with several bank ratios: commerical and industrial

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[6] Data were provided by the Federal Deposit Insurance Corporation and the Board of Governors of the Federal Reserve System. The distortions of wage and price controls did not affect banking during this period to any extent, although a demand-depressing recession occurred in 1969-70 and interest rate swings affected this industry.

[7] If one-bank holding company banks resemble MBHC affiliates, then the contrast between MBHC banks and all other banks would be biased downward. But the banks of one-bank holding companies tend to advise and direct the nonbanking subsidiaries of one-bank holding companies, rather than being influenced themselves by the nonbanking subsidiaries. Robert J. Lawrence, Operating Policies of Bank Holding Companies--Part II: Nonbanking Subsidiaries (Washington: Board of Governors of the Federal Reserve System, 1974). There seems to be little a priori reason to expect a bank to alter its competitive behavior if it forms a one-bank holding company, unless, contrary to usual practice, the capital of the bank is being "drained" for the benefit of the parent company or its nonbank subsidiaries.

[8] For technical details of the analysis and data, see [7]. This study respecifies the regression variables of [7] to emphasize the effect of MBHC affiliation on bank performance, however. Financial support was provided by a Conference of State Bank Supervisors Dissertation Fellowship, National Defense Education Act Funds, and the Federal Reserve Bank of Richmond. Mary Ann Welch provided computer programming for the study.

TABLE 1.

CORRELATION COEFFICIENTS OF BANKING VARIABLES WITH MULTIBANK HOLDING COMPANY AFFILIATION

Operating and Portfolio Ratios	
Time and Savings Deposits/Total Deposits*	0.04
"Investments"/Assets*	-0.06
Cash Items/Assets*	-0.04
Agricultural Loans/Total Loans**	-0.07
Commercial and Industrial Loans/Total Loans**	0.13
Consumer and Individual Loans/Total Loans*	0.04
Trust Revenue/Total Revenue**	0.12
Equity/Assets**	-0.20
Labor Expense/Revenue**	-0.13
Occupancy Expense/Revenue	0.00
Dividends/Net Income**	0.21
Output, Price, and Profitability Ratios	
Loans and Discounts/Total Deposits**	0.13
Operating Revenue Less Demand Deposit Service Charges/Assets**	0.08
Loan Interest Minus Loan Loss Provisions/Loans**	0.10
Time and Savings Deposit Interest/Time and Savings Deposits**	0.20
Adjusted Loan Interest Rate Minus Time and Savings Account Interest Rate	-0.03
Net Income/Equity**	0.13

* Significant at the 0.10 level of a two-tailed t-test.

** Significant at the 0.01 level of a two-tailed t-test.

loans/total loans, trust revenue/total revenue, the dividend payout ratio, loans/deposits, operating revenue minus demand deposit service charges/total assets, risk-adjusted loan interest rates, time and savings deposit interest rates, and net income/stockholders' equity. MBHC affiliation is negatively correlated at the 0.01 level with agricultural loans/total loans, stockholders' equity/total assets, and labor expense/total revenue.

Table 1 also reveals that MBHC affiliation is positively related at the weaker 0.10 level of significance to time and savings deposits/total deposits and consumer and individual loans/total loans. It is negatively related to "investments"/assets and cash items/assets at this level of significance.

MBHC affiliation is not significantly correlated, however, with bank occupancy expense/revenue or the difference between the risk-adjusted loan interest rate and the time and savings deposit interest rate.

Although MBHC banks in the sample have a larger proportion of commercial and industrial loans than other banks, the MBHC emphasis on serving businesses through demand deposits that McLeary [3] postulates is not visible in Table 1. MBHC bank affiliation is positively correlated with services to individuals through consumer and individual loans as well as through time and savings deposits. MBHC affiliates, moreover, seem to avoid relatively low-yielding agricultural loans and "investments", as well as nonearning cash items. MBHC affiliates seem to provide a higher-than-expected level of trust services, possibly reflecting the indirect provision of these services by the lead bank of the MBHC to the customers of the affiliates. In locations served only by small banks, this affiliation may be the only way in which trust services can be provided to such banking markets.

The lower half of Table 1 indicates that MBHC banks extend a relatively large supply of credit through loans, possibly because their loans earn a higher-than-average return even after loan loss provisions are deducted. Accordingly, the returns on assets of MBHC banks are apparently higher than those of non-MBHC banks. These higher returns induce them to pay their customers higher interest on time and savings deposits. (Their demand for time and savings deposits is, of course, a derived demand that depends on

loans and other extensions of credit.) The time and savings deposit rates of MBHC banks apparently exceed those of other banks by more than the amount that risk-adjusted loan interest rates of MBHC affiliates exceed those of nonaffiliated banks. That is, the difference between these rates--a summary indicator of effective competition--is negatively correlated with MBHC affiliation, although not at a significant level.[9]

MBHC banks are leveraged; Table 1 shows that they typically have a lower ratio of equity to assets than non-MBHC banks--as postulated above. Their leverage, when combined with their lower-than-average labor expense ratio and their higher-than-average rates of return on earning assets, seemingly allows MBHC affiliates to enjoy a superior level of profitability. In turn, they pay out more of their earnings to their owners as dividends. (Independent banks generally retain earnings to finance their capital requirements internally, while most MBHC affiliates must pay enough dividends to meet the debt interest and dividend requirements of parent MBHCs.)

Correlation analysis suggests that MBHC banks tend to have slightly different output, portfolio, pricing, and profitability ratios than other banks. The largest of these correlation coefficients, however, explains less than 5 percent of the variation in any of these banking variables. Moreover, simple correlation is biased upward. It misspecifies reality by ignoring the relations between more than two variables. Correlation cannot account for higher-order relationships between bank regulation, bank structure, the demand for financial services, portfolio management, and other influences that could be associated with MBHC affiliation in affecting bank performance [9]. These tangled strands of interaction between variables can be unraveled, however, by factor analysis.

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[9] The meaning of this important measure is explored on p. 21-23 below.

Factor Analysis

Factor analysis is a multivariate technique that reveals the higher-order patterns of common influence present in any large data set. It reduces the dimensionality of the data to that of a relatively compact space--revealing the multicollinearity of banking data. Essentially, factor analysis creates multidimensional correlation coefficients ("factor loadings") that relate large numbers of variables to each other. It clusters highly related traits together; while it separates unrelated traits onto patterns ("factors") that are orthogonal to each other -- "at right angles" in several dimensions.[10]

A factor analysis should detect multicollinearity and other complex interactions among MBHC affiliation, state laws that regulate MBHC activity, and 49 other banking demand, management, portfolio, regulatory, structure, and time trend variables that are theoretically relevant to bank performance [8]. This second form of analysis will reveal whether MBHC afffiliation is strongly related to other banking traits.

The analysis finds that 13 patterns of common influence appear among these 53 variables. Table 2 (p.13) summarizes these patterns, showing the variables that are related to MBHC variables. Details of the analysis appear in [8].

The MBHC affiliation variable appears on only the eleventh factor, which, not surprisingly, shows that MBHC affiliates are found in states that allow them and are not found in states that prohibit them. This lack of connection between MBHC affiliation and any other variables indicates that MBHC affiliation per se is not a strong determinant of any banking or financial characteristic examined. The variables representing state laws that govern MBHCs, however, appear in several factors. The dummy variable identifying states that permit only limited MBHC activity appears on factors one, five, and thirteen. The first factor contains many banking and socieconomic traits that are essentially regional. The fifth factor reflects some influences that should depress bank activity

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[10] R.J. Rummel, Applied Factor Analysis (Evanston: Northwestern University Press, 1970). This form of analysis is related to the principal components analysis used by Johnson and Meinster [10], but it will isolate related clusters of variables more clearly than principal components.

TABLE 2.

SUMMARY OF FACTOR ANALYSIS

Factor	Variables Related to MBHC Variables
1. State Structure-Demand	Dominant-signed variables: limited MBHC state, bank entry, average bank size in state, Gini deposit coefficient, nonbank competition, financial labor, population density, urbanization, per capital income, population growth, households per banking office. Opposing-signed variables: unlimited MBHC state, agricultural loans, agricultural labor.
2. State Concentration	None
3. Large Banks	None
4. Limited Branches Versus Units	None
5. Financial Ratios	Dominant-signed variables: limited MBHC state, nonbank competition, agricultural loans, bank equity, labor expense. Opposing-signed variables: time and savings deposits.
6. Bank Prices and Costs	None
7. State Economic Growth	None
8. Bank Charters and Liquidity	None
9. Time	None
10. Banking Time Trends	None
11. Multibank Holding Companies	Dominant-signed variables: unlimited MBHC state, MBHC bank affiliation. Opposing-signed variable: MBHC prohibited state.
12. Bank Output	None
13. State Deposit Variation	Dominant-signed variables: limited MBHC state, deposit coefficient of variation in state. Opposing-signed variable: Gini deposit coefficient in state.

Source: Summarized from [8], Technically, the factors are listed in descending order of their original eigenvalues with a 1.0 cutoff, after varimax rotation.

such as nonbank competition, bank equity capital (low leverage), and labor cost. The last factor contains state deposit size inequality and variation. The limited MBHC state variable is, clearly, multicollinear. It is statistically connected with many traits--while it is not a logical cause of them. Similarly, the unlimited MBHC state variable appears on the first factor, to which it is not logically connected except by regional association.

These state MBHC law variables reflect regional associations, according to the factor analysis. They are not examined further, because it is more appropriate to examine the effect of MBHC affiliation on banks directly -- in both an economic and a statistical sense.

The factor analysis summarized in Table 2 suggests that several variables can represent the separate strands of complex associations present in banking data. Several variables are selected as representative variables to typify the relationships underlying the factors, for use as later regressors.[11] MBHC affiliation and 17 other variables are thus selected as potential explanatory variables for the explanation of six crucial bank performance variables in later regression. These ratios essentially summarize the competitive behavior of a bank [7].

Regression Technique

The regressions below answer the question: does MBHC affiliation alter important aspects of bank performance by itself? The basic theory that underlies these regressions is that a bank is an imperfect competitor, operating in an environment influenced by many exogenous forces, although it has considerable freedom to determine

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[11] Rummel, pp. 442-43. James L. Murphy, Introductory Econometrics (Homewood, Ill. Irwin, 1973) p. 198. The selection is made so that: the variables are generally uncorrelated with each other where possible, they represent aspects of theoretically different influences, and they are uncorrelated with MBHC affiliation. The correlation coefficients between MBHC affiliation and other explanatory variables below are only small values, ranging from -0.20 (bank equity/assets) to 0.08 (national bank charter.)

its operating and portfolio behavior.[12]

These regressions isolate the separate effect of MBHC affiliation on bank behavior, while they should lessen the effect of any remaining multicollinearity. They report only variables that are significant, using an in-and-out stepwise procedure (BMD02R). The coefficients of Tables 3-6, below, are "standardized" beta coefficients. That is, the conventional regression coefficients for the variables, which are highly sensitive to units of measurement, have been converted into standard deviation form, independent of their units of measurement. The larger the beta coefficient of a variable, the larger is its influence on the dependent variable, both absolutely and relative to the other regressors.[13] These regressions separate the effects of demand, economies of scale, number of branches, portfolio composition, and regulation from the effect of MBHC control on bank behavior. The coefficient of MBHC control is not downward-biased to any extent by multicollinearity, with the possible exception of the -0.20 correlation between MBHC affiliation and bank equity, an association that most analysts would not consider especially multicollinear.

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[12] The theory is set forth in [7] and [8]. It is derived largely from a model of a bank as a monopolistic competitor: Ernest Bloch, "Deposit-Type Intermediaries: Bank and Nonbank," Financial Institutions and Markets, ed. Murray Polakoff et. al. (Boston: Mifflin, 1970); and multivariate models of banking activity: Alfred Broaddus, "The Banking Structure: What It Means and Why It Matters," Federal Reserve Bank of Richmond, Monthly Review, November, 1971, and Almarin Phillips, "Structural and Regulatory Reform for Commercial Banking," Issues in Banking and Monetary Analysis, eds. G. Pontecorvo et. al. (New York: Holt, 1967).

[13] The computed "b" coefficients of the usual regression model:

$$Y = a + b_1 X_1 + b_2 X_2 + \ldots + b_n X_n$$

are converted into the beta coefficients of the model:

$$\frac{Y}{s_y} = a' + \beta_1\left(\frac{X_1}{s_1}\right) + \beta_2\left(\frac{X_2}{s_2}\right) + \ldots + \beta_n\left(\frac{X_n}{s_n}\right)$$

where "s" represents the standard deviation of a variable. For each increase of one standard deviation of an explanatory variable, Y should increase by that variable's β, in terms of the standard deviation of Y. The beta coefficients of absolute dollar, dummy, and ratio variables can be directly compared, while their regression ("b") coefficients cannot be directly compared because of their different units of measurement.

Loan/Deposit Ratio Regression

The primary function of a bank is to make loans. Operationally, the best measure of a bank's competitive supply of credit, relative to its resources, is its ratio of loans to deposits, a stock-type proxy measure of output.

Table 3 (p. 17) summarizes the results of explaining the ratio of loans and discounts to total deposits by the 18 explanatory variables. It shows that affiliation per se does increase the loan/deposit ratio of a bank. Ten variables are more important than MBHC control for bank output, though. Nonbank competition, asset size, Herfindahl concentration,[14] and income stimulate bank leading to a greater extent than MBHC affiliation. Unit bank operation, labor cost, cash holdings, small branch bank operation, the financial climate of 1971,[15] and the bank equity ratio reduce lending to a larger extent than MBHC control stimulates it. Table 3 confirms the positive simple correlation found in Table 1 between MBHC control and a bank's loan to deposit ratio.

Asset Yield Regression

Another way of measuring bank output is in flow terms, just as industrial firms' output may be defined as dollar sales per year. Again, this output should be measured relative to a bank's resources for a measure of allocative efficiency. The second critical bank performance ratio--gross return on assets--is thus defined as operating revenue minus demand deposit service charges divided by assets.

Table 4 (p. 18) indicates that this ratio is stimulated by MBHC affiliation. MBHC control, however, is only the fourteenth most important stimulant of asset yields. Time trends representing "tight money" lagged effects on asset yields, Herfindahl

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[14]This measure is the sum of squared deposit shares. It is a proxy for the extent of statewide oligopoly in banking.

[15]The intercepts of the regressions include the effects of data being sampled in 1969; so that 1970 and 1971 are compared to a 1969 base. Loans grew 9.2%, while deposits only grew 0.3% in the tight-money climate of 1969.

TABLE 3.

REGRESSION RESULTS, LOAN/DEPOSIT RATIO DEPENDENT

Variable	Beta Coefficient
unit-type bank	-0.32[a]
nonbank competition	0.18[a]
bank asset size	0.14[a]
labor cost/revenue	-0.14[a]
cash items/assets	-0.12[a]
Herfindahl concentration	0.11[a]
per capita income	0.11[a]
small branch bank	-0.11[a]
1971	-0.10[a]
equity/assets	-0.08[a]
MBHC subsidiary bank	0.08[a]
deposit size variation	0.07[b]
national bank	not significantly different from zero
nonmember bank	" " " " "
change in concentration ratio	" " " " "
time and savings deposits/total deposits	" " " " "
population growth	" " " " "
1970	" " " " "

R^2 = 0.24
F (12, 1631) = 42.1[a]
standard error of estimate/mean = 0.132

The F test indicates the significance of these results as:

a significant at the 0.001 level
b significant at the 0.010 level
c significant at the 0.025 level
d significant at the 0.050 level

James L. Murphy, Introductory Econometrics (Homewood: Irwin, 1973), pp. 502-07.

TABLE 4.

REGRESSION RESULTS, OPERATING REVENUE MINUS DEMAND DEPOSIT SERVICE CHARGES/ASSETS DEPENDENT

Variable	Beta Coefficient
1970	0.35[a]
cash items/assets	-0.33[a]
1971	0.21[a]
unit-type bank	-0.18[a]
Herfindahl concentration	0.16[a]
nonmember bank	0.16[a]
labor cost/revenue	0.15[a]
population growth	0.15[a]
small branch bank	-0.11[b]
per capita income	-0.11[a]
time and savings deposits/total deposits	-0.11[b]
equity/assets	-0.09[a]
national bank	0.08[b]
MBHC subsidiary bank	0.06[b]
deposit size variation	-0.04[d]
change in concentration ratio	not significantly different from zero
nonbank competition	" " " " "
bank asset size	" " " " "

R^2 = 0.35
F (15, 1628) = 66.8[a]
standard error of estimate/mean = 0.066

See the footnotes to Table 3.

concentration, a nonmember bank charter, labor cost, population growth,[16] and a national bank charter all stimulate this measure more than MBHC control. Conversely, cash holdings, unit banking, small branch banking, per capita income, time and savings deposits, and bank equity tend to decrease this measure more strongly than MBHC affiliation increases it. The simple correlation of Table 1, associating MBHC control with asset yields, is confirmed in Table 4.

The relationship between asset return and MBHC affiliation may be explained by the ability of these banks to economize on some nonearning internal reserves, such as correspondent balances. They also receive relatively high asset yields not only because they extend more loans, but also because they charge more for their loans, as shown below.

Loan Interest Rate Regression

The crucial price that a bank charges is its loan rate. The lower the loan rate, after correcting for loan demand, the more competitive the bank--as with any price. However, different loans bear different risks, so that loan loss provisions should be deducted from nominal loan yields to generate a risk-adjusted (average) loan interest rate, the only one available from the data source.

Table 5 (p.20) indicates that a positive relationship exists between risk-adjusted interest rates on loans and MBHC bank affiliation. This highly significant finding may be independent of the types of loans that MBHC banks extend, since Table 1 finds only a weak relationship between loan composition and MBHC affiliation.[17] Again, several explanatory variables have stronger effects on the dependent variable than MBHC control. Time trends that indicate tight money, bank branching, population growth, and

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[16]Population growth is a proxy for the demand for banking services that is sometimes used in deciding acquisition and merger cases. Per capita income may be an unsatisfactory demand-type variable. See Richard Aspinwall, "Market Structure and Commerical Bank Mortgage Interest Rates," Southern Economic Journal, April, 1970, p. 379.

[17][8] finds only one strong relationship between loan mix and loan rates: consumer and individual loans bear higher rates, an expected relationship. Moreover, aggregating individual loan categories into a conventionally sloped continuous demand for loan curve is theoretically valid: e.g., Bloch, op. cit.

TABLE 5.

REGRESSION RESULTS, RISK-ADJUSTED LOAN INTEREST RATE DEPENDENT.

Variable	Beta Coefficient
1970	0.33[a]
1971	0.29[a]
unit-type bank	-0.23[a]
per capita income	-0.20[a]
population growth	0.19[a]
time and savings deposits/total deposits	-0.16[a]
Herfindahl concentration	0.14[a]
small branch bank	-0.14[a]
MBHC subsidiary bank	0.11[a]
bank asset size	-0.07[b]
labor cost/revenue	0.07[d]
deposit size variation	-0.06[c]
change in concentration ratio	-0.05[c]
national bank	not significantly different from zero
nonmember bank	" " " " "
nonbank competition	" " " " "
cash items/assets	" " " " "
equity/assets	" " " " "

R^2 = 0.26
F (13,1630) = 43.3[a]
standard error of estimate/mean = 0.076

See the footnotes to Table 3.

Herfindahl concentration are stronger stimulants of risk-adjusted loan rates; while high per capita income and time deposits are stonger negative influences for these loan rates; than MBHC affiliation. Table 5 confirms the positive simple correlation between MBHC affiliation and loan interest found in Table 1.

These higher loan rates, in turn, may induce MBHC banks to pay higher interest to their depositors than independent banks pay. This possibility is studied below.

Time and Savings Deposit Interest Rate Regression

Table 6 (p.22) indicates the positive effect of MBHC affiliation on depositor returns, measured as the ratio of time and savings deposit interest to these deposits. Clearly, this price represents the essence of competition for savings, although it is bounded from above by Regulation Q ceilings.[18]

Table 6, however, shows that eight variables are more important for this price than is MBHC afffiliation. The high interest rates and the liberalization of Regulation Q in 1970 represented by the time trend variables, bank asset size, Herfindahl concentration,[19] and a nonmember bank charter stimulate deposit interest to a larger extent than MBHC control. Similarly, the ratio of time and savings deposits themselves to total deposits, high labor cost, and equity capital all depress deposit interest to a greater extent than MBHC control increases it. Table 6 confirms the finding of Table 1 that MBHC banks pay generally more competitive deposit interest rates than other banks.

Interest Rate Differential Regression

Since MBHC affiliates both charge more and pay more than nonaffiliated banks, are they more or less competitive in their pricing structure than other banks? The overall

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[18]This average price is again a composite of the array of "different product prices," which can be theoretically ordered into the smooth curves of monopolistic competitition theory. See n. 17, above.

[19]The study shows that statewide concentration may not be entirely undesirable, since it stimulates depositor returns and loan extensions.

TABLE 6.

REGRESSION RESULTS, TIME AND SAVINGS DEPOSIT INTEREST RATE DEPENDENT.

Variable	Beta Coefficient
1971	0.37[a]
1970	0.33[a]
time and savings deposits/total deposits	-0.30[a]
bank asset size	0.25[a]
labor cost/revenue	-0.24[a]
equity/assets	-0.17[a]
Herfindahl concentration	0.15[a]
nonmember bank	0.12[a]
MBHC subsidiary bank	0.11[a]
nonbank competition	-0.09[a]
deposit size variation	-0.08[a]
national bank	0.07[c]
unit-type bank	0.06[c]
change in concentration ratio	not significantly different from zero
small branch bank	" " " " "
cash items/assets	" " " " "
per capita income	" " " " "
population growth	" " " " "

R^2 = 0.38
F (13,1630) = 77.8[a]
standard error of estimate/mean = 0.069

See the footnotes to Table 3.

competitive behavior of a bank may be measured by the "spread" between the net loan interest rate charged and the interest rate paid on time and savings deposits,[20] "...the opportunity cost to the depositor of having the banker invest his funds for him."[21] The lower this spread, the more competitive the bank--as with any operating profit margin measure for roughly similar firms in an industry.

The regression that examines the sources of variation in this differential (not shown) finds that MBHC affiliation has no significant effect on it. The stimulation that MBHC control provides to rates received and paid "cancels out" when the rate differential is rigorously analyzed. Rather, bank branching, labor cost, population growth, and time trends increase the interest-rate spread. Bank asset size, per capita income, and low leverage decrease this spread. The near-zero simple correlation between MBHC affiliation and this interest rate differential in Table 1 is confirmed.[22]

Profitability Regression

Finally, do the efficiencies possible by--or the diseconomies that may result from--MBHC operation of banks alter the relative net profitability of these banks? Theoretically, the profitability (net income/equity ratio) of investment directs equity capital flows into their most highly valued uses with similar risk levels. Accordingly, higher-than-average profits may be signs of either economies of operation and scale, or, alternatively, imperfect competition--with either interpretation being consistent with the belief of many bankers in the higher profitability of MBHC banks.

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[20] Franklin Edwards, "The Banking Competition Controversy," Studies in Banking Competition and the Banking Structure (Washington: U.S. Treasury Department, 1966), pp. 326-27. Robert Ware, "Banking Structure and Performance: Some Evidence from Ohio," Federal Reserve Bank of Cleveland, Economic Review, March, 1972, pp. 6-7. Stuart Greenbaum and Charles Haywood, "Secular Change in the Financial Services Industry," Journal of Money, Credit, and Banking, May, 1971, pp. 572-73. See [7].

[21] Robert Scott, "A Conditional Theory of Banking Enterprise," Journal of Financial and Quantitative Analysis, June, 1966, p. 95.

[22] The partial correlation between MBHC affiliation and the interest rate differential is only 0.024, when the regression controls for the 9 significant variables.

The last regression (not shown), however, finds a lack of connection between MBHC control and bank-level profitability, measured by the ratio of net income to equity. A bank's net income to equity ratio shows little relationship to its affiliation with a MBHC per se. The regression, rather, shows that time and savings deposits, cash holdings, labor cost, bank equity, per capita income, and a nonmember bank charter depress bank profitability. Conversely, time trends, an increase in the concentration ratio, and population growth stimulate bank earnings. The positive relationship between MBHC affiliation and bank profitability shown in Table 1 disappears when the data is analyzed more rigorously.[23]

Johnson and Meinster's call for more thorough specification in analysis [9] is especially correct regarding any investigation of bank profitability. The relatively higher asset and loan returns of MBHC banks do not seem to flow through into their profitability, after their relatively higher interest and "other expense" [12, 17, 19] outlays are deducted. These expenses may reflect not only payments to their parent MBHCs, but also attempts to increase market shares so that the MBHC as a whole may grow in the future.

Summary of Regressions

Table 7 (p. 25) summarizes and compares the effects of MBHC affiliation found by the regressions. It shows the computed percentage change in the performance variables that should occur in the long run if a nonaffiliated bank would affiliate with a MBHC. (Many MBHCs may not change the behavior of their affiliates immediately following their acquisition.)

The evidence seems to indicate that MBHC banks are somewhat more competitive than other banks in their extensions of loans and in their interest payments to depositors. They are somewhat less competitive than other banks in their loan interest rates. MBHC affiliates' asset yields are slightly higher than those of other banks, although this small difference may indicate a higher output measured as a flow as well as higher average prices [7]. Their interest rate spread and profitability values are not significantly different from those of nonaffiliated banks.

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[23]The partial correlation between MBHC affiliation and profitability is only 0.0008, when the regression controls for the 10 significant variables.

TABLE 7.

MULTIBANK HOLDING COMPANY
AFFILIATION AND BANK PERFORMANCE

	Dependent Variable	Effect of MBHC Affiliation*
1.	Loans and Discounts/Total Deposits	+ 2.90%, significant at the 0.001 level
2.	Operating Revenue Minus Demand Deposit Service Charges/Total Assets	+ 1.12%, significant at the 0.025 level
3.	Loan Interest Minus Loan Loss Provisions/ Total Loans	+ 2.37%, significant at the 0.001 level
4.	Time and Savings Deposit Interest/ Time and Savings Deposits	+ 2.55%, significant at the 0.001 level
5.	Interest Rate Differential: (3) Minus (4)	Not significantly different from zero
6.	Net Income/Equity	Not significantly different from zero

*The percentage change in each dependent variable, relative to its mean, that the typical bank in the sample would cause by shifting from nonaffiliated to affiliated status. This effect is computed by changing the affiliation value from zero to one.

Summary and Conclusions

To summarize, the differences between MBHC banks and other banks appear fairly small in absolute terms. The simple correlations between MBHC affiliation and any other banking variable examined in Table 1 explain no more than 5 percent of the variation in these banking characteristics. The factor analysis does not find any connection between MBHC affiliation and any interesting banking or financial variable. Moreover, none of the effects of a change in MBHC affiliation on bank performance is as large as 3 percent, as shown in Table 7.

Most MBHC banks seem to resemble non-MBHC banks generally, especially when the effects of their other characteristics such as branching and size are simultaneously examined.[24] According to the results of this study and most previous research, the impact of MBHC management upon the behavior of affiliated banks is best analyzed on an individual bank and bank holding company basis. For example, MBHC acquisition of a "problem bank" or an ultraconservative one could serve the public interest. But MBHC acquisition of a well-managed competitor, just so the MBHC would gain instant deposits, would apparently offer few public benefits. For approval of any proposed MBHC acquisition, the Federal Reserve System should determine that the specific MBHC would probably operate the acquired bank as a more effective competitor than its present management. (Only when considering these applications can the System effectively control the expansion of bank holding companies.) The competitive and financial implications of each specific application, in both the short-

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[24]The regressions and the factor analysis show that bank branching and size are stronger determinants of most bank behavior ratios than MBHC affiliation. In particular, large banks tend to have more competitive values of loan/deposit, time and savings deposit interest, and interest rate differential measures than either MBHC banks or "typical" banks. Extensive branch operation influences banking somewhat more than MBHC affiliation: large branch banks have less competitive values of risk-adjusted loan rates and the interest rate differential, while they have more competitive values of loans to deposits, then either MBHC banks or "average" banks. Branching does not affect time and savings deposit rates to a large extent. Moreover, neither bank asset size nor branching appears to affect profitability at a significant level.

run and the long-run should receive perhaps greater emphasis than at present,[25] since this study and other ones find that MBHC control of banks may generate not only some increases in, but also some decreases in, the extent of competitive behavior in banking. The results found in this study suggest that few broad generalizations should be made concerning the effect of MBHC control on any bank's behavior.

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[25] The Bank Holding Company Act of 1956, as amended, sec. 3(c), already contains this criterion [2, p. 16].

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