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thesis entitled

THE RESPONSE OF COMMERCIAL BANKS
TO INITIAL MARKET ENTRY BY
MULTI-BANK HOLDING COMPANIES

presented by

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has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Finance

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Date August 4, 1978

THE RESPONSE OF COMMERCIAL BANKS TO INITIAL MARKET ENTRY BY MULTI-BANK HOLDING COMPANIES

By
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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Accounting and Financial Administration

1978

ABSTRACT

THE RESPONSE OF COMMERCIAL BANKS TO INITIAL
MARKET ENTRY BY MULTI-BANK HOLDING COMPANIES

By

Gregg K. Dimkoff

The rapid growth in bank holding company acquisitions occurring since the passage of the 1966 Amendments to the Bank Holding Company Act of 1956 has generated considerable interest among regulators concerning ways in which recently acquired banks change relative to independent banks. This interest has resulted in several empirical studies that have been generally consistent in finding that new holding company affiliates do not perform much differently than independent banks.

The research described in this report differs in three ways from most of these bank holding company studies. First, the research sample was limited to only those multi-bank holding company acquisitions representing the initial entry into each market. If the reactions of competing banks to multi-bank holding company entry are a function of their reactions to prior holding company entry, failure to limit the sample to only the initial entry into a market could confound the findings. Next, an independent bank will be paired with both the new affiliate and with a non-competing independent bank. The purpose of this pairing technique is to check for differences between the new affiliate and competing independent bank and to check for coincident changes occurring to both of these competing banks. Finally, the usefulness of multivariate instead of only univariate statistics will be

investigated. Only the most recent research has used multivariate statistical techniques.

A multivariate multiple linear regression model was hypothesized which included three dependent variables (return on loans, before-tax return on investments, and operating expenses to operating revenue) and nine independent variables (calendar year, Federal Reserve System membership, state branching law, bank asset size, market concentration, county-wide personal income, deposits at competing financial institutions, and two variables describing bank type). The sample was selected from eight states: Florida, Iowa, Michigan, Missouri, New Mexico, Ohio, Texas, and Wisconsin. Counties were used as banking markets. All counties experienceing initial market entry through acquisition by a multibank holding company between 1/1/69 and 12/31/76 were included in the research sample if there were no holding company relationships between the affiliate and holding company prior to acquisition. Altogether 83 markets were identified. In each one, two banks were selected: the new affiliate and a same size independent bank which remained independent throughout the period investigated. Further, a same size non-competing independent bank located in a county experiencing no holding company activity was paired with the competing independent bank. Thus for each of the 83 markets, a triplet of three same size banks was selected: affiliate, competing independent bank, and non-competing independent bank.

Analysis of the sample began with inspection of graphs of the dependent variables over time for each of the three bank groups. The graphs suggested that holding company affiliates achieved slightly higher return on their loan portfolios, shifted into lower yielding

securities, and experienced no change in operating expenses to operating revenue compared with independent banks. Using both univariate and multivariate statistics, the null hypothesis that the coefficients of the variables designating bank type were equal to zero could not be rejected in 29 out of 30 multivariate tests or 81 out of 90 univariate tests at the 95 percent confidence level. Both univariate and multivariate statistics were consistent in finding few significant differences between bank groups. Thus there is no evidence that the univariate model distorts the findings compared with the multivariate model. The conclusion is that only univariate statistics was needed in this study.

These results suggest that when no clear-cut factors dictate approval or denial of an application for acquisition, the acquisition should be approved. Neither competing bank will significantly increase its riskiness, but there may be benefits from increased services, better management, and capital infusion at the new affiliate.

ACKNOWLEDGMENT

I am deeply grateful for the guidance I received from the members of my dissertation committee who were Professors Jack Brick and Harold Sollenberger, both of the Department of Accounting and Financial Administration, and Professor Robert Rasche of the Department of Economics.

I also wish to thank the staff of the Research Department of the Federal Reserve Bank of Chicago, especially Drs. Chayim Herzig-Marx and Dale Drum, without whose help and cooperation this dissertation would not have been possible.

Finally, I wish to acknowledge the patience and assistance of my wife, Evie. Her sacrifices made it all possible.

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CHAPTER I

INTRODUCTION

The objective of this chapter is to briefly describe why the response of commercial banks to initial market entry by multi-bank holding companies is of research interest and to explain how the response will be measured. Discussion begins with a background section describing the rapid increase in the number of holding company acquisitions and summarizing research results of several studies directed at finding how new affiliates change relative to other banks. The methodology that sets this research apart form previous studies is then explained. After the research model and null hypotheses are presented, policy implications are described. Finally, following an overview of the remainder of this report, the chapter concludes with a brief summary.

BACKGROUND

A bank holding company is a corporation which owns, controls, or has power to vote at least 25 percent of the common stock of a commercial bank or controls the election of a majority of the board of directors of a bank. While bank holding companies have been in existence for decades, their importance in the commercial banking industry was not great until passage of the 1966 Amendments to the Bank Holding Company Act of 1956. An examination of bank holding company growth

since the passage of these amendments makes evident the explosive growth that has occurred. For example, at the start of 1966, forty-eight multi-bank holding companies (MBHC's) controlled 8 percent of total deposits.[1] By the end of 1970 the number of MBHC's had grown to 121. They controlled 16 percent of total bank deposits while 1,352 one-bank holding companies controlled an additional 33 percent of the nation's bank deposits.[2] As of December 31, 1974, 276 MBHC's controlled 38 percent of total bank deposits while 1340 one-bank holding companies controlled an additional 30 percent.[3]

This explosive growth has occurred with the Federal Reserve's sanction since holding company acquisitions must be approved by the Board of Governors. Approval or rejection is based on an analysis of several banking factors and on the impact the acquisition has on potential competition.[4] Even though any one of these numerous factors can be the basis on which a bank holding company application is denied, one single factor--potential competition--has been either a major or minor factor in 50 percent of the denials since 1957.[5]

This rapid growth and its impact on competition has provided the impetus for several research studies aimed at finding how both the acquired bank and the remaining independent banks change after acquisition. Empirical results have been fairly consistent in finding that compared to unaffiliated banks, acquired banks shift funds out of U.S. government securities and into both state and local government securities and loans (6,7,8,9,10,11,12,13). Studies have also shown that acquired banks lend a greater proportion of their loanable funds to consumers (7,8,10,12) and experience no change in net income (6,10,14).

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METHODOLOGICAL ISSUES

In most of these studies acquired banks were paired with banks unaffiliated with MBHC's so that differences in their performance could be compared before and after acquisition. However, in studies like these, reactions of unaffiliated banks to the initial MBHC entry must be considered. This is necessary because when an MBHC first enters a market comprised of only unaffiliated banks, these independent banks may react in ways changing their operating and financial characteristics. Reactions might be in response to their actual or alleged inability to compete with the larger MBHC system. It is possible that the reactions of the unaffiliated banks to the second MBHC entry would be different than their reactions to the initial entry, that their reactions to the third MBHC entry would be different than their reactions to the first or second, and so on.

Thus to measure the initial response of independent banks to entry by an MBHC, it is necessary to limit the study to only those banking markets which are experiencing MBHC entry for the first time. In this way effects of holding company entry will not be distorted by confounding variables introduced from inclusion in the research sample of MBHC acquisitions occurring after the initial acquisition within a market. Previous studies have not included this limitation on sample selection.

Nor have previous studies adequately considered coincident changes that might have occurred to both the acquired and unaffiliated paired banks. Figure 1.1 below illustrates the pairing technique used by most researchers.

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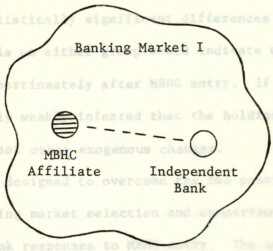
FIGURE 1.1
PAIRING TECHNIQUE USED IN MOST MBHC RESEARCH



New MBHC affiliates have been paired with independent banks of similar asset or deposit size. Differences in performance between the pairs at some point in time prior to acquisition were compared with differences at a point in time after acquisition. If statistically significant differences between these time points were found, they were attributed to the MBHC entry. If no differences were found, it was reasoned that MBHC's have little impact on competing independent banks.

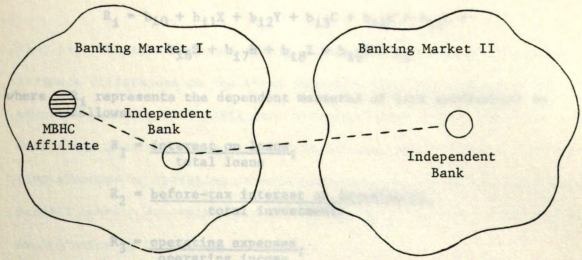
However, if managers of the paired independent banks felt threatened by acquisition of a competitor, they might take actions deemed necessary to remain competitive. Such actions might include changes in asset and liability structure, changes in pricing, etc. If the MBHC also made proportionate changes in its newly acquired bank, no differences in performance would be found between the acquired and independent banks even though both banks did experience a significant change.

In an attempt to overcome this possible shortcoming, several researchers have included other comparisons with this before and after pair-wise comparison (8,15). These other comparisons usually consist of

a before and after analysis of all new affiliates or all paired independent banks considered as a group. Thus if the pair-wise comparison indicated that no statistically significant differences existed, the before and after analysis on either group would indicate whether both groups did change proportionately after MBHC entry. If a change were found, it could be only weakly inferred that the holding company acquisition caused it and not other exogenous changes.

This research is designed to overcome the two possible shortcomings just described regarding market selection and comparison techniques in the measurement of bank responses to MBHC entry. The sample will be limited to only those banking markets which have experienced MBHC entry by acquisition for the first time. Further, to check for coincident changes occurring to both banks in the pairs, comparisons illustrated in Figure 1.2 will be made.

FIGURE 1.2
PAIRING TECHNIQUE USED IN THIS RESEARCH



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Not only will the new affiliates be compared with independent banks competing in the same banking market, but independent banks located in non-competing markets will be compared with the competing independent banks (Independent Bank in Market II will be compared with Independent Bank in Market I). This last comparison will indicate whether coincident changes occur to both banks in Market I in Figure 1.2. If coincident changes do occur, this will give more conclusive evidence that the change was in reaction to MBHC entry and not just a response to exogenous changes in the economy affecting all commercial banks.

Additionally, most prior research has relied upon univariate statistical techniques instead of using the more powerful multivariate techniques for analysis. This research will investigate whether the use of multivariate statistics on the measures used in this study would be more appropriate.

RESEARCH MODEL

The research model may be expressed in a regression framework as

$$R_i = b_{i0} + b_{i1}X + b_{i2}Y + b_{i3}C + b_{i4}M + b_{i5}L + b_{i6}S + b_{i7}H + b_{i8}I + b_{i9}D + e_i$$

where R_i represents the dependent measures of bank performance as follows:

$$R_1 = \frac{\text{interest on loans}}{\text{total loans}};$$

$$R_2 = \frac{\text{before-tax interest on investments}}{\text{total investments}};$$

$$R_3 = \frac{\text{operating expenses}}{\text{operating income}};$$

b_{ij} represent net regression coefficients;

X and Y have values of 0 or 1 and represent bank type. By manipulating the values of these two variables, a given bank type can be contrasted with either of the two others;
C represents calendar year;
M represents Federal Reserve System membership;
L represents state branching law;
S represents bank asset size;
H represents the Herfindahl Index;
I represents county personal income;
D represents county-wide deposits in competing financial institutions; and
e represents the error term.

Since there are three different dependent measures, multivariate statistics may be appropriate. The model is based on findings by other researchers and on an assessment of the usefulness of these measures. It is explained in detail in Chapter IV.

NULL HYPOTHESIS

The null hypothesis, H_o, is

$$H_o: \quad b_{i1} = b_{i2} = 0$$

$$i = 3 \text{ dependent variables.}$$

That is, bank type does not result in statistically significant performance differences on the three dependent measures. However, it is expected that new MBHC affiliates will experience higher return on both their loan and investment portfolios and higher ratios of operating expenses to operating revenue compared with paired competing independent banks. An explanation of the reasoning for these expectations is presented in Chapter IV.

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POLICY IMPLICATIONS

All acquisitions of banks by corporations require approval by the Board of Governors of the Federal Reserve System. The Board considers specific criteria contained in the Bank Holding Company Act of 1956 relating to present and potential competition, management competency, and the convenience and needs of the community served. Evaluation of these factors requires timely data and measurements of the effects acquisitions will have on the new affiliates and competing banks. This research will provide regulators with additional information which can be used to evaluate holding company applications.

Results will show whether holding company affiliates change their loan and investment portfolios after acquisition and whether their operating expenses rise compared with operating revenues. Additionally, whether competing independent banks change in response to the initial MBHC entry on these same performance measures will be determined.

If it is found that affiliates and/or competing independent banks switch to riskier loans and investments, regulators might use these findings to deny acquisition applications in markets where one or more of the banks has a relatively risky asset structure already. Approval of the application might result in even riskier banks and possibly damage their financial strength.

The Federal Reserve Bank of New York has for several years conducted research aimed at finding measures of bank performance that forewarn of financial deterioration.[16] One of the measures that has proven most useful is the ratio of operating expenses to operating revenue, R_3 in the research model described earlier. The findings of this research may indicate that R_3 falls for competing banks as a

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result of MBHC entry. If that is the case, it would be recommended that the Board carefully determine whether the decline in R_3 resulting from holding company entry will contribute to a financial deterioration of banking firms in a given market.

OVERVIEW

The remainder of this dissertation is subdivided into six chapters. Chapter II describes the history of regulation affecting bank holding companies. Then Chapter III presents a review of the literature related to holding company acquisitions. A discussion of the research model used to test for significant differences between bank groups is the subject of Chapter IV. Next, Chapters V and VI describe characteristics of the research sample and results of the testing, respectively. Finally, Chapter VII concludes this dissertation with a summary, discussion of implications, and suggestions for further research.

SUMMARY

This chapter provided an introduction to the six chapters that follow. Discussion began with a description of the rapid growth in bank holding company acquisitions occurring since passage of the 1966 Amendments to the Bank Holding Company Act of 1956. Consistency in the findings of several empirical studies was described. The methodology that sets this research apart from these past studies was then described. In brief, this study will investigate only those MBHC acquisitions occurring in markets previously void of holding company affiliates, will compare affiliates with both competing independent banks and non-competing independent banks, and will investigate the need for

multivariate instead of only univariate statistics. The research model was then described. Three dependent measures--return on loans, before-tax return on investments, and operating expenses to operating revenue--will be used to test for significant differences among groups of paired banks beginning with the third year prior to acquisition and continuing through the sixth year after acquisition. Ways bank regulators could use findings of this research to help reach decisions approving or denying acquisition applications was then described.

FOOTNOTES TO CHAPTER I

[1]One-bank holding companies were excluded from the regulations contained in the Bank Holding Company Act of 1956 and were not subject to them until the 1970 Amendments.

[2]Harvey Rosenblum, "Bank Holding Companies: An Overview," Business Conditions, Federal Reserve Bank of Chicago (August, 1973): 4.

[3]Annual Statistical Digest 1971-1975, (Washington, D. C.: Board of Governors of the Federal Reserve System, October 1976), 280.

[4]Banking factors include such items as capital adequacy, quality of management, earnings prospects, etc.

[5]Harvey Rosenblum, "Bank Holding Companies--Part II," Business Conditions, Federal Reserve Bank of Chicago (April, 1975): 14.

[6]Robert J. Lawrence, The Performance of Bank Holding Companies, (Washington, D. C.: Board of Governors of the Federal Reserve System, June, 1967).

[7]Samuel H. Talley, The Effect of Holding Company Activity on Bank Performance, (Washington, D. C.: Staff Economic Studies, Number 69, Board of Governors of the Federal Reserve System, 1972).

[8]Robert F. Ware, "Performance of Banks Acquired by Multibank Holding Companies in Ohio," Economic Review, Federal Reserve Bank of Cleveland (March-April, 1973): 19-28.

[9]Joe W. McLeary, "Bank Holding Companies: Their Growth and Performance," Monthly Review, Federal Reserve Bank of Atlanta (October, 1968): 131-138.

[10]Stuart G. Hoffman, "The Impact of Holding Company Affiliation on Bank Performance: A Case Study of Two Florida Multibank Holding Companies," Working Paper Series, Federal Reserve Bank of Atlanta (January, 1976).

[11]Thomas R. Piper, The Economics of Bank Acquisitions by Registered Bank Holding Companies, (Boston: Research Report to the Federal Reserve Bank of Boston, No. 48, 1968).

[12]Edward V. Daley and Duane B. Graddy, "Optimal Firm Size, Market Penetration, and Holding Company Performance: A Test of the Jessup-Piper Hypothesis," Conference Papers Series: #22, Business and Economic Research Center, Middle Tennessee State University, (June, 1977).

[13]Gerald C. Fischer, Bank Holding Companies, (New York: Columbia University Press, 1961).

[14]John J. Mingo, "Capital Management and Profitability of Prospective Holding Company Banks," Journal of Financial and Quantitative Analysis, (June, 1975): 191-201.

[15]Rodney D. Johnson and David R. Meinster, "The Performance of Bank Holding Company Acquisitions: A Multivariate Analysis," Journal of Business, (April, 1975): 204-212.

[16]For example, see "A Nationwide Test of Early Warning Research in Banking," Quarterly Review, Federal Reserve Bank of New York (Autumn, 1977): 37-52.

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CHAPTER II

HISTORY OF LEGISLATION AFFECTING BANK HOLDING COMPANIES

In order to understand the factors that have led to present restrictions on bank holding company formation and expansion, it is necessary to review the history of regulation affecting holding companies. That is the major objective of this chapter. After a brief description of the early history of attempts to control the movement toward holding company formation, a more detailed discussion of recent regulation is presented.

EARLY HISTORY

Interest in determining the impact bank holding companies have on bank structure has been a topic of great interest over the last twenty years. Hovever, the bank holding company concept has been around since the start of the nineteenth century. During the first third of that century, banks exercised their common law right to establish branches. Because many of these branches had their own presidents and boards of directors, they closely resembled today's holding companies.

Few branch banks remained in existence after the 1860's because of detrimental legislation included in the National Bank Acts of 1863 and 1864 and because of adverse conditions during the Civil War. Thus by the start of the twentieth century unit banking was dominant in the United States. For example, Klein points out that:

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> The great distances between population centers, the difficulties in travel and communication, and the primarily agrarian nature of the economy all fostered the development of unit banks--locally owned, operated, and controlled. By 1921, for example, there were 31,076 banks operating 1,455 branches.[1]

However, the thousands of banks that failed in the 1920's and 1930's convinced bank regulators of the need to prevent such "overbanking" whereby many small and inefficient banks were eking out a marginal existence.[2] As a result, both state and national authorities made it much more difficult to establish new banks or branches.

One of the first such attempts to restrict any form of banking except unit banking was contained in the Banking Act of 1933. Included in this act was the first federal attempt at regulating bank holding companies: those holding companies which included a member of the Federal Reserve as a constituent were required to register with the Federal Reserve System. Further, among its many provisions to financially strengthen the banking industry, this act included a provision which introduced the "need" test in chartering new banks and branches. It requires that banks must demonstrate to the appropriate regulators that a clear need exists for a new bank or branch in the community to be served.

The feelings against competitive banking that led to such restrictions were more deeply engrained during the 1930's than this act might suggest. Indeed, the popular sentiment against all forms of multiple banking was so pervasive in the U.S. that even the bankers themselves favored only unit banking. For example, during the American Bankers Association Boston Convention of 1937, a resolution was adopted which described unit banking as "peculiarly adapted to the highly diversified community life of the United States."[3]

DEVELOPMENTS DURING THE LAST TWO DECADES

Although the sentiment against multiple banking has abated somewhat since the 1930's, it still exists and still influences bank legislation. In fact, the most recent legislation affecting bank structure and competition has been a series of acts regulating bank holding company operations and expansion.

The initial legislation was the 1956 Bank Holding Company Act giving the Federal Reserve the responsibility for regulating bank holding companies. Additionally, bank holding companies were defined by this act as any corporation or trust association controlling 25 percent or more of the voting stock of two or more banks. Finally, registered bank holding companies were required to divest themselves of most of their non-bank businesses. At that time 53 corporations owned 428 banks and controlled 7.5 percent of total bank deposits.[4]

During the latter 1950's the banking industry entered a period of strong merger activity. Resultant concern among regulators, bankers, and Congress over the monopoly power of a few large banks led to the Bank Merger Act of 1960. This act specified to the appropriate regulators that in deciding whether a merger of FDIC insured banks should be approved, the following list of factors were to be considered:[5]

1. The financial history and condition of each of the banks involved;
2. Capital structure;
3. Future earnings prospects;
4. The general character of management;
5. The convenience and needs of the community to be served; and
6. The effect of the merger on competition.

Thus, in addition to the competitive effects of a proposed merger, regulators were instructed to also weigh other factors such as earnings and management competency. Mergers could be approved under the Act

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even if competition were reduced as long as the benefits from the other factors outweighed the reduction in competition.

However, in a landmark decision, the United States Supreme Court ruled on June 17, 1963 that Section 7 of the Clayton Act, as amended in 1950 by the Celler-Kefauver Act, applied to the banking industry.[6] Under Section 7, a merger is not allowed whenever the courts find a reasonable probability that competition will be substantially lessened in the relevent market. Most notably, the Court refused to accept any of the other factors listed above in determining the legality of a proposed bank merger: only the effects of competition mattered. Thus, a proposed merger could be found to be in the public interest under the Bank Merger Act but would be struck down by the courts based on this landmark decision. Prior to this time, bankers and regulators had believed themselves to be outside the scope of the Clayton Act.[7]

The Supreme Court decision threw the banking industry into a sea of confusion. Bankers were unsure of reactions by the courts to proposed bank acquisitions. Would the courts disallow the merger because of a lessening of competition? How restrictive would the courts be in their definition of competition? As a result of unanswered questions like these, there were few bank acquisitions in the ensuing three years.

Congressional concern regarding this confusion led to the Bank Merger Act of 1966. The Act provides that the appropriate federal banking agencies shall not approve a merger that would result in a monopoly. However, if public benefits outweigh the harm caused by lessened competition, the merger can be approved. Hence this act is not as restrictive as the Court's Philadelphia decision regarding the lessening of competition, but is more restrictive than the Bank Merger Act of 1960.

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Also that year the Bank Holding Company Act of 1966 was enacted to extend the provisions of the Bank Merger Act of 1966 to holding company acquisitions.

The last significant legislation affecting bank holding companies was the 1970 Amendments to the Bank Holding Company Act of 1966. The original act had excluded one-bank holding companies from its provisions. By 1970 however, these unregulated one-bank holding companies accounted for 38 percent of total bank deposits and operated in every major sector of the economy.[8] Concern over the financial power of these companies led to the 1970 Amendments which brought one-bank holding companies under the provisions of the Bank Holding Company Act of 1956 as amended in 1966.

This just-described stream of legislation restricting bank acquisitions is strong evidence that many still feel the preservation, if not the expansion, of unit banking is the best defense against the monopoly powers of big banks and the trend toward consolidation in the banking industry. Today the extent to which a bank or holding company can expand through branching or acquisition is determined by the laws of the state in which it is located. Twenty states permit state-wide branching (provided, of course, that the state or federal regulators approve the branch), seventeen states permit limited area banking, and thirteen states, the unit banking states, permit no branching whatsoever. Twenty states also restrict or prohibit the formation of bank holding companies. Tables 2.1 and 2.2 on the two following pages present state laws regulating branching and holding company acquisitions, respectively.

TABLE 2.1
CLASSIFICATION OF STATES ACCORDING TO TYPES
OF BRANCHING PREVALENT, DECEMBER 31, 1976

Statewide branch banking prevalent	Limited branch banking prevalent	Unit banking prevalent
Alaska	Alabama	Colorado
Arizona	Arkansas	Florida
California	Georgia	Illinois
Connecticut	Indiana	Kansas
Delaware	Iowa	Minnesota
Hawaii	Kentucky	Missouri
Idaho	Louisiana	Montana
Maine	Massachusetts	Nebraska
Maryland	Michigan	North Dakota
Nevada	Mississippi	Oklahoma
New Jersey	New Hampshire	Texas
New York	New Mexico	West Virginia
North Carolina	Ohio	Wyoming
Oregon	Pennsylvania	
Rhode Island	Tennessee	
South Carolina	Virginia	
South Dakota	Wisconsin	
Utah		
Vermont		
Washington		

SOURCE: Rand McNally International Bankers Directory, First 1977 Edition, New York, NY, Laws Section, L7-L154.

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TABLE 2.2
CLASSIFICATION OF STATE LAWS AFFECTING THE ACQUISITION OF BANK STOCKS BY CORPORATIONS, MAY 31, 1973

No limitations		State approval required	Restricted or prohibited
Alabama	Nevada	California	Alaska
Arizona	New Mexico	Connecticut	Arkansas
Colorado	North Carolina	Florida	Georgia
Delaware	North Dakota	Iowa	Illinois
Dist. of Columbia	Ohio	Maine	Indiana
Hawaii	South Dakota	Massachusetts	Iowa
Idaho	Tennessee	Missouri	Kansas
Maryland	Texas	New York	Kentucky
Michigan	Utah	Oregon	Louisiana
Minnesota	Virginia	South Carolina	Mississippi
Montana	Wisconsin		Missouri
	Wyoming		Nebraska
			New Hampshire
			New Jersey
			Oklahoma
			Pennsylvania
			Rhode Island
			Vermont
			Washington
			West Virginia

SOURCE: "Bank Holding Company Facts," Association of Registered Bank Holding Companies, Washington, D.C., Spring, 1973 Edition.

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SUMMARY

Regulations affecting the ability of holding companies to acquire commercial banks has been presented in this chapter. Discussion began with a description of the legislation affecting holding companies prior to the 1956 Bank Holding Company Act. Regulatory philosophy during this time period can be described as favoring unit banking and severely restricting multiple banking. This philosophy reflected concerns about destructive competition, about the great number of banks that failed during the 1920's and 1930's, and that bigness would lead to abuses of power.

The Bank Holding Company Act of 1956 defined bank holding companies and placed restrictions on the types of businesses that holding companies could acquire. Strong merger activity within the banking industry that began during the latter 1950's was severely restricted by a Supreme Court ruling in 1963 that held mergers or acquisitions could not be approved if a lessening of competition resulted. This was applicable even if there were offsetting public benefits of a proposed combination. To remedy this undesireable effect, the Bank Merger Act of 1966 and the Bank Holding Company Act of 1966 were enacted. The purpose was to permit combinations of banks if benefits outweighed the lessening of competition. Finally, the Bank Holding Company Act of 1966 was amended in 1970 to bring one-bank holding companies under provisions of the 1966 Act. They had been omitted from the original act.

The description of regulations affecting bank holding companies describes the regulatory environment that currently exists. With this background, a better understanding of research into the effects of holding company acquisitions can be gained. A review of the research literature is presented in the next chapter.

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FOOTNOTES TO CHAPTER II

[1]John J. Klein, Money and the Economy, (New York: Harcourt Brace Jovanovich, 1974): 45.

[2]Between 1921 and 1933, over 15,000 banks failed. Further discussion of the hardships encountered by banks during this period can be found in "Banking in the United States," The Banker, (September, 1974): 1101.

[3]George S. Eccles, "Registered Bank Holding Companies," in The One-Bank Holding Company, (Chicago: Rand McNally and Company, 1969): 90.

[4]Ibid., "Banking in the United States," p. 1101.

[5]Act of May 13, 1960, Public Law 86-463, 74 Stat. 129, 12 U.S.C. 1828(c).

[6]U.S. vs. The Philadelphia National Bank and Girard Trust Corn Exchange Bank, 374 U.S. 321 (1963).

[7]Ibid., "Banking in the United States," p. 1102.

[8]"One-Bank Holding Companies Before the 1970 Amendments," Builetin, Board of Governors of the Federal Reserve System, (December, 1972): 1101.

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CHAPTER III

LITERATURE REVIEW

A question raised by a number of researchers is: Do banks change their operating and financial characteristics in response to acquisition of a competing bank by another bank? However, most of the research has focused on changes occurring in the acquired bank. Although this research is concerned with changes in both the acquired bank and the remaining competing banks, a review of the literature will be fruitful. The methodology used and results obtained in this research can then be compared with the past research.

Research related to changes in acquired banks can be divided into three categories. The first compares performance pre- and post-acquisition for banks which have merged into a larger bank. In a second category the performance of bank branches has been compared with the performance characteristics of either their home offices, with unit banks, or with their own performance prior to acquisition. And finally, banks acquired by MBHC's have been examined to determine the effects the holding company had on the acquired bank. With only a few exceptions, the methodology and results are similar in all three of these categories. Each category is examined in more detail in the discussion that follows. The remainder of the chapter then describes the ways this research differs from that reviewed in the first three categories. The chapter ends with a summary.

Table 3.1

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BANK MERGERS

Table 3.1 on the following page summarizes key results of selected research into the effects of merger on bank performance. Included in the table are two notable investigations into the performance of merged banks--one by David Smith and the other by Thomas Snider. Each is described below.

DAVID SMITH

The first investigation is a study of 81 merging banks in the Fourth Federal Reserve District[1] during the 1960-65 period by David Smith.[2] These 81 merged banks were compared with 81 non-merging banks of the same approximate asset size located in the same geographical location. Twenty-two banking ratios were then selected to measure bank performance. Pre-merger data were collected at year-end for the year preceding merger and post-merger data were collected for year-end, three years later.

A univariate t-test for statistical significance was performed on the mean difference between the two groups for each ratio. Smith found that the merged banks significantly decreased their cash assets compared with non-merged banks, increased their relative holdings of time and savings deposits, and changed the composition of their loan portfolio less than non-merging banks.

THOMAS SNIDER

The second notable investigation of merged banks shown in Table 3.1 was conducted by Thomas Snider.[3] He investigated whether loan portfolios of formerly independent rural banks changed significantly after the rural banks were acquired by urban banks. His sample consisted of

TABLE 3.1
SUMMARY OF SELECTED RESEARCH
INTO THE EFFECTS OF MERGER
ON BANK PERFORMANCE

PERFORMANCE MEASURE	RESEARCHER	
	Smith	Snider
Cash Assets	-	
Time and Savings Deposits as a percent of Total Deposits	+	
Changes in Loan Portfolio Composition	-	
Five Loan Portfolio Ratios		NSD

Where - represents a lower level after merger compared with before.
+ represents a higher level after merger compared with before.
NSD represents no significant difference before and after merger.

36 urban-rural mergers which occurred in Virginia during the period June 30, 1960 to June 30, 1968. Each of the formerly independent banks was paired with a non-merging independent bank of the same approximate asset size and located in the same banking market.

Data were collected for three years prior and for three years after the merger (but not including the year of the merger) and were used to calculate five loan portfolio ratios based on averaged data pre- and post-merger for each bank. Like Smith, Snider used univariate t-tests to check for statistical significance. Tests were applied to the mean difference for each ratio (average of the differences between each bank pair) and to the difference in each ratio before and after merger.

Results indicated that there were no statistically significant differences between the merged and non-merged banks either prior to or following merger. Snider therefore concluded that "...recent changes in the Virginia banking structure have not materially affected the amount or type of bank credit available in rural areas."[4]

In summary, there have been two notable investigations into the effects of merger on bank performance, one by David Smith and one by Thomas Snider. If new MBHC affiliates behave as merged banks, then based on the Smith and Snider findings, the affiliates will experience decreases in cash assets, will increase their time and savings account deposits relative to total deposits, and will make few changes in their loan portfolios.

BRANCHING

More evidence exists describing the performance of bank branches than exists for merged banks. As in the case of the merged banks, the major interest of most of the research has been concerned with how

branches (or acquired banks) change compared to independent banks. On the following page Table 3.2 summarizes key findings of selected research into the effects of branching on bank performance. A brief discussion of each study follows.

KOHN and CARLO

Kohn and Carlo studied the competitive impact of new bank branches opened in New York State between 1950 and 1961.[5] Their objective was to determine whether recently created branches of commercial banks, savings banks, and savings and loan associations had an adverse effect on competing institutions. They used three profitability measures and the growth rate of total deposits to measure the impact of new branches. To eliminate erratic fluctuations, three year averages of these measures were employed.

Each measure was then calculated for every bank in a nine county sample (79 banks total) for the three year period prior to opening of the first branch in that county and for the three year period following the year in which the first branch appeared. Additionally, ratios were calculated for various three year periods terminating with 1967 to determine whether adverse influences required more than three years to appear.

The ratios were contrasted with identical measures for various control groups over the same time periods. The control groups were selected so as to be similar in size, structure, and environment. Sign tests and t-tests were used to check for statistical significance. There was general agreement among the tests that no statistically significant adverse effects in any of the time periods existed for the three measures of bank profitability. However, significant adverse

TABLE 3.2
SUMMARY OF SELECTED RESEARCH
INTO BRANCHING EFFECTS ON
BANK PERFORMANCE

PERFORMANCE MEASURE	RESEARCHER			
	Kohn Carlo*	New York State Branching Department*	Schweiger McGee†	Horvitz Shull*
Profitability	NSD			
Deposit Growth Rate	-			
Lending Activity		+		
Operating Expenses			+	
Loans to Assets			+	
Interest Rates Charged on Loans				-
Service Charges on Checking Accounts				+
Interest Paid on Savings Accounts				+

*Changes occurring to a bank or branch after acquisition compared with performance before acquisition.
†Branch bank performance compared with unit bank performance.

Where - represents a lower value for the branch bank.
+ represents a higher value for the branch bank.
NSD represents no significant difference.

effects were found for rates of deposit growth in two of the nine counties studied. Deposit growth slowed by 4-6 percent for these two counties depending upon the control group used for comparison.

These same results, viz., branching had no significant impact on bank profitability but did decrease the rate of deposit growth of competing banks, were found when Kohn and Carlo made similar tests on a subset of banks whose home offices were close enough to recently established branches to be subject to maximum competitive impact of branching. Kohn and Carlo concluded with a suggestion that if geographic limits to branching were extended, no adverse effects would be noticeable in the performance measures they studied.

NEW YORK STATE BANKING DEPARTMENT

Research reported by the New York State Banking Department analyzed 39 banks which converted to branch offices between 1946 and June, 1957.[6] Various loan ratios pre- and post-branching were compared. They showed that the lending activities of these banks increased substantially after merger. However, field interviews indicated that remaining independent banks in areas where a unit bank was absorbed through merger were not adversely affected by this increased lending activity. In fact, the independent banks "sharpened up" to meet this new competition. This finding suggests that pairing of independent banks with similar recently acquired banks located in the same banking market may hide some of the changes occurring to the acquired banks because the control group (independent banks) may change.

SCHWEIGER and McGEE

In a much quoted study by Schweiger and McGee, the adequacy of the financial structure in Chicago and in Illinois in 1960 was investigated.[7]

Although this study was not directed at comparing the effect of bank acquisitions on independent banks, some light was shed on the matter. They found:

1. Branch banks grant a larger volume of loans than unit banks of the same capital and deposit size;

2. Unit banks competing with branch banks in the same areas had higher loan to asset ratios than did unit banks in unit banking areas; and

3. Branch banks have higher operating expenses than unit banks of the same size.

Hence this research suggests that if independent competing banks do in fact change their operations in reaction to the entry of a larger bank through merger of a competitor, it would be expected that the independent banks might raise their loan volume and thereby experience higher operating expenses than similar non-competing banks.

Based on these findings and on the results of research into several other areas related to financial institutions in Chicago and Illinois, Schweiger and McGee recommended relaxed entry laws for banking.

HORVITZ and SHULL

Additional support for the Schweiger and McGee findings was established through research conducted by Paul Horvitz and Bernard Shull.[8] Questionnaires requesting information about prices and services pre- and post-merger were sent to all national banks that acquired other banks through merger in 1962. Post-merger data represented bank operating experience at a point in time at least two years after merger. Sixty-three responses were studied. Results indicated that the pricing and loan policies of most acquired branches were identical to those of the acquiring bank. However, there was a tendency for the acquired banks to pay a higher rate on savings accounts and charge lower rates with

more liberal terms on loans after the merger than before. Additionally, service charges on checking accounts and the number of services offered by the acquired branch both increased. These results are similar to those found in the New York State Banking Department study described earlier.

Horvitz and Shull then investigated 3,000 Federal Reserve member banks to determine the effect of branch banking on bank performance. Results showed that bank profitability did not appear to be related to branch banking laws. There was no consistent pattern to the degree of profitability of banks in branch banking states versus banks in unit branching states. However, they did find that unit banks located in states permitting branch banking have lower loan to asset ratios and higher ratios of time deposits to total deposits than branch banks. That branch banks generally have the highest loan to asset ratios was also found. Finally, Horvitz and Shull found that, in isolated towns, the rate of interest paid on time deposits was higher when unit banks established branches.

In summary, much more research into the effects of bank branching has occurred compared with research into bank mergers. If new MBHC affiliates behave in a manner similar to new branches, the results of this research provide insights into how the affiliates might change after acquisition. The studies suggest that new affiliates will experience no significant change in profitability, will increase lending activity, and will incur higher levels of operating expenses. Results also indicate that state branching law must be considered when investigating the performance of banks. Although changes caused by branching law were not great, they did exist.

BANK HOLDING COMPANY ACQUISITIONS

Most of the recent research concerned with the impact of acquisitions and branching on bank performance has dealt with bank holding company affiliation. In general, all of the holding company studies have found that independent banks acquired by holding companies do not operate or perform much differently than independent banks. For example, Peter Rose and Donald Fraser state that: "Bank holding companies seem to have much less effect on the performance of their affiliated institutions than both the supporters and the critics of the holding company movement would have us believe."[9] A brief description of the pertinent research in this area will make clear the extent of influence holding companies have had on their affiliates. Table 3.3 on the following page summarizes selected findings of this research.

THOMAS PIPER

In a research paper for the Federal Reserve Bank of Boston, Thomas Piper investigated the acquisition activities of registered bank holding companies[10] during the years 1947 through 1967.[11] One area investigated was the post-acquisition performance of the acquired banks. The study was based on the 146 acquisitions for which complete data were available during this twenty year period. Omitted from this sample were holding company acquisitions of lead banks. These are typically large banks which are acquired not as investments but represent merely a reorganization to the corporate form of business. They are not representative of most banks acquired by holding companies. In fact, Piper found that at the time of acquisition the holding companies were twenty times larger on average that the acquired banks in his sample.

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TABLE 3.3
SUMMARY OF BANK HOLDING COMPANY
RESEARCH FINDINGS:
RELATIVE CHANGES OCCURING IN NEW AFFILIATES

PERFORMANCE MEASURE	RESEARCHER: LAWRENCE	McLEARY	TALLEY	WARE	HOFFMAN	PIPER	MINGO	JOHNSON	MEINSTER	DALE	Gandy	GRADY	FISCHER
Cash to Assets	-			-		-			-				
Loans	+		+	+	+	+			+		+		
State and Municipals	+	+		+	+	+					+		+
U.S. Gov't. Securities	-	-	-	-	-	-							
Demand Deposit Fees	+								+				
Operating Revenue	+			+	+								
Operating Expenses	+				+								
Other Operating Expenses	+		+	+							+		
Fringe Benefits	+												
Net Income	NSD				NSD		NSD						
Demand Deposits to Total Deposits		+									+		
Capital to Assets							-						
Capital to Deposits			+	+	+						+		
Consumer Loans				+					+				

Where NSD represents no significant difference between bank pairs,
+ represents a higher value for the acquired bank relative to the paired independent bank, and
- represents a lower value for the acquired bank relative to the paired independent bank.

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He paired acquired banks with unacquired banks of the same deposit size, his only pairing criterion. The independent and acquired banks in the pairs were similar at the time of acquisition. However, he recognized that "...affiliation might result in significant operating changes both by the acquired bank and by the (paired) competing institution."[12] Thus the problem of a changing control group described earlier in this report was recognized in writing for the first time. Piper, therefore, made a second test comparing asset structure of the acquired banks at the time of acquisition and at year-end 1967 with all commercial banks operating in the host state. His intent was to check for actual performance differences that may not have appeared in the paired comparison because of proportionate changes occurring to each of the paired banks. He found evidence that affiliates tended to change their asset composition after acquisition, but these tendencies were not significant at the 5 percent level.

JOE McLEARY

In somewhat related research, Joe McLeary investigated the 1966 performance of a group of holding company banks versus a paired group of independent banks of approximately the same total deposit size.[13] Eighty-two pairs of banks located in the same county or metropolitan area in the Sixth Federal Reserve District comprised the sample.[14] Data were collected for eleven measures of performance. To check for statistical significance, univariate t-tests were applied to the pair differences for each measure.

Results of this cross-section study indicated that the holding company banks were very similar to the independent banks with only the following exceptions. Significant differences were found on loan

interest rates, U.S. Government securities held as a fraction of total assets, municipal securities to total assets, and time deposits to total deposits. While the ratio of municipal securities to total assets increased for the acquired banks relative to the independent banks, the three other measures were all lower for the affiliated banks. McLeary concluded that each proposed acquisition must be evaluated on its own merits; results of this research were not convincing enough to use for making policy decisions.

One possible defficiency in McLeary's study arises from the rather large difference in average bank size of the acquired banks compared with the independent paired banks. Deposits of the affiliates were on average fourteen million dollars greater than deposits of the independent banks. Because it is possible that economies of affiliation exist for small banks but decrease as bank size increases, the relatively large difference in average bank size may have affected McLeary's findings.[15]

In a second area of research, McLeary investigated whether absentee ownership of banks affiliated with holding company groups affected their responsiveness to the banking needs of the local areas served.[16] Using ten performance measures and a 1967 sample of 23 locally controlled holding companies versus 59 holding company banks located outside the county or metropolitan area of the lead bank (the absentee group), he found that the operating performance of the local groups was fairly similar to the absentee group and also similar to that of independent banks in the same area.

ROBERT LAWRENCE

In another study of the effect holding companies have on acquired banks, Robert Lawrence compared 43 acquired banks with 55 banks of similar size in the same town.[17] The acquired banks were selected from 123 holding company acquisitions occurring from 1954 through 1963. Lawrence found that the acquired banks were typical banks one year prior to acquisition. Differences in means of selected performance measures for the acquired group versus the independent group indicated that at the 95 percent confidence interval, the only statistically significant difference prior to acquisition was "due to banks as a percent of total deposits." After acquisition Lawrence found that, compared with independent banks, the affiliates held greater amounts of state and local obligations and loans to total assets, less cash, and more capital. He also found that service charges on checking accounts were higher for the affiliates.

SAMUEL TALLEY

Samuel Talley updated Lawrence's study by investigating 82 pairs of banks based on acquisitions taking place between 1966 and 1969.[18] He found that the affiliates held more municipal securities and made more consumer loans than independent banks, but held less U. S. governments. In contrast to Lawrence's study, checking account service charges were found to be lower at the affiliate banks.

JOHNSON and MEINSTER

Rodney Johnson and David Meinster completed one of the first studies using multivariate statistics. They stated:

> We hypothesize that some performance measures used in the earlier studies are highly correlated with each other and that some measures might act differently in combination than they would if tested separately. Therefore multivariate analysis should yield different results.[19]

They used data acquired from questionnaires on 20 different measures for 36 pairs of banks. Performance before acquisition was compared with bank performance 1, 2, and 4 years after acquisition.

Using univariate statistics, the greatest changes were found to be in the asset structure of the acquired banks. However, using multivariate discriminate analysis, largest changes were found in bank pricing, not asset composition. This demonstrates that when several measures are used, multivariate estimates can be differenct from univariate estimates.

Johnson and Meinster found that after acquisition, service charges on deposits, interest rates received on U.S. governments, and loans as a percent of total assets all increased for affiliates, but interest rates received on loans decreased compared with independent paired banks.

ROBERT WARE

Robert Ware studied acquisitions occurring in Ohio during a three year period.[20] Acquired banks were paired with independent banks located in the same market. Pair differences one year prior to acquisition were compared with pair differences 1, 2, and 3 years later using univariate t-tests. Like other researchers, he found that MBHC affiliates held less cash and U.S. government securities and more loans and municipal securities compared with the paired independent banks. He also found that other operating expenses were higher for affiliates.

STUART HOFFMAN

Stuart Hoffman studied the acquisitions of two Florida MBHC's.[21] Thirteen affiliates of each holding company were paired with independent banks. Using univariate statistics on 28 measures, Hoffman's findings were consistent with those of other researchers, viz., the affiliates held less cash and U.S. governments but more loans and municipal securities as a percent of total assets than independent banks. He also found that increases in revenues offset increases in operating expenses for the affiliates compared with independent banks.

JOHN MINGO

In another study that used multivariate statistics, John Mingo investigated whether holding company affiliates take greater risks compared with independent banks.[22] He theorized that this might be the case because:

1. There are activities available to affiliates that are not available to independent banks, such as leasing, factoring, and insurance selling;

2. To justify the relatively high prices paid for new affiliates, return and therefore risk must be higher; and

3. The relatively great separation between owners and managers of holding company banks may induce managers to operate affiliates in a riskier manner.

To test this proposition, 384 banks in 9 states were studied - 134 were holding company affiliates and 250 were independent banks. All banks had assets less than $70 million. Mingo found that the affiliates operated with more financial leverage (capital to assets was lower) compared with independent banks. This was evidence that affiliated banks in Mingo's sample were operated in a riskier manner than independent banks.

LUCILLE MAYNE

A study whose objective most closely resembles the objective of this research was conducted by Lucille Mayne.[23] Her research goal was to determine whether there were significant differences in the operations of bank holding company affiliates and independent banks during the 1969 through 1972 period. A sample of 656 banks, evenly divided between affiliates and independent banks, was studied. No attempt was made to measure the affects of holding company acquisitions. Rather a cross-section analysis was performed on each of the four years investigated. In this manner operating differences between affiliates and competing independent banks that continually persist for years after acquisition could be measured.

The sample was drawn from 28 states. Differences on eighteen performance measures were investigated using multivariate linear regression. Results of the study indicated that compared to affiliates, independent banks

1. Held more cash and liquid assets to total assets but less municipal securities to assets,
2. Had less capital to non-liquid assets,
3. Had lower service charges on deposits,
4. Had higher wage expense as a percent of assets,
5. Experienced higher loan losses, and
6. Had lower profitability (net profit to total assets, net profit to total capital, and after-tax income before total gains and losses on securities to total assets were all higher for affiliates).

She concluded that the higher profitability of affiliates appeared to be caused by three contributing factors--assumption of greater risk, higher service charges on deposits, and economies of operation. Because the

other research described in this section compared new affiliates with independent banks, but Mayne's research was not directed at new affiliates, these findings are omitted from Table 3.3.

Her study differs from this research in several respects. First, the average length of time of affiliation in the markets she studied was 10 years. In this research only those markets experiencing initial MBHC entry were selected for study. Another difference is the inclusion in this research of several independent variables not included in the Mayne study. Except for holding company affiliation, only bank asset size, bank charter type, and bank location were included by Mayne as independent variables. Further, the sample selected in this study is limited to affiliates of only MBHC's. Mayne's study included affiliates of one-bank holding companies as well. A final difference is that the error in matching bank pairs by asset size is considerably less in this research than the approximate 50 percent error accepted by Mayne. The degree of success in matching banks is explained in more detail in Chapter V.

DALEY and GRADDY

Finally, the most recent study of MBHC acquisitions was completed by Daley and Graddy.[24] Using 150 bank pairs from the four states that have experienced the greatest amount of MBHC acquisition activity since 1970, a cross section multiple discriminate analysis using 1975 data was performed. Excluded from the sample were de novo acquisitions and one bank holding company acquisitions. Counties were defined as banking markets. Their most important findings were that affiliates earned a higher return on net worth and experienced higher operating expenses to operating revenues than paired independent banks.

In summary, past empirical research has been directed at examing changes occurring to acquired banks after affiliation. Using a variety of ratios and growth rates as performance measures, most studies have been fairly consistent in finding that compared with paired independent banks, affiliates held less cash and U.S. governments but more loans and municipal securities as a percent of total assets. No significant changes have been found in net income as a result of affiliation. Only the most recent studies have used multivariate statistics.

DIFFERENCT APPROACHES OF PRESENT RESEARCH

The research described in the remainder of this report differs in three ways from most of the bank holding company studies just described. These different approaches are:

1. The sample will be limited to only those MBHC acquisitions representing the initial MBHC entry into each market;

2. An independent bank competing with a new MBHC affiliate will be paired with the affiliate and with a non-competing independent bank located in a different market to check for changes in bank behavior; and

3. The appropriateness of multivariate statistics in measuring performance differences among banks for the variables used in this study will be investigated.

Discussion of each of these different approaches is presented below.

SAMPLE SELECTION

Past researchers have in most cases selected their samples by including all MBHC acquisitions occurring during a specified time interval or in a certain geographical or political area. Thus included in their samples were MBHC acquisitions which represented the first, second, third, etc. MBHC acquisition in that market. However, to measure the full undistorted impact of MBHC entry on the new affiliates and

remaining independent banks, reactions of independent banks to the initial MBHC entry must be considered. This is necessary because if affiliates or competing banks do change their operations or policies in response to MBHC entry through acquisition, it is possible that their response to the first MBHC acquisition in the market would be different than their response to the second MBHC acquisition. Likewise their response to the third MBHC entry might be different than their response to either the first or second, and so on.

If reactions of competing banks to MBHC acquisitions within their market are a function of their reactions to prior holding company entries, failure to consider the extent of MBHC influence already present in the market may introduce confounding variables into the research and possibly distort the findings. In order to measure the full undistorted impact of MBHC acquisitions on the new affiliates or competing independent banks then, the research sample must be limited to only those banking markets experiencing initial MBHC entry. In this way confounding variables caused by existing MBHC influence in the market can be minimized.

PAIRING TECHNIQUE

A second difference in approach concerns the pairing technique used to measure changes. Most researchers have paired the new affiliate with an independent bank located in the same banking market. Using this technique, if no statistically significant differences between the pairs were found before and after acquisition, the researchers reasoned that MBHC acquisitions did not significantly affect operating or financial characteristics of either bank in the pair. Yet a possible reason that relatively few significant differences were found may be

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that the control group of independent banks reacted to the entry of a larger competitor by themselves changing. Hence a significant difference between the banks may not appear even though both did change their operations significantly.

To see this deficiency, suppose the ratio of cash to total assets in recently acquired banks is studied and that independent competing banks are paired with these banks. It is quite possible that no significant differences would be found between the two groups using a before and after comparison. It might then be concluded that MBHC's do not affect the liquidity position of their affiliates as measured by this ratio. However, if managers of the paired independent banks felt threatened by acquisition of a competitor, they might take actions deemed necessary to remain competitive. One of these actions might be to reduce cash balances to a minimum. If the MBHC also reduces the cash holdings of its new affiliate, no difference in the cash to total assets ratio would be found between the two banks even though both banks did experience a significant change.

Some researchers have recognized this problem. For example Piper states that "...affiliation might result in significant changes both by the acquired bank and by the competing institution. Under such conditions, use of paired bank comparisons could be misleading."[25] Those researchers who have attempted to overcome this potential problem have done so in one of two ways. The most common approach has been to make a before and after acquisition test for all independent banks in the pairs and then for all affiliates in the pairs. This will indicate whether the independent banks as a group, or the affiliates as a group, changed after MBHC entry. If no statistically significant differences

between the pairs are found, and then it is found that both groups did change after acquisition compared to before, researchers concluded that the changes were attributable to holding company entry. Evidently the independent banks "sharpened up" in response to the acquisition as the New York State Branching Department study suggested. A problem with this technique is that the differences may represent secular changes in the banking industry and may not necessarily be a result of MBHC entry.

A second approach used to avoid the problem of not finding responses occurring equally to both paired banks was used by Piper. He compared a group of acquired banks with a group of all other commercial banks in the host state. The intention was that if only MBHC entry caused the acquired banks to change, differences would be found between these two groups, unless secular changes in the banking industry systematically affected one group more than the other. Unfortunately the average bank size of Piper's two groups was substantially different. This is a major limitation of that technique. Most researchers have found that banks acquired by holding companies are not typical banks. They are smaller than average size banks.

A more appropriate technique, the one used in this research, is to make a three-way comparison. After checking for statistically significant differences between the paired independent banks and affiliates, one of the groups could be compared with a group of similar size banks in other markets void of MBHC affiliates. Secular changes in banking should affect both groups equally. If no difference between the independent-affiliate pairs are found, it may be that MBHC entry does not significantly affect competing banks or it may be that banks in both groups changed equally. But if differences are then found between the

independent banks and a group of similar size independent banks in markets void of MBHC affiliates, it may be more strongly deduced that MBHC entry was responsible for some changes occurring to competing banks in its market. Changes resulted from MBHC entry, not secular changes.

APPROPRIATENESS OF MULTIVARIATE STATISTICS

The final difference in approach concerns the reliance of researchers on univariate statistics to test for statistical significance. Univariate statistics may be inadquate when used alone to test several highly correlated measures of performance. For example, Johnson and Meinster explain that if 40 ratios are being used and the confidence interval is 95 percent, then on average two of the ratios (5 percent x 40) will turn out significant when, in fact, the true differences for all 40 measures is zero.[26] Evidence that findings may be different if multivariate statistics are used is furnished by the Johnson and Meinster study cited earlier.

Performing a series of univariate tests to check for statictical significance may be inappropriate for a second reason. When several dependent variables are used as measures of whether an independent variable makes a significant difference in performance, a series of univariate tests might detect a small but insignificant difference on each of the dependent variables. The researcher might be undecided as to whether the independent variable had no affect on performance or whether all of the slight differences together indicate a significant difference.

Multivariate statistics provides a method of working with these types of problems. The differences among the groups stratified by the independent variables are evaluated in terms of all dependent variables considered simultaneously. In general terms univariate scalar values

are replaced with matrices of dependent and independent variable characteristics. It is the use of these matrices that allows all of the dependent variables to be considered simultaneously. Multivariate analysis will generate a T- or F-ratio which can be used to accept or reject the null hypotheses based on analysis of all dependent measures considered together. This is quite unlike a series of univariate tests which would give a t- or F-ratio for the null hypothesis on each of the dependent measures.

In this research both univariate and multivariate tests will be performed. A comparison of the estimated coefficients obtained will indicate whether multivariate tests are more appropriate than univariate tests.

SUMMARY

To gain insights into how researchers have tested for performance differences between banks and into what responses might be expected in this present study, the investigations of several researchers have been described. These investigations were categorized by the type of banking activity studied and included bank mergers, new branches, and holding company acquisitions. Two studies into the effects of merger on bank performance and four studies describing the responses of branches compared with independent banks were described. Considerably more research into the impact of bank holding company acquisitions on new affiliates exists than for both of these two other categories combined. The research is also more recent. A description of the different holding company studies concluded that findings were fairly consistent. Compared with independent banks, new affiliates held less cash and U.S. governments but more loans and municipal securities as a percent of

total assets. Affiliation did not appear to affect profitability of affiliates versus independent banks.

After these three categories of past research were reviewed, two unique approaches of the present study and one approach seldom employed in most research were described. In short, this research is unique because the sample is limited to only those MBHC acquisitions representing the initial holding company entry into each market and because competing independent banks will be paired with both the new affiliates and non-competing independent banks to check for coincident changes occurring to both affiliates and competing banks. The appropriateness of using multivariate instead of only univariate statistics, something only the most recent MBHC research has considered, will be examined. In the chapter that follows the research model is developed and explained.

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FOOTNOTES TO CHAPTER III

[1]The Fourth District includes Ohio and parts of Pennsylvania and Kentucky.

[2]David L. Smith, "The Performance of Merging Banks," Journal of Business, (April, 1971): 184-192.

[3]Thomas E. Snider, "The Effect of Merger on the Lending Behavior of Rural Banks in Virginia," Journal of Bank Research, (Spring, 1973): 52-57.

[4]Ibid., p. 52.

[5]Ernest Kohn and Carmen J. Carlo, The Competitive Impact of New Branches, (Albany, New York: New York State Banking Department, December, 1969).

[6]Postwar Banking Developments in New York State--A Summary Report, (Albany, New York: New York State Banking Department, 1958).

[7]Irving Schweiger and John S. McGee, "Chicago Banking," Journal of Business, (July, 1961): 203-366.

[8]Paul Horvitz and Bernard Shull, "The Impact of Branch Banking on Bank Performance," The National Banking Review, (December, 1964): 143-188.

[9]Peter S. Rose and Donald R. Fraser, "The Impact of Holding Company Acquisitions on Bank Performance," Bankers Magazine, (Spring, 1973): 91.

[10]A registered bank holding company was a bank holding company required to register with the Federal Reserve and required to gain its approval for any acquisition involving more than five percent of the acquired bank's stock. A holding company was required to register if it consisted of two or more banks. Excluded from registration until the 1970 Amendments were one-bank holding companies.

[11]Thomas R. Piper, The Economics of Bank Acquisitions by Registered Bank Holding Companies, (Boston: Research Report to the Federal Reserve Bank of Boston, No. 48, 1968).

[12]Ibid., p. 165.

[13]Joe W. McLeary, "Bank Holding Companies: Their Growth and Performance," Monthly Review, Federal Reserve Bank of Atlanta (October, 1968): 131-138.

[14]Included were banks in Tennessee, Georgia, and Florida.

[15]For a summary of research that has been directed at measuring the economies of affiliation in banking, see Midwest Banking in the Sixties, "Bank Costs and Output--A Commentary on the Evidence," pp. 186-193, published by the Federal Reserve Bank of Chicago, March, 1970.

[16]Joe W. McLeary, "Absentee Ownership--Its Impact on Bank Holding Company Performance," Monthly Review, Federal Reserve Bank of Atlanta (August, 1969): 99-101.

[17]Robert J. Lawrence, The Performance of Bank Holding Companies, (Washington, D. C.: Board of Governors of the Federal Reserve System, June, 1967).

[18]Samuel H. Talley, The Effect of Holding Company Activity on Bank Performance, (Washington, D. C.: Staff Economic Studies, Number 69, Board of Governors of the Federal Reserve System, 1972).

[19]Rodney D. Johnson and David R. Meinster, "The Performance of Bank Holding Company Acquisitions: A Multivariate Analysis," Journal of Business, (April, 1975): 204-212.

[20]Robert F. Ware, "Performance of Banks Acquired by Multibank Holding Companies in Ohio," Economic Review, Federal Reserve Bank of Cleveland (March-April, 1973): 19-28.

[21]Stuart G. Hoffman, "The Impact of Holding Company Affiliation on Bank Performance: A Case Study of Two Florida Multibank Holding Companies," Working Paper Series, Federal Reserve Bank of Atlanta (January, 1976).

[22]John J. Mingo, "Capital Management and Profitability of Prospective Holding Company Banks," Journal of Financial and Quantitative Analysis, (June, 1975): 191-201.

[23]Lucille S. Mayne, "A Comparative Study of Bank Holding Company Affiliates and Independent Banks, 1969-1972," Journal of Finance, (March, 1977): 147-158.

[24]Edward V. Daley and Duane B. Graddy, "Optimal Firm Size, Market Penetration, and Holding Company Performance: A Test of the Jessup-Piper Hypothesis," Conference Papers Series: #22, Business and Economic Research Center, Middle Tennessee State University, (June, 1977).

[25]Ibid., Piper, p. 58.

[26]Rodney D. Johnson and David R. Meinster, "An Analysis of Bank Holding Company Acquisitions: Some Methodological Issues," Journal of Bank Research, (Spring, 1973): 59.

CHAPTER IV

THE RESEARCH MODEL

The last two chapters have explained the factors that led to present restrictions on bank holding company formation and the research that has been directed at finding how banks have changed in response to mergers, branching, and holding company acquisitions. Furthermore, the ways in which this research differs from the described research was explained. This chapter now describes in detail the research model that will be used to test for statistical differences between bank groups. Discussion begins with a description of the research model. The rationale for including each dependent performance measure is then described. That section is followed by a similar section describing the rationale for including each independent variable in the model. Finally, the chapter ends with a summary.

THE RESEARCH MODEL

The effect of MBHC entry will be examined using the following multivariate multiple linear regression model:

$$R_i = b_{i0} + b_{i1}X + b_{i2}Y + b_{i3}C + b_{i4}M + b_{i5}L + b_{i6}S + b_{i7}H + b_{i8}I + b_{i9}D + e_i \quad (1)$$

where R_i represents the dependent measures of bank performance as follows:

$R_1 = \frac{\text{interest on loans}}{\text{total loans}}$;

$R_2 = \frac{\text{before-tax interest on investments}}{\text{total investments}}$; and

$R_3 = \frac{\text{operating expenses}}{\text{operating income}}$.

The denominator and numerator in each of these measures are in dollars.

R_1 is the ratio of line A1a to line 9a on the Consolidated Report of Income.

R_2 is calculated as follows:

$$R_2 = \frac{A1d + A1e + A1g + A1f/(1 - A6b/A3)}{2 + 3 + 4 + 5}.$$

In the numerator all terms are found on the Consolicated Report of Income while all terms in the denominator are found on the Report of Condition. Each term is defined below.

A1d = dollars of interest received on Treasury securities.
A1e = dollars of interest received on federal agency securities.
A1g = dollars of interest received on other securities.
A1f = dollars of interest received on state and municipal securities.

The divisor of A1f is necessary to convert the yield on state and municipal securities to a before-tax value comparable with the three other sources of interest income. This step is required because interest income on state and municipal securities is not taxed while all other sources of interest income are. A6b divided by A3 is income tax paid divided by taxable income, i.e., the effective average tax rate.

Lines 2, 3, 4, and 5 represent dollars of Treasury, federal agency, state and municipal, and other securities held, respectively.

R_3 is the ratio of line A21 to line A1n found on the Consolidated Report of Income. It is the ratio of interest income, trust department income, demand deposit service charge income, and other income to operating expenses. These expenses include items such as salaries and wages, fringe benefits, interest paid on deposits, interest paid on borrowed money, occupancy expenses, depreciation, and loan losses.

Tables 4.1 and 4.2 on the following pages are a Consolidated Report of Condition and a Consolidated Report of Income, respectively. They help explain the calculation of these three dependent measures.

b_{ij} represent net regression coefficients.

C represents calendar years from 1969 through 1976.
M represents Federal Reserve System membership.
If M = 1, the bank is a member.
If M = 0, the bank is not a member.
L represents state branching law.
If L = 1, limited area branching is permitted.
If L = 0, no branching is permitted.
S represents bank asset size in dollars.
H represents the Herfindahl Index for each market.
I represents dollars of personal income in each market.
D represents dollars of deposits in competing financial institutions in each market.

X and Y have values of 0 or 1 and represent bank type. By manipulating the values of these two variables, a given bank type (affiliate, competing independent, or non-competing independent) can be contrasted with either of the two others.

Although only X and Y are necessary to differentiate among the three types of banks, a third variable, Z, was created to simplify the analysis. Each type of bank can then be represented by a different variable and then the three comparisons to be tested can be represented as follows:

Z - X Independent banks (different market than the affiliate) versus MBHC affiliates.

X - Y Affiliates versus competing independent banks (same market as the affiliate).

Y - Z Competing independent banks versus affiliates.

For example, consider the first comparison shown above (Z - X). Variable X in equation 1 would take on a value of 0 or 1 indicating either independent banks (Z) or affiliates (X), respectively. Thus variable Y in equation 1 will hold constant effects of the remaining bank group--the competing independent banks. The two other comparisons will be made in a similar manner. In every comparison the Y variavariable represents the bank groups whose effect is held constant while the X variable represents the two groups being compared.

The model will be tested for each of the ten years relative to the acquisition year (-3 through +6). The objective is to determine whether there are statistically significant differences between groups in any year or from year to year. The rationale for including each dependent

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TABLE 4.1
CONSOLIDATED REPORT OF CONDITION OF BANK AND DOMESTIC SUBSIDIARIES

Comptroller of the Currency
Administrator of National Banks

CONSOLIDATED REPORT OF CONDITION LARGE BANK

(Including Domestic Subsidiaries)

CHARTER NUMBER: _____

NAME OF BANK: _____

CITY: _____

STATE: _____ ZIP CODE: _____

CALL: MARCH 31, 1978
Month Day Year

NOTE: This report must be signed by an authorized officer, attested to by not less than three directors other than the officer signing the report and forwarded within ten days after receipt of request for Report of Condition. The Comptroller of the Currency must be promptly notified if publication has not been made within the time specified.

I, _____
Name

_____
Title

of the above-named bank do hereby declare that this Report of Condition is true and correct to the best of my knowledge and belief.

_____
Signature

_____
Date

We, the undersigned directors attest to the correctness of the Report of Condition. The Report of Condition includes the statement of resources and liabilities, supporting schedules and applicable supplements. We declare that it has been examined by us, to the best of our knowledge and belief is true and correct, and that it has been or will be published in the manner prescribed by 12 U.S.C. 161, within twenty days from the date of the request for Report of Condition, or as otherwise prescribed by the Comptroller of the Currency.

_____
_____
_____
} Directors

Name, title and phone number of person to whom inquiries may be directed:

_____
_____
_____
_____

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TABLE 4.1, CONT'D.

NAME OF BANK: _____ CHARTER NUMBER: _____

BALANCE SHEET at the close of business on _____ (month / day / year)

Statement of Resources and Liabilities

Thousands of dollars

		Sch.	Item	Col.		Thousands	Hnds	Dls	
ASSETS	1. Cash and due from banks	C	7				XXX	XX	1
	2. U.S. Treasury securities	B	1	E			XXX	XX	2
	3. Obligations of other U.S. Gov't. agencies and corps	B	2	E			XXX	XX	3
	4. Obligations of States and political subdivisions	B	3	E			XXX	XX	4
	5. Other bonds, notes, and debentures	B	4	E			XXX	XX	5
	6. Federal Reserve stock and corporate stock						XXX	XX	6
	7. Trading account securities						XXX	XX	7
	8. Federal funds sold and securities purchased under agreements to resell	D	4				XXX	XX	8
	9. a. Loans, Total (excluding unearned income)	A	10		XXX XX				9a
	b. Less: Reserve for possible loan losses				XXX XX				b
	c. Loans, Net						XXX	XX	c
	10. Direct lease financing						XXX	XX	10
	11. Bank premises, furniture and fixtures, and other assets representing bank premises						XXX	XX	11
	12. Real estate owned other than bank premises						XXX	XX	12
	13. Investments in unconsolidated subsidiaries and associated companies						XXX	XX	13
	14. Customers' liability to this bank on acceptances outstanding						XXX	XX	14
	15. Other assets	G	7				XXX	XX	15
	16. TOTAL ASSETS (sum of items 1 thru 15)						XXX	XX	16
LIABILITIES	17. Demand deposits of individuals, prtnshps., and corps.	F	1f	A			XXX	XX	17
	18. Time and savings deposits of individuals, prtnshps., and corps.	F	1f	B+C			XXX	XX	18
	19. Deposits of United States Government	F	2	A+B+C			XXX	XX	19
	20. Deposits of States and political subdivisions	F	3	A+B+C			XXX	XX	20
	21. Deposits of foreign govts. and official institutions	F	4	A+B+C			XXX	XX	21
	22. Deposits of commercial banks	F	5+6	A+B+C			XXX	XX	22
	23. Certified and officers' checks	F	7	A			XXX	XX	23
	24. TOTAL DEPOSITS (sum of items 17 thru 23)						XXX	XX	24
	a. Total demand deposits	F	8	A	XXX XX				a
	b. Total time and savings deposits	F	8	B+C	XXX XX				b
	25. Federal funds purchased and securities sold under agreements to repurchase	E	4				XXX	XX	25
	26. Liabilities for borrowed money						XXX	XX	26
	27. Mortgage indebtedness and liability for capitalized leases						XXX	XX	27
	28. Acceptances executed by or for account of this bank and outstanding						XXX	XX	28
	29. Other liabilities	H	9				XXX	XX	29
	30. TOTAL LIABILITIES (sum of items 24 thru 29 excluding items 24a & b)						XXX	XX	30
EQUITY CAPITAL	31. Subordinated notes and debentures						XXX	XX	31
	32. Preferred stock No. shares outstanding _____ (par value)						XXX	XX	32
	33. Common stock a. No. shares authorized _____ b. No. shares outstanding _____ (par value)						XXX	XX	33
	34. Surplus						XXX	XX	34
	35. Undivided profits						XXX	XX	35
	36. Reserve for contingencies and other capital reserves						XXX	XX	36
	37. TOTAL EQUITY CAPITAL (sum of items 32 thru 36)						XXX	XX	37
	38. TOTAL LIABILITIES AND EQUITY CAPITAL (sum of items 30, 31, and 37)						XXX	XX	38
MEMORANDA	1. Average for 30 calendar days ending with report date: a. Cash and due from banks (corresponds to item 1 above)						XXX	XX	1a
	b. Fed. funds sold and securities purchased under agreements to resell (corresponds to item 8 above)						XXX	XX	b
	c. Total loans (corresponds to subitem 9a above)						XXX	XX	c
	d. Time deposits of $100,000 or more (corresponds to memoranda subitems 3 plus 4 below)						XXX	XX	d
	e. Total deposits (corresponds to item 24 above)						XXX	XX	e
	f. Fed. funds purchased and securities sold under agreements to repurchase (corr. to item 25 above)						XXX	XX	f
	g. Liabilities for borrowed money (corresponds to item 26 above)						XXX	XX	g
	h. TOTAL ASSETS (corresponds to item 16 above)						XXX	XX	h
	2. Standby letters of credit (outstanding as of report date)						XXX	XX	2
	3. Time certificates of deposit in denominations of $100,000 or more (outstanding as of report date)						XXX	XX	3
	4. Other time deposits in amounts of $100,000 or more (outstanding as of report date)						XXX	XX	4

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TABLE 4.2
CONSOLIDATED REPORT OF INCOME OF BANK AND DOMESTIC SUBSIDIARIES

Comptroller of the Currency
Administrator of National Banks

CONSOLIDATED REPORT OF INCOME
(Including Domestic and Foreign Subsidiaries)

CHARTER NUMBER: _____

NAME OF BANK: _____

CITY: _____

STATE: _____ ZIP CODE: _____

CALL: MARCH 31, 1978
Month Day Year

Thousands of dollars		
	THOUSANDS	Hnds	Cts
Total assets as of report date: (Including domestic and foreign subsidiaries) (Thousands of dollars)		XXX	XX

Name, title and phone number of person to whom inquiries may be directed:

_____

_____

_____

_____

I, _____
Name

_____
Title

of the above-named bank do hereby declare that this Report of Income is true and correct to the best of my knowledge and belief.

_____
Signature

_____
Date

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TABLE 4.2, CONT'D.

NAME OF BANK: _____ CHARTER NUMBER: _____

SECTION A—SOURCES AND DISPOSITION OF INCOME YEAR TO DATE (Indicate losses in parentheses)

	Thousands of dollars: THOUSANDS	Hnds	Cts	
1. Operating income:				
a. Interest and fees on loans		XXX	XX	1a
b. Interest on balances with banks		XXX	XX	b
c. Income on Federal funds sold and securities purchased under agreements to resell in domestic offices		XXX	XX	c
d. Interest on U.S. Treasury securities		XXX	XX	d
e. Interest on obligations of other U.S. Government agencies and corporations		XXX	XX	e
f. Interest on obligations of States and political subdivisions of the U.S.		XXX	XX	f
g. Interest on other bonds, notes, and debentures		XXX	XX	g
h. Dividends on stock		XXX	XX	h
i. Income from direct lease financing		XXX	XX	i
j. Income from fiduciary activities		XXX	XX	j
k. Service charges on deposit accounts in domestic offices		XXX	XX	k
l. Other service charges, commissions, and fees		XXX	XX	l
m. Other income (Section D, Item 4)		XXX	XX	m
n. Total operating income (sum of Items 1a thru 1m)		XXX	XX	n
2. Operating expenses:				
a. Salaries and employee benefits		XXX	XX	2a
b. Interest on time certificates of deposit of $100,000 or more issued by domestic offices		XXX	XX	b
c. Interest on deposits in foreign offices		XXX	XX	c
d. Interest on other deposits		XXX	XX	d
e. Expense of Federal funds purchased and securities sold under agreements to repurchase in domestic offices		XXX	XX	e
f. Interest on borrowed money		XXX	XX	f
g. Interest on subordinated notes and debentures		XXX	XX	g
h. 1. Occupancy expense of bank premises, Gross		XXX	XX	h1
2. Less: Rental income		XXX	XX	h2
3. Occupancy expense of bank premises, Net				h3
i. Furniture and equipment expense		XXX	XX	i
j. Provision for possible loan losses (or actual net loan losses) (Section C, Item 4)		XXX	XX	j
k. Other expenses (Section E, Item 3)		XXX	XX	k
l. Total operating expenses (sum of Items 2a thru 2k)		XXX	XX	l
3. Income before income taxes and securities gains or losses (Item 1n minus 2l)		XXX	XX	3
4. Applicable income taxes (domestic and foreign) (tax credits in paren.)		XXX	XX	4
5. Income before securities gains or losses (Item 3 minus 4)		XXX	XX	5
6. a. Securities gains (losses), Gross		XXX	XX	6a
b. Applicable income taxes (domestic and foreign) (tax credits in paren.)		XXX	XX	b
c. Securities gains (losses), Net		XXX	XX	c
7. Net income (Item 5 plus or minus 6c)		XXX	XX	7
OR				
7. Income before extraordinary items		XXX	XX	7
8. Extraordinary items, Net of tax effect (Section F, Item 2c)		XXX	XX	8
9. Net income (Item 7 plus or minus 8)		XXX	XX	9

and independent variable in the regression model is presented in the two sections that follow.

DEPENDENT VARIABLES

Underlying the discussion that follows is the hypothesis that business managers seek to maximize shareholder wealth as measured by common stock price. This implies that when a manager must make a decision which has more than one alternative, the one which maximizes the firm's common stock price will be chosen.

Market price can be expressed as

$$P_o = \sum_{t=0}^{n} E_t/(1+k_e)^t \qquad (2)$$

where P_o is the current common stock price, E_t represents the earnings expected at the end of time period t, and k_e is the rate of return investors require on common stock of a given risk class. In other words, market price equals the present value of all future earnings discounted at the investor required rate of return. It follows then that there are two general methods of increasing price--increasing the expected earnings or decreasing the required rate of return.

Whatever reasons MBHC managers have in mind when the decision is made to acquire another bank, the ultimate purpose must be an increase in the holding company's market price. Favorable effects must appear in earnings, the investor required rate of return, or both if the acquisition is to be a successful investment. Some of the more important reasons for acquiring a bank that would have the effect of increasing return or decreasing risk, and the implications these reasons have for bank performance, are presented below. For each reason discussed, one or two

measures of bank performance are described that will indicate whether the expected benefits of acquisition were achieved. Because the same measures can be used for several of the reasons presented, only three different independent measures are needed to determine whether the hypothesized benefits were realized.

DIVERSIFICATION

Officers of an MBHC can reduce the overall risk of their firm by acquiring a bank whose portfolio of assets and liabilities does not have perfect positive correlation with its own portfolio. For instance, consider the case of an MBHC whose affiliates are located in large metropolitan areas and a rural bank located in an agricultural region. The loan portfolios of the urban banks may consist mostly of business and consumer loans while for the rural bank the loan portfolio may be dominated by agricultural loans. Less than perfect positive correlation between the portfolios of the rural and urban banks would be expected. Acquisition of the rural bank by the MBHC would reduce the riskiness of the combined loan portfolio because variability of returns would be reduced.

Even when this "product line" diversification is not present, geographical diversification will be. It results from the Federal Reserve Board's reluctance to approve those acquisitions where the proposed affiliate and the holding company banks are located in the same banking markets. Asset and liability portfolios of these banks will not have perfect positive correlation because the banks will have neither the same borrowing customers nor the same depositors. Riskiness of the combined portfolio will be less than the riskiness of either prior to acquisition.

A conclusion from the foregoing discussion is that MBHC's may acquire banks to reduce risk. This is consistent with the hypothesis that managers seek to maximize share value: when risk decreases, the required rate of return will fall and thereby tend to drive stock prices upward, ceteris paribus.

Prior to the proposed affiliation an MBHC might be located at point A on the risk-return space shown in Figure 4.1 below.

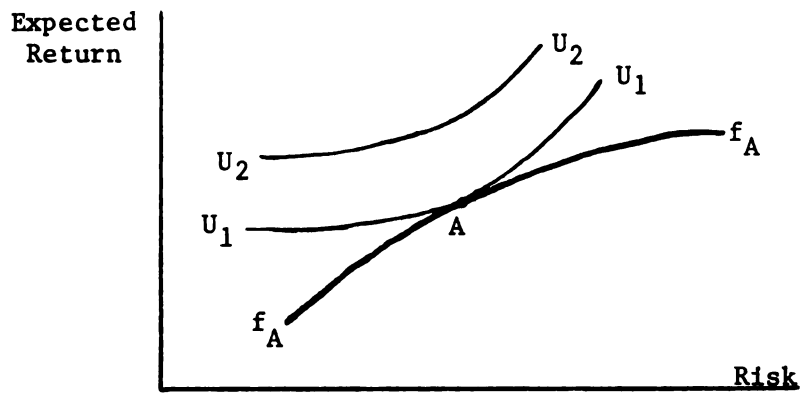

FIGURE 4.1: Initial MBHC Position

Point A lies on line $f_A f_A$ which represents the holding company's efficient frontier, i.e., the locus of all points which represent maximum return for any level of risk. Lines U_1U_1 and U_2U_2 are utility curves for risk averse bankers. Management of holding company A selects point A because its utility is maximized at that point, i.e., the highest utility curve that can be achieved, U_1U_1, is tangent to the efficient frontier at that point. If it could be achieved, management would prefer a risk-return point along curve U_2U_2 because U_2U_2 represents a greater level of utility.

If this holding company acquires a bank of lower risk than represented by point A, holding company A can reduce its over-all risk regardless of the new affiliate's return. Figure 4.2 shows this point.

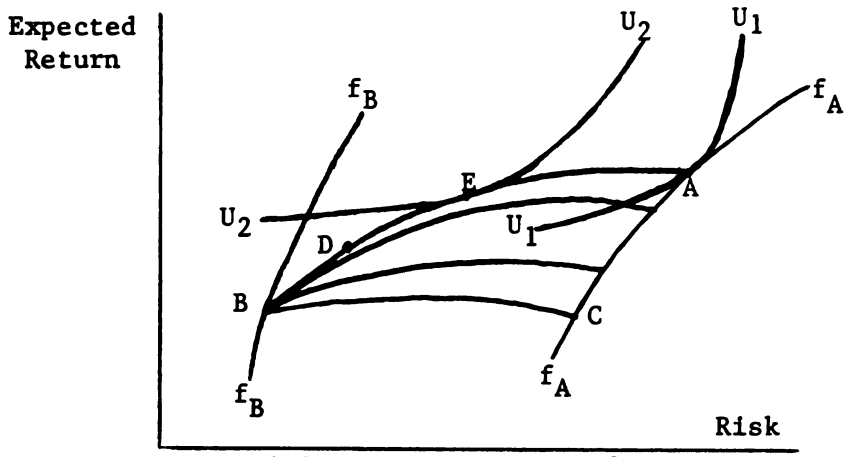

FIGURE 4.2: MBHC Position After Acquiring Bank B.

Suppose holding company A acquires bank B located at a lower risk, lower return position compared with point A. Management of bank B has selected point B along its efficient frontier, $f_B f_B$ in Figure 4.2. After acquisition the holding company can achieve any risk-return position within or along envelope ABC. How will the holding company decide upon a final risk-return point? It will choose that point which maximizes its utility.

Initially the holding company, considering its combined portfolio of A assets and B assets, may find itself at point D. Point D represents the combined risk-return position immediately after acquisition. Return at this point is simply a weighted average of the returns of the affiliate and holding company together. Combined risk is a function of relative bank size, risk, and correlation between the two banks.

The MBHC may choose to remain at this risk-return position contented with the same return at lower risk. If this were the case, measurements of risk should show that it has decreased. Unfortunately the time span covered by this research, 8 years, is not sufficiently long to allow an accurate calculation of risk. Because returns can be

calculated only annually,[1] the number of observations for each acquisition will range from 3 to 8 depending on the number of years for which data on each bank is available. A risk measure such as the standard deviation calculated on these few observations would be accurate only by coincidence. And even if the data for a sufficient number of years were available, such a measure would include risk for conditions that existed several years prior to the time of interest.

However, instead of being contented with the same return but lower risk, management of the holding company may maximize its utility if it can achieve a point such as point E representing higher return and risk. This result can be accomplished by acquiring a bank and then changing the riskiness of its loan and investment portfolio and by increasing the degree of financial leverage.[2] Immediately after acquisition the MBHC has reduced its risk through diversification and will be located at a point such as D in the risk-return space. The shift from D to E can be made by lengthening the maturity and/or increasing the average risk of both loans and investment securities. For instance, short-term securities could be replaced with longer term securities while cash and Treasury securities could be replaced with municipal securities. Both of these actions would increase risk and return without causing the banks to be illiquid because MBHC's could shift liquidity to affiliates if the need arose. The same approach can be applied to the loan portfolio to increase return and risk.

This effect can be measured by comparing the rate of return generated by the investment and loan portfolios of acquired and unaffiliated banks. Returns of MBHC affiliates should increase after acquisition compared with unaffiliated or independent banks. The two measures

below would capture this effect:

$$\frac{\text{Interest on loans}}{\text{total loans}}$$

$$\frac{\text{Before-tax interest on investments}}{\text{total investments}}$$

The contention that owners increase the riskiness of their affiliates to generate greater returns will be supported if differences between affiliates and independent banks on these two performance measures turn out to be statistically significant.

Figure 4.2 shows affiliate B located at a position of both lower risk and lower return than holding company A. If risk is to be lower, then it follows that expected return probably is lower. After all, if an investor wishes to avoid risk, expected return will be lower compared to that available if riskier investments are acquired. However, the preceding discussion is not affected if a bank of lower risk but equal or greater return than the holding company is acquired. Combined risk will still be lower. But if the affiliate has the same return as the holding company, combined return will not change as a result of the acquisition. And if the affiliate has a greater return than the holding company, combined return will be greater after acquisition. Whatever the case, risk will be reduced, and the effect of this risk reduction will show up in the two measures cited earlier.

If banks riskier than the holding company are acquired, it is likely that these new affiliates also have greater return compared with the holding company--higher risks are necessary to earn greater returns. Thus combined return after acquisition will be higher. And if the acquired banks are riskier than the holding company, a reason might be

that the new affiliates' loans are concentrated in one or a few local industries such as agriculture or tourism. These loans would exhibit high positive correlation among themselves. Yet the loan portfolio of the potential affiliate might be negatively correlated with the holding company's portfolio for the reasons described at the beginning of this section. Thus the holding company may still shift assets in the new affiliate's portfolio to a higher return, riskier composition by substituting municipal securities for Treasury securities and by channeling more consumer loans to it. It can safely do this because of the diversification achieved. Both performance measures cited earlier will capture this effect by increasing for the acquired bank relative to an independent bank located in the same banking market.

MANAGEMENT SUCCESSION

Federal Reserve Board Orders indicate that many small banks, prior to acquisition by an MBHC, are controlled by managers who are at or near the customary retirement age.[3] Management succession in these banks is a potential major problem. If management retires in the absence of trained and competent successors, the performance of the bank is likely to suffer. Knowledge of this possibility leads investors to require a higher rate of return than otherwise. But an MBHC would be a source of competent managers. The effect of acquisition would be a reduction in risk and the subsequent reduction in return required by investors. The relationship in Equation (2) shows how this will lead to a higher market price. It follows that MBHC's may acquire small banks because the potential exists to lower the investor required rate of return by supplying competent management to the bank. The lower risk return position thereby achieved can be altered by holding company owners by

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restructuring the affiliate's loan and investment portfolios in the manner described earlier. The effect would be an increase in risk, but this is offset by the risk reduction achieved from product line and geographical diversification. This effect will be captured by the two measures cited earlier measuring return on the affiliate's loan and investment portfolios.

FINANCIAL LEVERAGE

The ability to issue more debt than otherwise may be another reason MBHC's acquire banks. Debt capacity will be greater after affiliation because risk will have been reduced. Affiliation will reduce the variance of the combined cash stream of the MBHC and its new affiliate as long as the streams do not have perfect positive correlation and the acquired bank is not riskier than the holding company. Favorable financial leverage achieved through the use of greater amounts of debt financing will increase bank returns. This should have a beneficial impact on the bank's stock. The operating expense to revenue ratio mentioned in the discussion of economies of affiliation can be used to measure this higher return.

INEFFICIENT MARKETS

Areas of capital market imperfection exist. For instance investors may not possess sufficient knowledge about a firm to accurately access the market price of its stock. This is expected for many of the small banks that are candidates for holding company acquisition. Because the bank may be owned by relatively few investors, the stock may not be actively traded. Estimates of its value would then be difficult to make. Under such circumstances it may be possible for a bank holding company

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with astute management to acquire the bank at a price below its true value. Such an occurrence would benefit the holding company owners but would not affect the affiliate's returns or risk position.

However, it may be the case that market imperfections may present an opportunity for MBHC's to increase the return of an affiliate. This would be expected when the potential affiliate does not have the investment opportunities necessary to achieve its desired risk-return position. For example, there might be little profitable loan demand in the bank's market. Without a strong correspondent banking relationship, the bank would have to settle for a position below the BDEA line of Figure 4.2. Acquisition by an MBHC could supply the bank with the loan demand necessary to move its position to the efficient frontier, i.e., higher return for the level of risk accepted. The two measures used to test for changes in loan and investment return mentioned earlier will capture this effect.

ECONOMIES OF AFFILIATION

The desire to reduce unit costs through economies of affiliation is another possible reason for bank acquisition. Empirical evidence indicates that significant economies of scale exist for banks whose size does not exceed about $10 million in deposits, but these economies moderate as bank size increases.[4] Whether MBHC's can achieve these economies by acquiring small banks is debatable. Scherer states that:

> ...The bulk of all scale economies in production are realized at the plant level; multi-plant production and physical distribution economies of scale appear to be modest or non-existent. Suppose then that two previously independent plants producing the same product are brought under the same corporate shell. What economies of scale will be realized? The answer must be little or none. The plants are already built; not much can be done to unbuild them in order to increase their scale.[5]

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SUMMARY

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If economies of affiliation do exist as a result of MBHC affiliation, an acquisition would tend to increase the holding company's combined earnings and dividends and therefore its market price. Referring to Figure 4.2, this would be depicted by a movement from point E to some higher return point lying above E. Diseconomies would be depicted by movement to a position below E. In both of these cases the effects of risk have been ignored. Its presence would cause movement to a final position along a line similar to but lying above BDEA in Figure 4.2.

The presence of economies or diseconomies of affiliation will be measured using the following operating ratio:

$$\frac{\text{Operating expenses}}{\text{Operating income}}$$

If the result of an acquisition is an increase in earnings relative to expenses, this measure will capture that effect.

SUMMARY

In summary, five reasons that explain why MBHC's acquire banks have been discussed. All of the reasons ultimately lead to changes in return and/or risk and are consistent with the hypothesis that mangers seek to maximize shareholder wealth. Three measures will be used to capture these risk and return effects. These dependent measures are:

$$\frac{\text{Interest on loans}}{\text{Total loans}};$$

$$\frac{\text{Before-tax interest on investments}}{\text{Total investments}}; \text{ and}$$

$$\frac{\text{Operating expenses}}{\text{Operating income}}.$$

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It is hypothesized that affiliates, compared with independent banks located in the same market, will experience higher levels for the first two measures and lower levels for the last.

INDEPENDENT VARIABLES

Presented below is the rationale for including each independent variable found in Equation (1) in the regression model.

BANK TYPES X AND Y

X and Y have values of 0 or 1 and represent bank type. By manipulating the values of these two variables, a given bank type (affiliate, competing independent, or non-competing independent) can be contrasted with either of the two others. The three comparisons to be tested and an example explaining how X and Y will be used was described on page 51 of this report.

FEDERAL RESERVE SYSTEM MEMBERSHIP, M

It is necessary to include this variable because membership may affect bank performance. One reason is that Federal Reserve System member banks are much more limited in the types of assets that qualify as required reserves than many non-member banks. A result is that differences in composition of asset portfolios and return on investments is likely among member and non-member banks. For instance, the cash to assets ratios for member banks are higher than those of non-members. Gilbert has estimated that many member banks with assets less than $50 million make relatively little use of Reserve Bank services. The cost of membership for these banks averaged 11.2 percent of profits and 1.8 percent of equity capital in 1976.[6] Thus it would be expected

that, since most banks acquired by MBHC's have total assets less than $50 million, Federal Reserve membership will cause banks to be less profitable than non-members.

STATE BRANCHING LAW, L

All states closely regulate the extent to which banks can branch. Some permit no branches, others permit branching only within a limited geographical area, and some states permit state-wide branching. These are described as the unit, limited, and state-wide branching states, respectively. Inclusion of this variable is necessary if the effect of differences among banks due to branching laws is to be held constant. Differences would be expected to arise from factors such as economies of scale that accrue to branches but not to one large bank, risk reduction achieved through customer and geographic diversification, and level of competition, which would be reflected in output prices and types of services offered.

In fact, several researchers have found differences in bank performance because of state branching law. Bell and Murphy found that branching tends to raise bank costs.[7] Schweiger and McGee found evidence that branch banks have higher operating expenses than unit banks.[8] And a study by the New York State Banking Department found that banks with branches increased their lending activity relative to unit banks.[9]

It would be expected then, that banks acquired by MBHC's in unit banking states would have lower values of R_3 than banks acquired in limited branching states. In this study none of the markets included in the sample were from states permitting state-wide branching. Therefore a dummy variable with a value of 1 was used to indicate a state

permitting limited branching and a value of 0 to indicate a unit branching state.

BANK ASSET SIZE, S

Several researchers have found that bank performance is dependent on bank size measured by total deposits or total assets. Schweitzer found that scale economies exist for very small banks with assets less than 3.5 million dollars, constant returns exist for banks within a 3.5 million to 25 million dollar range, and decreasing returns exist for banks of asset size greater than 25 million dollars. Bell and Murphy state that since branching raises bank costs and most banks with branches are large banks, costs vary with bank size. They also found increasing returns to scale for many bank functions.[10] It is necessary therefore to include bank asset size as an independent variable so that its effect on bank performance can be held constant while holding company effect is measured.

HERFINDAHL INDEX, H

It seems reasonable that an MBHC holding a major share of deposits within a market would react differently to MBHC entry than would a bank which shares the market equally with several other banks. How a bank reacts to holding company entry is therefore likely to be a function of market concentration.

A convenient measure of market concentration is the Herfindahl Index:

$$H = \sum_{i=1}^{n} s_i^2$$

where s_i is the market share of the ith firm. When there is only one

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firm in the market, the index will have a value of 1.00. As the number of firms increases, the value of the index decreases. Thus the higher its value, the greater the market concentration. This continuous variable is therefore present in the regression equation. When the ratio has a high value, the market is concentrated and monopoly profits may exist. If this is the case, R_1 may be greater for these concentrated markets than for more competitive markets because banks in less competitive markets may be able to charge higher interest rates on loans than otherwise.

COUNTY INCOME, I

Structure within a market is a function of supply and demand factors and the level of competition. In this research, where the interest is in the commercial banking structure within a county, variables affecting structure which are of no research interest will be held constant by including them in the model to be tested.

The Herfindahl Index specifies market concentration or the level of competition. County personal income, I, is included as a measure of demand and supply. The higher the personal income within a county, the greater the demand for such banking services as deposits, loans, etc. Further, bank output is a function of county personal income. The greater is I, the more loans a bank can make. Hence county personal income is included to hold market structure among counties constant. County income data were compiled from various issues of the "Survey of Current Business," U.S. Department of Commerce/Bureau of Economic Analysis.

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DEPOSITS AT COMPETING INSTITUTIONS, D

The demand and supply of substitutes for banking services within a market is another structure variable that must be included in the analysis to hold constant differences among markets. Savings banks, savings and loan associations, and credit unions all offer substitute services for commercial banks. However, in the case of credit unions, the services are not usually available on a county-wide basis. Rather services are available only to members who share a common bond such as place of employment. Therefore D includes deposits at only savings banks and savings and loan associations. Sources of deposit data were:

Savings Banks	FDIC	Summary of Accounts and Deposits in All Mutual Savings Banks, various editions.
Savings and Loan Associations	FHLBS	Summary of Savings Accounts, Member Savings and Loan Associations of FHLBS, Washington, D.C., various editions.

The last two variables, I and D, are meant to hold supply and demand constant among markets. These two will not completely describe the supply or demand functions for each market. This is not the intent. Rather the intent is to capture the supply and demand effects. These two independent variables will capture the important components of those effects.

SUMMARY

The objective of this chapter was to describe the research model that will be used to test for significant differences in bank performance. A multivariate multiple linear regression model was hypothesized which included three dependent variables (return on loans, before-tax return on investments, and operating expenses to operating revenue)

and nine independent variables (calendar year, Federal Reserve System membership, state branching law, bank asset size, market concentration, county-wide personal income, deposits at competing financial institutions, and two variables indicating bank type). A detailed description was given of each variable. The remainder of the chapter was an explanation of the rationale for selecting the variables that appear in the model. The next chapter describes the research sample that will be used to test it.

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FOOTNOTES TO CHAPTER IV

[1]Income figures are available from The Consolidated Report of Income which was issued annually prior to 1976.

[2]The effects of increased financial leverage will be discussed in a subsequent section.

[3]Frederick M. Scherer, Industrial Market Structure and Industrial Performance, (Chicago: Rand McNally, 1970): 116.

[4]For example, see the following Board Orders in the Federal Reserve Bulletin:

--State Street Boston Financial Corporation, July, 1973, pp. 526-528.
--United Jersey Banks, March, 1972, pp. 296-297.
--BancOhio Corporation, April, 1972, pp. 415-416.
--Valley Bancorporation, May, 1972, pp. 470-471.
--Depositors Corporation, January, 1971, pp. 36-37.
--First Holding Company, Inc., February, 1971, pp. 139-140.
--Dominion Bankshares Corporation, March, 1970, pp. 307-309.

[5]For instance, see Thomas R. Piper, The Economics of Bank Acquisitions by Registered Bank Holding Companies, (Boston: Research Report to the Federal Reserve Bank of Boston, No. 48, 1968), and Eugene Rotwein, "Bank Mergers and the Bank Concentration in California in the Postwar Period," unpublished paper, Federal Reserve Bank of San Francisco, 1964, pp. 9-10.

[6]R. Alton Gilbert, "Utilization of Federal Reserve Bank Services by Member Banks: Implications for the Costs and Benefits of Membership," Review, Federal Reserve Bank of St. Louis (August, 1977): 3.

[7]Frederick W. Bell and Neil B. Murphy, Costs in Commercial Banking: A Quantitative Analysis of Bank Behavior and Its Relation to Bank Regulation, (Boston: Research Report to the Federal Reserve Bank of Boston, No. 41, 1968): 179.

[8]Irving Schweiger and John S. McGee, "Chicago Banking," The Journal of Business, (July, 1961): 208-209.

[9]Postwar Banking Developments in New York State--A Summary Report, (Albany, New York: New York State Banking Department, 1958).

[10]Ibid., Bell and Murphy, p. 47.

CHAPTER V

THE SAMPLE

The objective of this chapter is to describe how the sample was selected and to describe several of its characteristics. A discussion of these topics will be helpful in understanding the statistical testing and results described in Chapter VI. To examine the response of commercial banks to the initial market entry by MBHC's, markets must first be defined. Discussion therefore begins with the market difinition used in this study. Next is a discussion of how the sample was selected. Finally, several sample characteristics are described. These include the sample size, geographical location of the sampled banks, and the relative success achieved in pairing banks of equal size. The chapter ends with a summary.

MARKET DEFINITION

Prior to selecting the sample of banking markets to be included in this research, it was necessary to define a "banking market". Counties are used as the definition. While arguments against this definition can be raised, several reasons exist for its use.[1] These are:

1. State branching laws are frequently based on county lines;
2. Geographic barriers that were used to establish county lines also constrain banking markets;
3. In a study of prices in different markets in Florida, Salley found that a county definition worked as well as any other definition;[2]
4. County boundaries do not change over time;
5. In many counties commerce revolves around the county seat which is located near the geographical center of the county; and

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6. Much of the data is readily available only by county.

The sample will also be constrained so that it encompasses the eight-year period from 1/1/69 through 12/31/76. Data prior to this time span will not be used because some of the Report of Condition and Report of Income categories needed for the dependent measures were changed at the end of 1968 and therefore are not comparable with data from later years.

SAMPLE SELECTION

An explanation of how markets experiencing initial entry by an MBHC were identified and the criteria used to select individual banks are presented in this section. The next section describes the success achieved in matching same size bank pairs.

Eight states were surveyed to find those counties which experienced initial MBHC entry after 1/1/69. They were:

Florida	Ohio
Iowa	New Mexico
Michigan	Texas
Missouri	Wisconsin

Included are all states in the Chicago and Dallas Federal Reserve districts that permit MBHC's and most of the other states in the U.S. experiencing greatest MBHC activity after 1968.[3]

Counties to be included in the sample were selected by surveying Summary of Deposit data by county for all FDIC insured commercial banks as of 6/30/76. Counties with and without MBHC's were identified. For those counties with MBHC's, the date of acquisition of each holding company bank was determined. If the initial entry of an MBHC occurred after 1969, the Federal Reserve Board Orders describing each acquisition in that county were inspected to determine whether a holding company relationship existed between the MBHC and the new affiliate prior to

acquisition. If not, the county was included in the research sample. De novo banks and MBHC lead banks were excluded because they are not representative of typical acquired banks. De novo banks are recently created banks. High "startup" costs and the absence of an established customer clientele make de novo banks atypical banks during their first years of operation. MBHC lead banks are large banks which are typically the initial acquisition of an MBHC. Their acquisitions represent organizational changes rather than policy changes. As stated earlier in this report, Piper found that, on average, lead banks were twenty times larger than their affiliates. They are therefore not representative MBHC affiliates.

Altogether 83 counties were found which experienced initial market entry by an MBHC after the beginning of 1969 and met the other selection criteria. In each of these counties two banks were selected for inclusion in the sample. One bank was the new MBHC affiliate, i.e., the first MBHC affiliate in the county. The other was an independent bank at the time of MBHC entry which remained independent through 1976. In the statistical testing these two banks will be paired with each other to check for changes. Criteria used to select these independent banks were as follows:

1. Bank deposits — The independent bank closest in size to the MBHC affiliate was the overriding selection criterion. In this way differences between the two banks caused only by size (bank deposits) would be minimized.

   Unless an independent bank could be found which was no more than 50 percent larger or smaller than the affiliate, the county was omitted from the sample. At the very worst then, the affiliate

was paired with a competing independent bank 50 percent larger or 50 percent smaller than itself.

2. Distance between banks — If more than one independent bank of the same approximate deposit size as the affiliate existed in the county, the one selected was the one nearest the affiliate. However, in very few counties was there more than one independent bank of the same deposit size. Thus this second criterion was seldom applied. In fact, many counties that met all other selection criteria were omitted from the research sample because no single independent bank was present in the county whose deposits were within ± 50 percent of the affiliate's.

Finally, for each state a list of all counties which had no MBHC or one-bank holding company affiliates during the 1969-1976 period was prepared. An independent bank from one of these counties was then selected for pairing with the MBHC affiliate. The only selection criterion was deposit size. In general there were more counties without holding companies than counties experiencing initial MBHC entry. Therefore it was possible to more closely match deposit size of the competing independent-noncompeting independent bank pairs than the affiliate-competing independent bank pairs.

Two final points should be made regarding sample selection. First, no large metropolitan area (cities with populations exceeding 100,000) are represented in the sample. Although these areas were not explicitly excluded, the sample selection criteria prevented any of them from being selected. In the states surveyed, initial acquisitions in large metropolitan areas either occurred prior to 1969, were acquisitions of lead banks (merely an organizational change), or were only formal recognitions of a holding company relationship that existed prior to

acquisition. As a result, the findings of this research cannot be generalized to MBHC acquisitions occurring in large metropolitan areas.

The second point is that for many of the counties included in the sample, other MBHC's entered through acquisition after the initial entry. Hence some counties contained only one MBHC affiliate during the 1969-1976 period while others contained several. These subsequent acquisitions should provide more pressures for change, especially among remaining independent banks which watched their competitors change from independent banks to MBHC affiliates. Because the major research interest is to find whether the hypothesized changes occurred because of MBHC entry, these subsequent entries will have the effect of making whatever changes might occur more evident.

In summary, the research sample consists of 83 three-bank pairings:

affiliate--competing independent bank (same county)--non-competing independent bank (different county).

These three-bank pairings are designated in this research as "triplets". Tables 5.1 and 5.2 on the following two pages present the sample size (number of triplets) by state for each year relative to the acquisition year and for each calendar year, respectively.

SAMPLE CHARACTERISTICS

AVERAGE BANK SIZE

A brief discussion of selected sample characteristics is presented here. Two characteristics are described. First, the average asset size of the three bank groups by state is described. Then the degree of success achieved in pairing same size banks is presented.

Table 5.3, which follows on page 80, gives the average size of each of

TABLE 5.1
NUMBER OF TRIPLETS BY STATE FOR
EACH YEAR RELATIVE TO ACQUISITION YEAR*

	YEAR RELATIVE TO ACQUISITION										
STATE	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	Total
Florida	1	3	3	3	3	1					14
Iowa	4	4	5	5	5	4	4	2	1	1	35
Michigan	9	10	10	10	9	9	4	2			63
Missouri	11	19	23	25	24	21	13	13	10	7	168
New Mexico	2	2	3	4	4	4	3	2	2	2	29
Ohio	5	8	14	16	15	15	14	10	9	5	112
Texas	11	11	11	11	10	9	7	5			75
Wisconsin	3	7	8	8	8	8	8	8	5	1	64
Total	46	64	77	82	78	71	53	42	27	16	560

*A triplet is a paired group of three banks:

Affiliate--Competing independent--Non-Competing independent
same county different county

TABLE 5.2
NUMBER OF TRIPLETS AVAILABLE FOR TESTING
BY STATE AND CALENDAR YEAR

	CALENDAR YEAR								
STATE	69	70	71	72	73	74	75	76	Total
Florida	1	1	2	2	2	2	2	2	14
Iowa	2	4	4	5	5	5	5	5	35
Michigan	2	4	8	9	10	10	10	10	63
Missouri	10	10	14	26	27	27	27	27	168
New Mexico	2	3	4	4	4	4	4	4	29
Ohio	11	14	15	15	16	14	14	13	112
Texas	5	7	9	10	11	11	11	11	75
Wisconsin	8	8	8	8	8	8	8	8	64
Totals	41	51	64	79	83	81	81	80	560

TABLE 5.3
AVERAGE ASSET SIZE OF BANK GROUPS
DURING THE ACQUISITION YEAR

	AVERAGE ASSET SIZE, ($1,000's)		
STATE	Affiliates	Competing Independent Banks	Non-Competing Independent Banks
Florida	17,716	24,613	19,668
Iowa	19,992	20,560	19,387
Michigan	22,864	23,863	24,286
Missouri	15,086	13,599	14,455
New Mexico	26,075	26,382	24,941
Ohio	28,255	23,992	26,961
Texas	47,875	42,096	47,619
Wisconsin	18,544	20,505	18,649

the three bank groups in the study. The data shown represent group averages of the banks in each triplet for the year in which the affiliate was acquired. For instance three Florida triplets exist representing three Florida counties experiencing initial MBHC entry after 1/1/69. Acquisitions occurred in 1971, 1974, and 1975. The affiliate bank size shown in Table 5.3 for Florida was calculated by summing the 1971 affiliate's 1971 size with the 1974 affiliate's 1974 size and with the 1975 affiliate's 1975 size and then dividing this sum by three. The same was done for the other two Florida groups and for groups in the other states.

From this table it is evident that the non-competing independent banks more closely match the affiliates in asset size than do the competing independent banks. The reason is that there were more non-competing than competing independent banks. A same size non-competing bank was therefore easier to find than a same-size competing bank.

It is also evident from this table that average bank size by group varies considerably from state to state. There are several reasons for this. Most important is that the calendar year of most acquisitions in some states was more recent than for other states. Hence average bank size for banks acquired in 1973 or 1974 would be larger than average bank size for banks acquired in 1969 or 1970 because of the growth of average bank size as time passes. Most Wisconsin acquisitions occurred during the early years of the time period studied while most Michigan and Texas acquisitions occurred during the early or middle 1970's. It would be expected that average size of Michigan and Texas banks would be larger than Wisconsin banks, and they are.

Another reason that average bank size varies is that the average

size of all commercial banks in a host state varies from state to state. In heavily industrial states commercial banks are larger than in less industrialized states. Banks in triplets from industrialized states (Michigan and Ohio) will therefore be larger on average than banks in other states (Iowa and Missouri, for example).

ACCURACY OF PAIRING TECHNIQUE

An indication of the accuracy achieved in matching banks by size in each triplet is presented in Table 5.4. Shown for the acquisition year are absolute size differences between the bank groups in each pair and the percentage difference. The percentage difference is defined as

$$\text{Percentage Difference} = \frac{\text{Mean of absolute size differences between pairs}}{\text{Average bank size of affiliate or Average bank size of competing independent bank.}}$$

The denominator of this expression depends on whether the affiliate--competing bank pair or the competing--non-competing bank pair is of interest.

Averages of bank size and percentage difference for all states together are:

	Average Size ($1,000's)	Percentage Difference
Affiliates	24,320	
		6.1
Competing independent banks	22,840	
		5.0
Non-competing independent banks	23,991	

The largest absolute differences in dollars between the bank pairs exists for the Texas triplets. However, because the Texas banks are the largest banks in the research sample, the percentage difference for

TABLE 5.4
ACCURACY OF BANK PAIRINGS

	BANK PAIRING			
	AFF - CPTG		CPTG - IND	
STATE	Mean of Absolute Differences ($1,000's)*	Percentage Difference**	Mean of Absolute Differences ($1,000's)+	Percentage Difference++
Florida	7629	43	4943	20
Iowa	4129	21	3805	19
Michigan	4690	20	6194	26
Missouri	3426	23	3253	24
New Mexico	2845	11	3191	12
Ohio	5101	18	4648	19
Texas	10303	22	11472	27
Wisconsin	3893	21	3520	17

*Mean of absolute differences between banks in this pair.
**Mean of absolute differences between banks in pairs expressed as a percent of the affiliates' average asset size.
+Mean of absolute differences between banks in this pair.
++Mean of absolute differences between banks in pairs expressed as a percent of the competing independent banks' average asset size.

the two groups of pairs was only a little above the average for all banks together. Largest differences in pairing banks occurred in the Florida pairs. The reason is that only three counties in Florida are included in the sample and in all of them the competing independent bank closest in deposit size to the affiliate was near the $\pm$ 50 percent selection criterion.

SUMMARY

The research sample was selected from eight states: Florida, Iowa, Michigan, Missouri, New Mexico, Ohio, Texas, and Wisconsin. For a variety of reasons, counties were used as banking markets. Those counties experiencing initial market entry by an MBHC through acquisition between 1/1/69 and 12/31/76 were identified by surveying Summary of Deposit data for all FDIC insured banks. De novo banks and acquisitions of lead banks were omitted from the sample. Although 83 counties were indentified that met all sample selection criteria, Missouri and Ohio contributed the greatest number of counties; Florida, New Mexico, and Iowa contributed the least.

Each new affiliate was paired with an independent bank located in the same county. The independent bank closest in deposit size and located nearest the affiliate was chosen. From a list of all counties in the host state containing neither one-bank nor multibank holding companies, a same size independent bank was selected. Thus for each county experiencing initial MBHC entry, three banks were indentified: affiliate, competing independent, and non-competing independent.

Discussion concluded with a brief description of sample characteristics. The average asset size of each bank group by state was presented. Reasons for variations in bank size by state were explained.

Finally, the degree of success achieved in pairing same size banks was described. Affiliates and non-competing independent banks were both slightly larger on average than competing independent banks.

FOOTNOTES TO CHAPTER V

[1]For instance, see Richard W. Stolz, "Local Banking Markets and the Relation Between Structure, Prices, and Non-Prices in Rural Areas," Dissertation for the Degree of Ph. D., Michigan State University, 1975. Stolz found that while many counties adequately represent banking markets, many do not. He therefore recommended that market definitions be based on economic and demographic factors.

[2]Charles D. Salley, "Concentration in Banking Markets: Regulatory Numerology or Useful Merger Guideline," Monthly Review, Federal Reserve Bank of Atlanta (November, 1972): 190-191.

[3]Every county in states which are located in two Federal Reserve districts was surveyed. For example, every county in Michigan (part of Michigan is in the Chicago district and part is in the Minneapolis district) was surveyed.

CHAPTER VI

TESTING AND RESULTS

This chapter describes both the analysis of the research data and results from the statistical testing. A discussion of characteristics of the continuous variables is followed by a graphical analysis of the research data. Plots of the behavior of each dependent variable for each bank group and of the Herfindahl Index for markets with and without holding company affiliates are examined. The next section then covers the statistical testing and describes the comparisons made and the results of each. Signs and magnitudes of the estimated coefficients are then examined.

CHARACTERISTICS OF THE RESEARCH VARIABLES

Twelve variables appear in the statistical model (Equation IV-1). Of these, seven are continuous, four are dummy variables with values of 0 and 1, and one, calendar year, is an integer variable. This section begins with a description of several statistical characteristics of each of the seven continuous variables. A discussion of the correlations among all twelve variables then follows. Material presented in this section will be helpful in understanding the results that are described in later sections of the chapter.

CHARACTERISTICS OF THE CONTINUOUS VARIABLES

On the following page Table 6.1 presents selected results of the SPSS CONDESCRIPTIVE computer program used to compute data characteristics

TABLE 6.1
STATISTICAL CHARACTERISTICS OF
CONTINUOUS VARIABLES

VARIABLE	MEAN	MINIMUM	MAXIMUM	STANDARD DEVIATION
County-wide Personal Income ($1,000's)	190.	10.0	1800.	227.2
Competing Deposits ($1,000's)	36.4	0	475	54.4
Bank Assets ($1,000's)	27,263	1800	263,297	23,758
R_1	7.7%	4.6%	12.4%	1.0%
R_2	5.8%	1.4%	12.5%	1.1%
R_3	79.9%	34.8%	160.7%	4.4%
Herfindahl Index	.284	.06	.81	.125

for the research sample. Since characteristics of the dummy and integer variables are of little interest or meaning, only the seven continuous variables are described.

Values presented are computed from the total of all 560 triplets shown in Table 5.1. Because there are three different banks in each triplet, 1680 separate bank observations during the 1969-1976 research period are represented (560 X 3 = 1680). It is important to note that all banks in each of the three bank groups over the 1969-1976 period are included in the results of this table. No distinction was made among acquisition years, calander years, bank type, branching law, or Federal Reserve System membership status. Instead, all data was analyzed as a single group to obtain the reported results.

It may be noted that county-wide personal income, competing deposits, and bank asset size all have rather large standard deviations compared with their respective means. This result was caused by inclusion in the sample of MBHC acquisitions in counties with very low levels of economic activity as well as counties with much higher levels. For instance, county-wide personal income varied from 10 million to 1.8 billion dollars, the latter figure being 180 times greater than the former. Large differences in the ranges of competing deposits and bank asset size similarly exist. These large ranges caused by the great size disparity among markets included for study explain the large standard deviations that exist.

On the other hand, the three dependent performance measures have relatively small standard deviations compared with their means. This would indicate that individual banks are unable to perform much differently than average. Results for R_1 and R_2 suggest that bankers have

only a narrow range in which they can vary rates charged on loans (R_1) or earn interest on investments (R_2). Reed et al. state that it would be unusual for banks to make loans at rates much higher than 2.5% above their prime lending rate.[1] Similarly, interest rates on mortgage loans and consumer loans for items such as automobiles tend to vary over a relatively small range. Thus a large standard deviation on the average bank lending rate would not be expected. A similar situation exists for the average return on investments. A spread of only about 3% between the safest investments (T-Bills) and the riskiest (perhaps municipal securities) exists. Before-tax return on investments would not be expected to vary greatly around the average. Its relatively low standard deviation in Table 6.1 supports this expectation.

Neither does the operating expenses to operating revenue ratio, R_3, vary greatly for banks within the asset range studied. Evidently bankers are limited in their ability to achieve economies through mechanization, to achieve economies of scale or affiliation, or to change greatly the prices paid or received for services relative to other banks. Because prices received consist of fees and interest rates, and because the largest cost component is interest expense, it is apparent that the small variation in interest rates discussed above contributes to the uniformity among banks in operating efficiency.

Table 6.1 also indicates that for the 83 counties studied from 1969 through 1976, the Herfindahl Index averaged 0.284. Consequently, a market with an index value greater than this would be more concentrated (less competitive), and one with a lower value would be more competitive than average.

CORRELATIONS AMONG THE VARIABLES

Correlations among all the research variables were calculated on data which included all banks in all time periods. Results are presented in Table 6.2. The discussion that follows explains the correlations found in this table that exceed 0.40.

Calendar Year and Acquisition Year. A relatively high positive correlation exists between these two independent variables. This is a logical result since as time (calendar year) progressed, year relative to acquisition year increased.

Calendar Year and R_1. Calendar year also has a high positive correlation with R_1, return on loans. Bankers can rapidly adjust the return received on their loan portfolios in response to rising interest rates in the economy because a large proportion of bank loans have short-term maturities. As interest rates rise, bankers adjust loan rates upward. Since interest rates in the economy rose secularly during the eight years covered by this study, the relatively high positive correlation appearing in Table 6.1 was expected.

County-Wide Personal Income and Both Deposits in Competing Financial Institutions and Bank Asset Size. County-wide personal income has a relatively high positive correlation with both deposits in competing financial institutions and bank asset size. This was also expected because as county income rises, banks and competing financial institutions can attain a larger scale of operation. Deposits at financial institutions would increase with increases in county income. As more funds become available, banks could increase dollars of loans and investments. Since banks count these as assets, bank size would increase.

TABLE 6.2
CORRELATION MATRIX OF
ALL VARIABLES IN THE STUDY

	L	C	I	A	D	M	S	R_1	R_2	R_3	H	Z	Y	X
L	1.00													
C	.06	1.00												
I	-.08	.10	1.00											
A	.17	.69	.20	1.00										
D	-.06	.14	.87	.28	1.00									
M	-.07	-.06	.12	.12	.12	1.00								
S	-.28	.18	.48	.30	.51	.27	1.00							
R_1	-.14	.50	.09	.33	.09	-.01	.19	1.00						
R_2	-.04	.19	.01	.11	.01	-.02	.02	.15	1.00					
R_3	.08	.14	.22	.15	.16	.06	.14	.13	.02	1.00				
H	.02	.07	-.34	-.07	-.24	-.02	-.04	.10	.00	-.17	1.00			
Z	.00	.00	-.20	.00	-.16	-.07	.01	-.02	-.02	-.11	.42	1.00		
Y	.00	.00	.10	.00	.08	.05	-.02	-.01	-.03	.07	-.21	-.50	1.00	
X	.00	.00	.10	.00	.08	.02	.02	.03	.04	.04	-.21	-.50	-.50	1.00

L represents state branching law.
C represents calendar year.
I represents county personal income.
A represents year relative to acquisition year.
D represents county-wide deposits in competing financial institutions.
M represents Federal Reserve System membership.
S represents bank asset size.
R_1 represents return on loans.
R_2 represents before-tax return on investments.
R_3 represents operating expenses to operating income.
H represents the Herfindahl Index.
Z represents independent banks located in counties with no holding company affiliates.
Y represents banks located in the same county as holding company affiliates.
X represents bank holding company affiliates.

Deposits at Competing Financial Institutions and Bank Asset Size. The fact that these two variables have high positive correlation suggests that all competing financial institutions changed size together during the eight year period investigated.

Herfindahl Index and Markets with no MBHC Affiliates. The relatively high positive correlation found between these two variables suggests that market concentration is higher in markets without MBHC affiliates than in markets with affiliates. That is, there is less competition in markets that have only independent banks. Perhaps the efforts of the Federal Reserve to approve holding company acquisitions that increase competition and to deny those that do not (unless there are offsetting benefits) contribute to the difference in concentration between these two types of markets.

Correlations Among the Three Bank Groups. The negative correlations among the three bank groups result from the pairing technique and research design. They have little research meaning. For instance, if a bank is an affiliate (X), one paired bank would be an independent competing bank (Y) and one would be a non-competing independent bank (Z). Because these banks were represented by dummy variables with values of 0 and 1, correlations would, by design, have a value of -.50.

GRAPHICAL ANALYSIS

In this section the behavior of the three dependent performance measures and the performance of the Herfindahl Index for each year relative to the acquisition year are examined graphically. For the three dependent variables, the graphs show performance differences for each bank group. Although the graphs do not indicate whether the differences

that appear are statistically significant, they do highlight relative performance differences. The graph of the Herfindahl Index versus type of market (with or without an MBHC affiliate) is included to determine whether banking concentration in markets void of MBHC affiliates is affected by the initial entry of an MBHC. Each of these graphs is explained in more detail in the remainder of this section. The next section will discuss whether differences among bank groups on the three dependent measures are statistically significant.

DEPENDENT MEASURES

Figures 6.1, 6.2, and 6.3 present the behavior of R_1, R_2, and R_3, respectively. Each figure is described in the discussion that follows.

Return on Loans, R_1. Figure 6.1 shows the response of R_1. Return rises slowly for all three groups during the 10 years relative to acquisition year shown. Loan return for the group of MBHC affiliates is lower than return for either of the other two groups prior to the acquisition year. However, R_1, becomes greater than the other groups following acquisition and stays greater throughout the next six years. No clearly identifiable differences between the competing independent and non-competing independent bank groups exist.

This increase in loan return for the MBHC affiliates supports the research hypothesis stated earlier in this report that holding companies restructure the loan portfolios of their new affiliates to riskier, but higher yielding loans. Yet McLeary and Johnson and Meinster found that loan revenue to total loans fell for affiliates compared with independent banks. Perhaps the sample selection criterion used in the research that limits the sample to only initial market acquisitions is responsible for this difference.

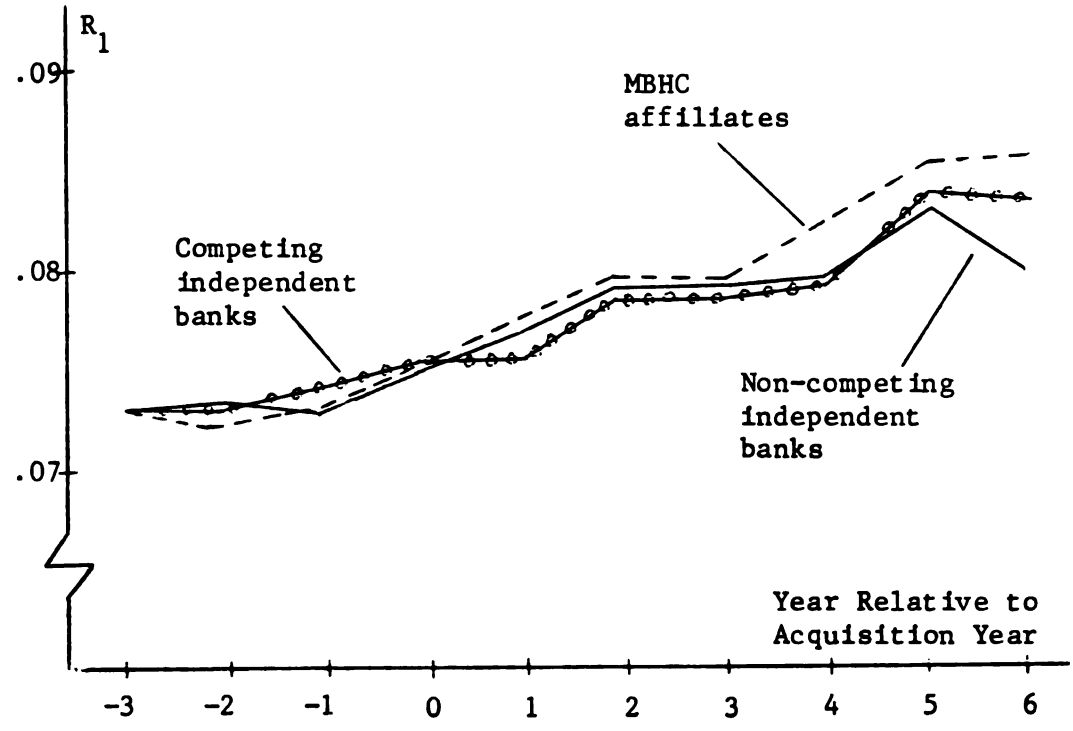

FIGURE 6.1: Behavior of R_1, Return on Bank Loans, for Bank Groups Relative to Acquisition Year.

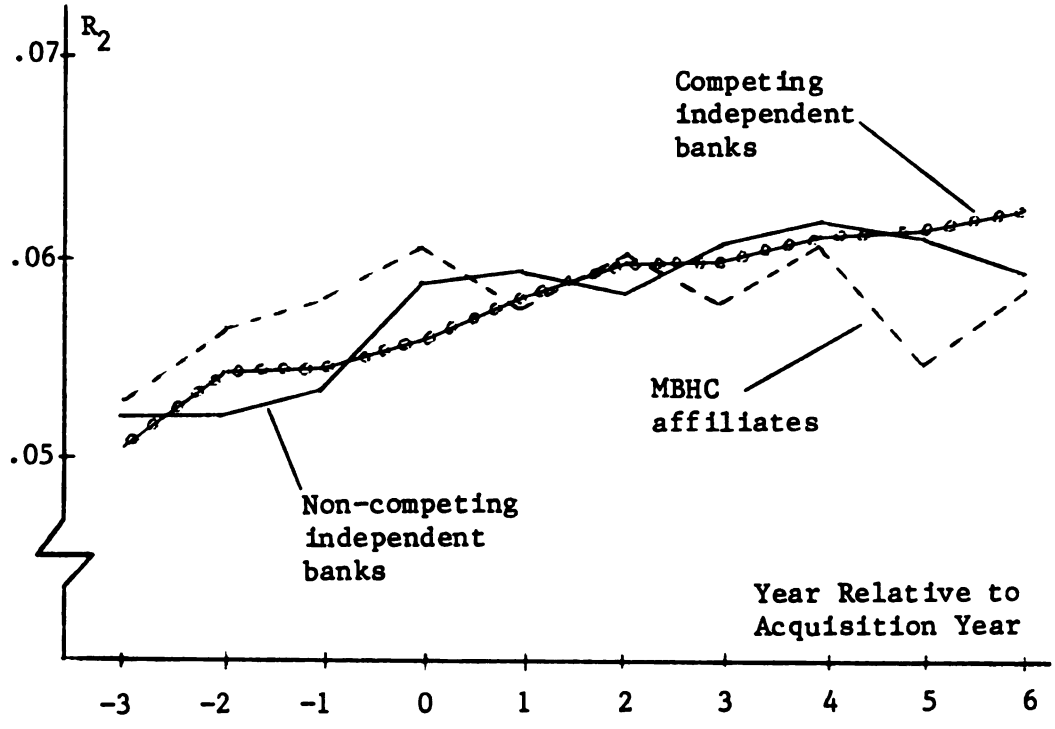

FIGURE 6.2: Behavior of R_2, Return on Investments, for Bank Groups Relative to Acquisition Year.

Before-Tax Return on Investments, R_2. Figure 6.2 shows the behavior of R_2 by bank group. As with R_1, return rises slowly for the two independent bank groups without discernible differences between them during the ten years shown. However, unlike with R_1, return on investments for the group of affiliates, after rising rapidly during the three years prior to acquisition, fell slightly during the years following acquisition. Further, for the affiliates, R_2 is higher than the other groups prior to acquisition and equal to or lower than the other groups after acquisition. It seems that acquisition makes a considerable difference in R_2 for affiliates both relative to the other two bank groups and relative to the acquisition year.

This behavior is not consistent with the research hypothesis that MBHC's shift funds of their affiliates into higher yielding securities after acquisition. A possible explanation is that affiliates may pay lower tax rates than independent banks. This might occur because operating expenses are relatively high for affiliates compared to independent banks (see the discussion of R_3 below). If affiliates do invest in riskier tax-exempt securities, but are not in the highest income tax brackets, before-tax yields may not be as high as on safer investment securities. In this case return would fall even though affiliates did shift into riskier investments compared with independent banks.

Operating Expenses to Operating Revenue, R_3. The behavior of R_3 is shown in Figure 6.3. Most notable is that the two competing banks groups--MBHC affiliates and competing independent banks--experienced higher operating expenses per dollar of operating revenue than the non-competing independent bank group. There are no major differences between affiliates and competing independent banks. This finding is

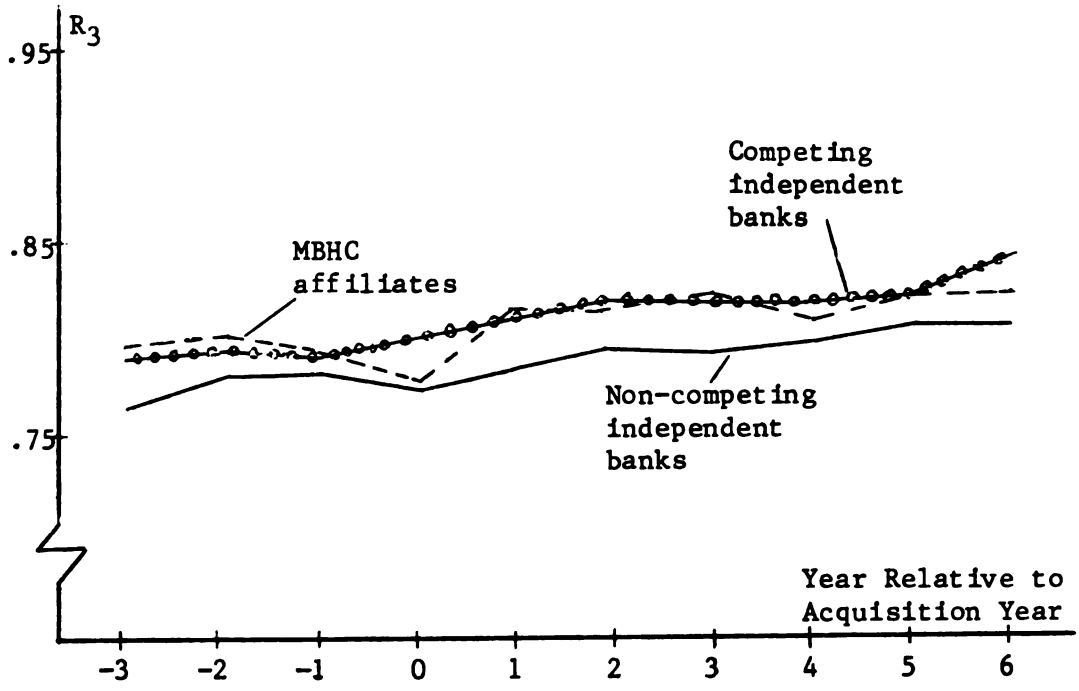

FIGURE 6.3: Behavior of R_3, Operating Expenses to Operating Revenues, for Bank Groups Relative to Acquisition Year.

consistent with past research and suggests that if economies of affiliation exist, they are offset by increases in operating expenses. Affiliates might experience higher operating expenses arising from extended customer service hours, additional services offered, an added layer of management compared with independent banks, and so forth.

Although R_3 was lower for non-competing independent banks than for either of the two other groups, it was lower both prior to and after acquisition by approximately the same amount. Thus holding company entry does not appear to affect either of the two competing bank groups relative to each other or relative to non-competing independent banks.

In summary, graphical analysis suggests that, in response to initial market entry by MBHC's,

1. MBHC affiliates achieve higher return on their loan portfolios, lower return on investments, and no significant change in operating expenses to operating revenues compared with both competing and non-competing independent banks, and
2. Competing independent banks do not behave much differently than non-competing independent banks on any of the three dependent measures.

HERFINDAHL INDEX

Figure 6.4 contrasts market concentration in counties containing MBHC affiliates with counties void of holding company affiliates. Two points are of interest. First, markets without MBHC affiliates are much more concentrated (less competitive) than markets containing an MBHC affiliate. Perhaps this is caused by the reluctance of the Federal Reserve to approve holding company acquisitions in already concentrated markets

.40
.30
.20

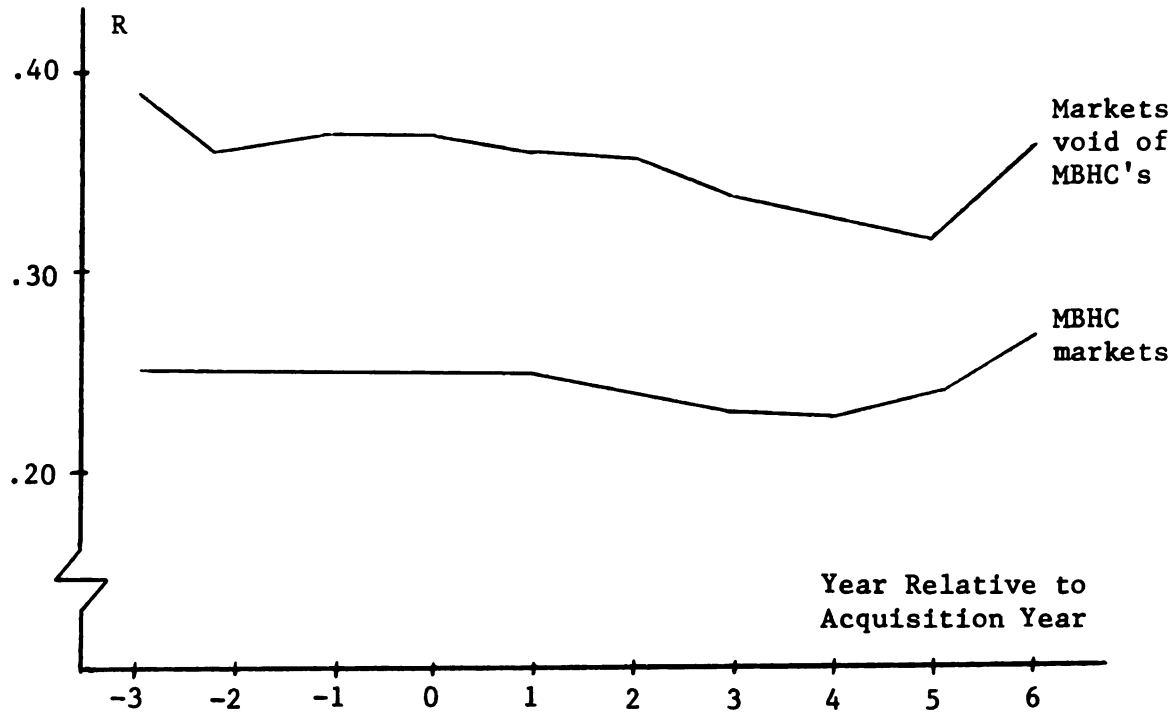

FIGURE 6.4: Changes in the Herfindahl Index Relative to Acquisition Year for Markets with and without MBHC Affiliates.

unless the acquisition will strengthen the acquired bank and increase market competition. In that case, MBHC's would tend to acquire banks in markets with lower Herfindahl Index values. The second notable point in Figure 6.4 is that acquisition does not appear to affect market concentration. Patterns of change in market concentration for both types of markets are similar. In summary, relative to markets void of holding company affiliates, acquisition neither increases nor decreases concentration in markets with MBHC affiliates. Because the research objective was to determine whether affiliates change relative to independent banks, a test for statistical differences between markets in the Herfindahl Index was not made.

STATISTICAL TESTING

The primary objective of this section is to describe the tests that were made and to explain the results. Three comparisons were tested: affiliates versus competing independent banks, affiliates versus non-competing independent banks, and competing independent banks versus non-competing independent banks. After a discussion of these three comparisons, the multivariate and univariate test results on the dependent measures are reported for each. The necessity of multivariate instead of only univariate testing is covered next. Finally, signs and coefficients of the independent and dependent variables are described.

COMPARISONS

In order to find whether banks in markets void of MBHC affiliates change their operating performance after the initial entry of an MBHC through acquisition, three separate comparisons were made. Each MBHC affiliate was paired with a similar size independent bank located in the

same market. The group of affiliates was then compared with the group of competing independent banks to test for significant difference between them. This comparison will indicate whether affiliates change compared with competing independent banks. Another comparison looked at the performance of the independent competing banks versus a group of non-competing independent banks located in markets void of affiliates. If, because of market entry by an MBHC, the former group of banks change in ways similar to the MBHC affiliates, the first comparison may not reveal a difference, but the second comparison would. The final comparison contrasts the group of MBHC affiliates with the group of non-competing independent banks. This comparison serves as a further check to determine whether similar changes occurred to both competing independent banks and MBHC affiliates.

RESULTS

Version seven of the SPSS computer program was used to test the research hypothesis that the beta coefficients for the independent variables representing bank type were equal to zero. Although Version seven will perform a multivariate analysis of variance (MANOVA), it will not perform a multivariate linear regression analysis. Therefore the multivariate testing was done using an MANOVA. Unfortunately, output from the MANOVA analysis does not include standard errors of the estimated coefficients or the constant term. To get this information on the univariate tests, linear regression was used. Both multivariate and univariate tests were made for each of the 10 acquisition years (-3 through +6) investigated. Three tests for each acquisition year were made--one for each bank group comparison described previously. Therefore a total of 120 tests were performed giving either multivariate or

univariate results. Discussion of the results begins with an explanation of statistical significance found. Next is a discussion of the need for a multivariate instead of a univariate analysis. This is followed by a discussion of estimation using raw regression coefficients. Signs of the independent variables are then briefly discussed. Finally, this section concludes with an analysis of the beta coefficients of the three dependent variables.

Statistical Significance. Tables 6.3 and 6.4 on the next pages present results of the 120 tests for significant differences between bank groups. Table 6.3 shows the F-ratios for each test while Table 6.4 expresses these ratios as the degree of confidence that statistically significant differences between bank groups exist. The reported confidence values in Table 6.4 are 1.00 minus the probability of Type I error. High F-ratios and confidence values indicate that significant differences did exist. If, at the 95 percent confidence level, a statistically significant difference exists, a circle has been drawn around the F-ratios or percentages in Tables 6.3 and 6.4, respectively. All other values are not significant at this level.

Both of these tables present multivariate results and then univariate results of tests for differences. Inspection of the reported values shows that at the 95 percent confidence level, only one of thirty multivariate tests indicate that a statistically significant difference existed: In the acquisition year a significant difference between affiliates and competing independent banks was found. Yet at this confidence level one or two tests (5 percent x 30 = 1.5) would be significant by chance alone. Thus the null hypothesis cannot be rejected based on these multivariate tests. That is, the multivariate hypothesis that

TABLE 6.3
RESULTS OF F-TESTS FOR
SIGNIFICANT DIFFERENCES BETWEEN GROUPS

		F - RATIOS									
COMPARISON	TESTS	-3	-2	-1	0	1	2	3	4	5	6
IND-AFF (Z - X)	Multivariate	1.60	2.12	2.44	1.55	.56	.73	1.95	1.31	1.64	.91
	Univariate										
	R_1	2.47	.61	.68	1.07	.69	1.23	.52	3.45	1.61	2.55
	R_2	.05	(5.27)	(6.68)	3.06	.94	.81	(5.39)	.57	3.76	.14
	R_3	.99	.12	.50	.58	.17	.88	1.20	.17	.61	.31
AFF-CPTG (X - Y)	Multivariate	.39	.59	1.92	(2.68)	1.00	.78	.73	1.23	2.25	1.08
	Univariate										
	R_1	.00	1.07	1.21	.00	2.60	.23	.44	2.17	.84	.31
	R_2	1.12	.43	(4.38)	(6.86)	.17	1.65	1.85	.26	(2.68)	.74
	R_3	.00	.04	.00	3.08	.00	.20	.00	.58	.01	.12
CPTG-IND (Y - Z)	Multivariate	1.40	1.88	1.37	.62	.41	.85	.63	.53	.26	1.44
	Univariate										
	R_1	2.35	2.94	3.32	1.10	.43	.44	.01	.23	.18	1.28
	R_2	.49	2.89	.46	.43	.34	.08	1.14	.92	.00	1.31
	R_3	.88	.03	.49	.72	.15	1.79	1.21	1.23	.45	.75
Tabled F-Ratio at 95% Confidence*											
	Multivariate	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.76	2.92
	Univariate	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00	4.08

*The F-ratios differ from year to year because the sample size varies as year relative to acquisition year changes. F-ratios equal to or exceeding the tabled values at 95% confidence are circled.

TABLE 6.4
RESULTS OF TESTS FOR
SIGNIFICANT DIFFERENCES BETWEEN GROUPS

		CONFIDENCE THAT SIGNIFICANT DIFFERENCES EXIST*									
		Year Relative to Acquisition Year									
COMPARISON	TESTS	-3	-2	-1	0	1	2	3	4	5	6
IND-AFF (Z - X)	Multivariate	.81	.90	.93	.80	.36	.46	.88	.73	.81	.55
	Univariate										
	R_1	.88	.56	.59	.70	.59	.73	.53	.93	.79	.88
	R_2	.17	(.98)	(.99)	.92	.67	.63	(.98)	.55	.94	.29
	R_3	.68	.27	.52	.55	.32	.65	.72	.32	.56	.42
AFF—CPTG (X — Y)	Multivariate	.24	.38	.87	(.95)	.60	.49	.46	.70	.91	.63
	Univariate										
	R_1	.02	.70	.73	.01	.89	.37	.49	.86	.64	.42
	R_2	.71	.49	(.96)	(.99)	.32	.80	.82	.39	(.97)	.61
	R_3	.04	.16	.00	.92	.02	.34	.01	.55	.09	.26
CPTG—IND (Y — Z)	Multivariate	.75	.86	.75	.40	.25	.53	.40	.33	.14	.75
	Univariate										
	R_1	.87	.91	.93	.71	.49	.49	.08	.37	.33	.73
	R_2	.51	.91	.50	.49	.44	.22	.71	.22	.04	.74
	R_3	.65	.13	.51	.61	.30	.82	.73	.73	.50	.61

*Numbers reported are 1 - probability of a Type I error. Confidence values equal to or greater than 95% are circled.

there are no significant differences between bank groups cannot be rejected. The implication is that initial market entry by MBHC's does not result in significant performance differences among banks.

Only 6 of the 90 univariate tests were significant at the 95 percent confidence level. All of the significant univariate differences appear for the tests on R_2, before-tax return on investments. However, these differences are distributed both before and after acquisition without any pattern related to MBHC entry. It therefore does not appear that statistically significant differences between bank groups on R_2 was caused by MBHC entry. Further, these 6 significant differences are not much greater than the 4 or 5 that would be expected from chance (5 percent x 90 = 4.5). These results are consistent with the multivariate findings.

These conclusions are not much different even at the 90 percent significance level. Only 4 multivariate tests (10 percent x 90 = 3 expected) and 13 univariate tests (10 percent x 90 = 9 expected) were significant. Nine tests were significant for return on investments, but only three occurred during the years after MBHC entry. In this entire analysis only two notable patterns occur. First, there is a lack of significant differences on either R_1 or R_3 for any bank group. In fact, there were no significant differences on these measures at 95 percent confidence and only 3 of 60 tests at 90 percent were significant. The other pattern is the concentration of statistical significance in R_2. While 6 of 30 univariate tests on R_2 were significant at the 95 percent confidence level, 9 of 30 were significant at 90 percent. Additionally, considering only the two comparisons involving MBHC affiliates, 6 of 20 and 8 of 20 tests were significant at the 95 and 90 percent levels,

respectively. Clearly MBHC affiliates perform differently than independent banks. Yet because the significant differences were distributed before and after acquisition, the differences do not seem to be caused by holding company entry.

All other reported results in these two tables are not statistically significant, even at the 90 percent level. Probably the most striking result of this testing then, is that very few significant differences between any of the bank groups caused by MBHC entry were found. Evidently the initial market entry by MBHC's does not greatly affect either the new affiliates or competing independent banks relative to each other or relative to non-competing independent banks.

Need for Multivariate Analysis. One of the major objectives of this research was to determine the appropriateness of multivariate statistics in the analysis. Most research into the effect of holding company acquisitions has used only univariate testing. What little multivariate testing that has been done indicated that univariate tests do not give the same results as multivariate tests.

In this testing the need for multivariate statistics was investigated by testing the null hypothesis using both multivariate and univariate statistics. If both types of statistics give the same results, then the use of multivariate is not necessary in determining whether the null hypothesis is to be accepted or rejected.

Results indicate that there is no evidence that the univariate model distorts the findings. The estimated coefficients of the bank type variables were not significantly different from zero in either the univariate or multivariate model. Results from neither statistical technique caused the null hypothesis to be rejected.

Estimation. As part of the statistical testing, raw regression coefficients for each independent variable were computed. They give an indication of the effect each variable had on differences in performance between the bank groups in the three comparisons tested. Appendix A consists of ten tables of these coefficients--one table for each year relative to the acquisition year. In each table the three bank group comparisons are denoted as follows:

IND - AFF (Z - X)	represents the average performance of MBHC affiliates (X) subtracted from the average performance of non-competing banks (Z),
AFF - CPTG (X - Y)	represents the average performance of competing independent banks (Y) subtracted from the average performance of MBHC affiliates (X), and
CPTG - IND (Y - Z)	represents the average performance of non-competing independent banks (Z) subtracted from the average performance of competing independent banks (Y).

All of the dependent performance measures used in this research are ratios of information found on bank call reports. It must therefore be cautioned that because the raw regression coefficients represent differences in performance measures which are ratios, the exact meaning of a significant difference found in a ratio is difficult to interpret. Coefficients for each independent variable and the constant term, b_{10}, are presented for each univariate test. Below the estimated coefficients

are the standard errors. Again, the corresponding coefficients for the multivariate tests are not shown because Version 7 of SPSS does not print them.

Calculating the elasticity of the dependent variables with respect to the independent variables will give the relative importance of each independent variable in explaining variations in the dependent performance measures. In other words,

$$\text{Elasticity} = \text{beta coefficient } (\bar{X})/(\bar{Y}),$$

where $\bar{X}$ and $\bar{Y}$ represents the mean of the independent and dependent variables, respectively. This type of analysis indicated that, in general, calendar year was the most important variable explaining differences in all three dependent measures. The Herfindahl Index was also important in explaining all three performance measures while state branching law was important in explaining differences in R_1 and R_3, but not R_3. Federal Reserve System membership was the least important independent variable. Deposits at competing financial institutions was also relatively unimportant.

Direction of Effect of Independent Variables Compared With the Hypothesized Effect. Appendix B consists of seven tables, one for each independent variable excluding the two bank variables. Each table shows the direction of effect that an individual independent variable had on the three dependent measures--R_1, R_2, and R_3--for each bank comparison tested.

Signs are presented for each dependent measure by year relative to acquisition year (-3 through +6). A plus sign indicates that, as the independent variable increases, differences between the performances of

the two bank groups increases. An inverse relationship is denoted by a negative sign. It must be noted that the signs indicate direction of effect, but not whether the effect was statistically significant.

As would be expected, movement from unit to limited branching laws increases R_3 and decreases both R_1 and R_2 for all three bank comparisons in Table B.1. R_3 probably increases because of higher operating expenses associated with branch operation. The decline in R_1, return on loans, falls perhaps because banks with branches are generally larger than banks with none. Larger banks can make larger loans. The rate of interest charged on large loans is generally smaller than the rate charged on small loans because of differences in the risk of the borrowers. Large banks may also make a smaller proportion of risky agricultural loans and more relatively safe business loans. Before-tax return on investments, R_2, is also lower for banks with branches. Perhaps these banks require more liquidity than unit banks. Because liquid securities generally yield less than other investments, the greater liquidity requirements of branch banks could cause overall return on investments to fall compared with unit banks. In none of the comparisons does MBHC entry make a difference in the direction of effect.

The next table, B.2, shows the effect on the dependent measures of increasing levels of county-wide personal income. As county income rises, R_3 rises. Perhaps customers demand more low profit services from banks as income rises. Such services would include credit cards, trust services, and so forth. Also, the use of checking services would increase as personal income increases. Most banks do not charge their customers sufficient fees to compensate for the expenses necessary to handle checks. The effect would be an increase in R_3.

Interestingly, for all three comparisons, differences in both R_1 and R_2 fell as personal income rose prior to the acquisition year but rose with personal income from that point on. In other words, MBHC entry seems to have made a difference on how R_1 and R_2 respond to increases in personal income. Although this was not a statistically significant finding, Figures 6.1 and 6.2 suggest that there was a tendency for affiliates to earn higher returns on loans and lower returns on investments beginning with the acquisition year. Perhaps then the holding company effect dominated the effect of personal income. Beginning with the acquisition year, increases in R_1 and decreases in R_2 caused by holding company entry would lead to larger differences (positive sign) for the two comparisons involving affiliates. Evidently the response of competing independent banks to MBHC entry was great enough to cause similar large differences for the comparison of the two independent bank groups.

The response of the dependent measures to deposits at competing financial institutions is presented next in Appendix B. Differences in R_2 for the three comparisons do not appear to follow any pattern since plus and minus signs occur equally often in a nearly random pattern. While there do appear to be recognizable patterns in the behavior of R_1, and R_3, it must be remembered that competing deposits was shown in Appendix A to be one of the least useful variables in predicting the dependent measures. The patterns of signs that are present are therefore not significant and possibly were caused by some other confounding effect.

Differences in R_3 consistently fell as competing deposits rose. Possibly as competing financial institutions become larger, differences

between bank groups on this measure decrease, causing negative coefficient signs. Differences might decrease because independent banks with relatively low R_3 values may become more like affiliates (additional services, possibly at low or negative profits) in their attempt to remain competitive. A reduction in differences between bank groups would therefore occur.

R_1 appears to change from positive to negative beginning with the acquisition year for the two comparisons involving affiliates. Probably the tendency for affiliates to achieve higher loan returns compared with other banks explains this behavior better than changes in deposits at competing financial institutions.

Table B.4 implies that differences in all three dependent measures rose as time (calendar year) progressed. A general increase in interest rates during the time span investigated would cause R_1 and R_2 to rise. Accelerating inflation during most of the time span would be reflected in higher R_3 values, i.e., operating expenses increased faster than operating revenues. Holding company entry does not affect these findings.

Being a Federal Reserve member seems to lower differences in R_1 and R_2 as shown in Table B.5. Return on loans falls probably because most member banks are large banks which make relatively large loans. As already explained, larger loans generally carry lower interest rates than smaller loans because large borrowers are safer. Return on investments would be expected to fall because, as large banks, members may need more liquidity than non-member, smaller banks. Thus relatively more investments would be in low yielding but liquid securities. Also, members may hold more low yielding government securities for collateral against deposits by governmental units. R_3 increases with membership,

substantiating Gilbert's findings described earlier in this report that membership is costly to banks. It is also possible that the relatively large member banks offer more marginally profitable services than the relatively small non-member banks. MBHC acquisition does not appear to be related to the effect membership has on the performance differences.

Table B.6 shows that, in general, performance differences between bank groups increase as bank size increases. R_3 might have increased because of the tendency of large banks to have more branches and offer more marginally profitable services than smaller banks. Furthermore, researchers have found that if economies of scale exist, they are exhausted by the time banks attain 10 million dollars of assets.[2] Thus as small banks grow, operating expenses to operating revenue stops falling and possibly begins to increase. Patterns for R_1 suggest that loan rates rose as bank size increased. Yet the positive signs probably reflect rising interest rates more than increases in bank size. Previous discussion has emphasized that interest rates increased secularly during the years investigated. Further, during the ten years investigated, average bank asset size increased secularly. Because a variable measuring the general level of interest rates was not included in the research model and because interest rates and bank size rose together, R_1 would appear to increase because of asset increases. More than likely however, rising interest rates in the economy caused the changes. Return on investments generally fell as bank size rose. Perhaps the reason cited earlier that larger banks need greater liquidity than smaller banks explains this effect.

Finally, Table B.7 presents the effect of market concentration on bank performance. No pattern in the signs is identifiable for R_2. But

differences in R_1 increase and differences in R_3 decrease as market concentration increases. As banks experience less competition (increased concentration), loan rates and therefore differences in loan rates, measured by R_1, would be expected to rise. The ratio of operating expenses to operating revenue fell as fewer and fewer banks shared a market. Possibly in the absence of much competition bank officers feel little pressure to branch, extend existing services, or offer new servies. Low values of R_3 would then be expected. Also, these banks would be relatively homogeneous on R_3 compared to banks in very competitive markets. These latter markets could contain unit banks, both small and large, and banks with several branches. A relatively large difference between banks on R_3 in these markets might occur. Thus the relatively low values of R_3 and the relative heterogeneity of banks in concentrated markets compared with competitive markets is a possible reason why differences between bank groups decreased as market concentration rose.

In summary, seven tables were presented which showed signs of raw regression coefficients obtained from the statistical testing. In general, signs were either consistently positive or negative, with very few instances of random patterns occurring. Where patterns existed, explanations were presented.

ANALYSIS OF BETA COEFFICIENTS

Beta coefficients for the dependent performance measures are presented in Table 6.6. These coefficients represent differences in bank performance between bank groups in each comparison after holding constant the effects of the 7 other independent variables. In other words, the coefficients represent performance differences between bank groups

TABLE 6.6
BETA COEFFICIENTS FOR DEPENDENT VARIABLES

COMPARISON	TEST	BETA COEFFICIENTS* Year Relative to Acquisition Year -3	-2	-1	0	1	2	3	4	5	6
IND - AFF											
(Z - X)	R_1	-.00284	-.00128	-.00120	-.00154	-.00144	-.00170	-.00116	-.00428	-.00256	-.00718
		(.0018)	(.0016)	(.1115)	(.0015)	(.0017)	(.0015)	(.0016)	(.0023)	(.0020)	(.0045)
	R_2	-.00046	-.00498	-.00422	-.00332	.00176	-.01014	.00440	.00172	.00630	-.00228
		(.0021)	(.0022)	(.0016)	(.0019)	(.0018)	(.0112)	(.0019)	(.0023)	(.0033)	(.0060)
	R_3	-.01962	-.00682	.01126	.01036	-.00738	-.01418	-.01714	-.00718	-.01826	-.01946
		(.0198)	(.0195)	(.0160)	(.0136)	(.0177)	(.0151)	(.0156)	(.0174)	(.0233)	(.0351)
AFF - CPTG											
(X - Y)	R_1	.00004	-.00154	-.00146	-.00002	.00258	.00068	.00098	.00316	.00170	.00210
		(.0016)	(.0015)	(.0013)	(.0014)	(.0016)	(.0014)	(.0015)	(.0021)	(.0018)	(.0039)
	R_2	.00192	.00128	.00312	.00458	-.00070	.01330	-.00238	-.00108	-.00646	-.00456
		(.0018)	(.0020)	(.0015)	(.0017)	(.0017)	(.0103)	(.0017)	(.0021)	(.0030)	(.0053)
	R_3	.00096	.00352	-.00004	-.02196	.01644	-.00618	-.00010	-.01236	.00256	-.01036
		(.0017)	(.0176)	(.0145)	(.0125)	(.0164)	(.0139)	(.0144)	(.0162)	(.0214)	(.0305)
CPTG - IND											
(Y - Z)	R_1	.00280	.00282	.00266	.00156	-.00114	.00101	.00018	.00112	.00086	.00500
		(.0018)	(.0016)	(.0015)	(.0015)	(.0017)	(.0015)	(.0016)	(.0023)	(.0020)	(.0044)
	R_2	-.00146	.00370	.00110	-.00126	-.00106	-.00316	-.00202	-.00064	.00016	.00684
		(.0021)	(.0218)	(.0016)	(.0019)	(.0018)	(.0113)	(.0019)	(.0023)	(.0032)	(.0059)
	R_3	.01866	.00330	-.01122	.01160	.00694	.02036	.01724	.01954	.01570	.02984
		(.0199)	(.0196)	(.0160)	(.0136)	(.0178)	(.0152)	(.0156)	(.0176)	(.0233)	(.0345)

*Reported coefficients represent differences in bank performance for the two bank groups in each comparison after holding constant the effects of the seven independent variables. Standard errors are shown in parentheses.

not caused by the independent variables. As an example, the beta coefficient value of -.00284 for the first comparison (Z-X) and third year prior to acquisition indicates that on average MBHC affiliates earned .00284 higher return on loans (.284 percent) than non-competing independent banks after controlling for the effects of the independent variables. Care must be exercised in interpreting these coefficients because while they do indicate direction of effect and can be used to determine relative importance of the effect, they do not indicate whether the differences are statistically significant. The discussion that follows analyzes beta coefficients for R_1, R_2, and R_3, respectively.

R_1. The first comparison in Table 6.6 indicates that in all years relative to the acquisition year, affiliates earned higher return on loans than non-competing independent banks. That is, all coefficients representing the performance of affiliates subtracted from the performance of non-competing independent banks were negative. Similarly, the third comparison (CPTG - IND) indicates that generally banks competing with MBHC affiliates achieved higher loan returns than independent banks not competing with affiliates. Finally, the coefficients suggest that relative to competing independent banks, affiliates achieved higher returns on loans after MBHC entry but lower returns prior to entry. It thus appears that the initial market entry by MBHC's affected loan portfolio composition of the new affiliates. Although this is consistent with the hypothesized effect, testing showed this change was not generally statistically significant. To summarize, after holding company entry, affiliates achieved the highest loan return, competing independent banks achieved next highest, and non-competing independent banks earned the least.

R_2. Differences in return on investments change signs after MBHC entry for the comparisons involving the affiliate group. Affiliates earned higher returns than either group of independent banks prior to acquisition but lower returns after acquisition. The last comparison shown, CPTG - IND, indicates that MBHC entry did not affect R_2 for either group relative to the other. These findings are consistent with the implications drawn from Figure 6.2. After acquisition then, beta coefficients suggest that non-competing independent and competing independent banks achieve highest return while MBHC affiliates achieve lowest return on investments.

R_3. Unlike the two other dependent variables, coefficient signs for R_3 do not change after the acquisition year. They do indicate, however, that competing independent banks have highest operating expenses per dollar of operating revenue. The group of MBHC affiliates experienced levels of R_3 similar to competing banks. Non-competing independent banks had lowest R_3 values. All these results are consistent with the graphical analysis presented in Figure 6.3.

Coefficients for R_3 are generally larger than for either R_1 or R_2 because the average value of R_3 is larger than average values of R_1 and R_2. Table 6.1 shows average values of .799, .077, and .058 for R_3, R_1, and R_2, respectively.

SUMMARY

Discussion began with a description of statistical characteristics of the continuous variables appearing in the research model. Most notable were the relatively small standard deviations of the three dependent measures and the relatively large standard deviations of the

independent variables. Correlations among all research variables were then described. Explanations of the relatively high correlations were given.

This discussion was followed by a graphical analysis of the performance of the dependent measures and of the Herfindahl Index. Results showed that MBHC affiliates achieved higher return on their loan portfolios, lower return on their investments, and no significant change in operating expenses to operating revenues compared with both groups of independent banks. The graph of the Herfindahl Index showed that markets void of MBHC affiliates have higher concentration than markets with affiliates. Further, holding company entry did not appear to affect market concentration. Following the graphical analysis, a discussion of the statistical testing and results was presented.

Differences in three performance measures for three bank group comparisons were tested using a multivariate analysis of variance technique. The null hypothesis that the coefficients of the variables designating bank type were equal to zero could not be rejected in 29 out of 30 multivariate tests or 84 out of 90 univariate tests at the 95 percent confidence level. Only a few more tests were significantly different from zero at the 90 percent confidence level. These results were found in spite of suggestions from the graphs to the contrary. Both multivariate and univariate tests were consistent in finding few significant differences between bank groups.

One of the research objectives was to determine whether there were coincident changes occurring to both MBHC affiliates and competing independent banks as a result of MBHC entry. Results indicate this did not occur on the three performance measures tested. Yet one measure,

R_3, was nearly identical for both of these groups and considerably lower for non-competing independent banks. Although no significant differences from holding company entry were found on R_3, this was evidence that the two competing bank groups did experience coincident changes in R_3.

The independent variables predicting the greatest proportion of the differences between bank groups were calendar year, state branching law, and market concentration. Variables least important were Federal Reserve System membership and deposits at competing financial institutions.

Comparison of beta coefficients for the dependent performance measures suggested that return on loans was highest for MBHC affiliates and lowest for non-competing independent banks. Competing independent banks achieved returns greater than non-competing independent banks but lower than MBHC affiliates. After the year of acquisition, affiliates earned lower before-tax returns on investments than either non-competing or competing independent banks. Prior to acquisition these relationships were exactly opposite. Non-competing independent banks earned about the same returns as competing independent banks on R_2. Finally, competing independent banks had highest R_3 values, MBHC's had intermediate values, and non-competing independent banks had the lowest values.

FOOTNOTES TO CHAPTER VI

[1]Edward W. Reed et al., Commercial Banking, (Englewood Cliffs, New Jersey: Prentice-Hall, 1976): 220.

[2]"Bank Costs and Output--A Commentary on the Evidence," in Midwest Banking in the Sixties, (Chicago: Federal Reserve Bank of Chicago, March, 1970): 193.

CHAPTER VII

SUMMARY AND CONCLUSIONS

This final chapter summarizes the research and presents several conclusions based on the findings. A brief summary of the research objectives and methodology is presented first. This is followed by a summary of the findings. After a description of the implications that follow from the findings, policy recommendations are presented. While all of these sections address the conclusions and implications that directly follow from the research findings, the ensuing section describes insights formed during the study. Finally, the chapter ends with suggestions for further research.

SUMMARY OF OBJECTIVES AND METHODOLOGY

The major objective of this research was to determine whether the initial entry of an MBHC through acquisition in markets previously void of holding company affiliates affects other competing banks. This question is of research interest because the Federal Reserve must approve or deny applications for acquisitions based partly on its estimates of the effects the acquisition would have on other competing banks. In making these estimates the Federal Reserve is continually in need of timely information suggesting how banks might change in response to such acquisitions.

Although several researchers have investigated the impact of MBHC acquisitions on new affiliates compared with competing independent banks,

this research differs from most of it in three respects. First, the sample was limited to those markets experiencing initial entry by an MBHC. In this way the full, undistorted effects of holding company entry could be measured. A second way in which this research differs is in the comparisons made. The new affiliates were compared with same size competing independent banks and with same size independent banks located in markets containing no holding company affiliates. Further, the two groups of independent banks (competing and non-competing) were compared with each other. In this way if equal coincident changes occurred to both groups of competing banks, the changes could be found. Finally, multivariate statistics were used in the analysis. Only the most recent research into the effects of holding company acquisitions has employed multivariate statistics. At least one of these studies found that multivariate statistics gave different results than univariate techniques.

Using counties as banking markets, eighty-three markets were identified that experienced initial entry by an MBHC through acquisition between January 1, 1969 and December 31, 1976. Markets were selected from eight states: Florida, Iowa, Michigan, Missouri, New Mexico, Ohio, Texas, and Wisconsin. The new affiliates were paired with same size independent banks located in the same market as the affiliates. Further, each of these two banks were paired with a same size independent bank located in a market void of affiliates. For each market then, a group of three same size banks were selected--new affiliates, competing independent banks, and non-competing independent banks.

Three performance measures were used to determine whether any of these bank groups changed relative to the others. They were return on

loans, before-tax return on investments, and operating expenses to operating revenue. Using the assumption that bankers seek to maximize shareholder wealth, it was hypothesized that management of MBHC's would restructure the asset portfolios of their new affiliates to higher yielding loans and investments. If economies of affiliation were great enough to overcome increased expenses incurred from additional services and an additional layer of management, the operating efficiency ratio would decrease for affiliates compared with the other banks. A multivariate analysis of variance statistical technique was used to test for statistically significant differences between bank groups for each year relative to the acquisition year.

Nine independent variables were used to control for variations in bank performance. These were calendar year, Federal Reserve System membership, state branching law, bank asset size, market concentration, county-wide personal income, deposits at competing financial institutions, and two dummy variables specifying the bank groups included in each comparison.

SUMMARY OF FINDINGS

Results of MANOVA testing showed that only one of thirty multivariate tests was significant at the 95 percent confidence level. At this level one or two tests would be expected to be significant even if none were (5 percent x 30 = 1.5 tests). Hence, considering all three dependent performance measures together, the null hypothesis that no significant differences due to bank type existed could not be rejected.

Ninety univariate tests were performed on the ten years of data relative to the acquisition year. At the 95 percent confidence level only six of these tests were significant. Although this number exceeds

the 4 or 5 significant differences that would exist just by chance, no pattern in the differences was apparent. Both multivariate and univariate tests then, generally agreed that initial entry by an MBHC into markets void of affiliates did not significantly affect any of the bank groups relative to the others. This result was found in spite of graphical analysis suggesting that affiliates earned higher returns on loans but lower before-tax returns on investments compared with either group of independent banks after acquisition. Holding company entry did not appear to affect operating expenses per dollar of operating revenue for any of the bank groups. Agreement of univariate and multivariate statistics in finding few significant differences demonstrated that multivariate statistics were not necessary in this research.

POLICY IMPLICATIONS AND RECOMMENDATIONS

The initial entry of MBHC's into markets void of holding company affiliates does not appear to significantly affect either the new affiliates or their competitors on the three dependent measures tested. This information should be of use to the Federal Reserve in deciding whether to approve acquisition applications from bank holding companies. When no clear-cut factors exist that would result in approval or denial, and when the application represents the initial acquisition in a market, then the findings suggest that no adverse effects would result from approval. Neither return on loans nor return on investments would be significantly different for any of the competing banks after holding company entry.

The implication is that none of the banks would significantly change the riskiness of their loan or investment portfolios. Thus the

risk assumed by competing banks will not significantly change if approval is granted. Since a prudently safe banking environment is a regulatory goal, approval would not alter banking safety, but might contribute benefits such as increased services, improved management, infusion of capital into weak banks, and so forth.

The behavior of operating expenses to operating revenues suggests that even though both the new affiliates and same size competing banks had higher levels of operating expenses per dollar of operating revenue compared with independent banks in markets containing no MBHC affiliates, the higher levels were not related to initial holding company entry. This suggests that banking safety will not be jeopardized when applications for acquisition in these types of markets are approved because operating efficiency of competing banks will not be adversely affected. The suggestion is that concerns over lower operating efficiency resulting from holding company entry should not be the basis for denial of an application for entry.

In summary, when no clear-cut factors exist that would dictate approval or denial of an application for initial holding company entry in a market through acquisition, findings of this research suggest that the acquisition should be approved. Neither the new affiliates nor competing independent banks increase their riskiness or suffer a decline in operating efficiency. Yet there may be benefits from increased services, better management, and capital infusion at the new affiliates. These benefits are among those the Federal Reserve considers when deciding whether to approve or deny an application.

INSIGHTS

Insights into why few significant differences among banks were found and how the model would be changed based on hindsight are discussed in this section.

Two reasons can be presented suggesting why relatively few significant differences were found between bank groups. One reason is that because the degree of control exerted over affiliates varies from completely centralized to relatively autonomous, changes in the operating policies of the new affiliates will vary from considerable to relatively little. When a study such as this one considers all affiliates together without attempting to separate them by degree of centralized management, findings will represent banks with a degree of centralization between the two extremes.

Greatest changes between banks would be expected when control over new affiliates is strongly centralized. In these cases changes in management and management policies would be likely. If differences in the three performance measures among banks exist, they would be greatest for markets entered by centralized MBHC's. But when relatively autonomous affiliates are included with these centrally controlled affiliates, average changes in bank policy may be considerably lessened. Hence the absence of significant differences among bank groups may have been caused by the failure to differentiate among new affiliates according to the degree of centralized management control exerted.

Another possibility is that even though significant changes may have occurred, variation in the performance of individual banks dominate variations caused by affiliation. In other words, even after controlling for variations caused by the independent variables, other

remaining causes of variation hid the variations due to holding company entry. Such an occurrence is possible because a great proportion of the variation in the three performance measures is largely determined by conditions exogenous to individual banks. Most notably, the level of interest rates in the economy affects levels of R_1, R_2, and R_3. While bankers have some control over these variables, major variations occur because economic conditions in the economy change. Interest rates rise during prosperous periods and fall during business recessions. These fluctuations may cause greater variations in the performance measures than holding company entry. Changes caused by changing economic conditions could hide changes caused by holding company entry.

In view of these two possible reasons why no statistically significant differences were found between the bank groups, the research model could be changed in two respects. First, another independent variable could be included that would designate the degree of centralized management control the MBHC's have over their new affiliates. Possibly then differences between banks competing with new affiliates under centralized management control would be statistically significant. Further, to eliminate variation in the performance measures caused by changing levels of interest rates in the economy, an independent variable measuring the level of interest rates (such as the prime lending rate) could be included. If significant differences between bank groups that were not detected by this research did in fact exist, then making these two changes would increase the probability of finding them.

SUGGESTIONS FOR FURTHER RESEARCH

The findings of this study suggest several areas for additional research. One suggestion would be to replicate this study using an

identifier that designates the degree of control each MBHC exerts on its affiliates. Control could be described as strongly centralized, autonomous, or some place in between. While results of this study indicated that banks are not significantly affected by initial holding company entry, the results might have been different had attention been directed to segregating the markets in this manner. It might be expected that greatest changes would occur in markets containing a new affiliate under strongly centralized control.

Further research could also be directed at determining why before-tax return on investments fell for affiliates after holding company entry compared with the two other bank groups. This finding was contrary to what had been hypothesized and to what other researchers had found, viz., that new affiliates shift a greater proportion of their investments into tax-exempt securities. The suggestion for this unexpected finding was that perhaps new affiliates did not experience the relatively high tax rates necessary to make tax-exempt state and municipal securities as attractive as higher yielding but taxable investments. Whether this is true is a topic for further research.

Finally, although several reasons were presented justifying the use of counties as banking markets, it is recognized that this definition is not without drawbacks. The correct, albeit tedious and time consuming, method is to identify markets based on economic and demographic factors. Perhaps replication of this study using the latter approach would yield different results.

APPENDICES

APPENDIX A

RAW REGRESSION COEFFICIENTS FOR THE UNIVARIATE TESTS

APPENDIX A.1
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE THIRD YEAR PRIOR TO ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.595E-1	.101E-2	.119E-2	.183E-2	-.484E-2	.210E-7	.163E-1	-.217E-5	.199E-4
		(.392E-1)	(.143E-2)	(.144E-2)	(.562E-3)	(.147E-2)	(.589E-7)	(.604E-2)	(.873E-5)	(.568E-4)
	R_2	-.447E-1	-.175E-2	-.722E-3	.138E-2	.705E-3	.751E-7	-.339E-2	.340E-5	.935E-5
		(.449E-1)	(.164E-2)	(.165E-2)	(.644E-3)	(.168E-2)	(.645E-7)	(.691E-2)	(.999E-5)	(.651E-4)
	R_3	1.05	.632E-3	-.131E-1	-.353E-2	.122E-1	.952E-6	-.349E-1	.208E-3	-.909E-3
		(.428)	(.155E-1)	(.156E-1)	(.611E-2)	(.160E-1)	(.640E-6)	(.656E-1)	(.949E-4)	(.618E-3)
AFF - CPTG										
(X - Y)	R_1	-.507E-1	-.282E-2	.103E-2	.171E-2	-.516E-2	.161E-7	.214E-1	-.184E-5	.163E-4
		(.392E-1)	(.163E-2)	(.142E-2)	(.563E-3)	(.147E-2)	(.581E-7)	(.680E-2)	(.865E-6)	(.563E-4)
	R_2	-.444E-1	.490E-3	-.930E-3	.136E-2	.675E-3	.817E-7	-.264E-2	-.315E-5	.621E-5
		(.455E-1)	(.189E-2)	(.165E-2)	(.653E-3)	(.171E-2)	(.675E-7)	(.789E-2)	(.100E-4)	(.654E-4)
	R_3	1.07	-.191E-1	-.143E-1	-.439E-2	.992E-2	.920E-6	.268E-3	.211E-3	-.935E-3
		(.429)	(.178E-1)	(.155E-1)	(.615E-2)	(.161E-1)	(.636E-6)	(.743E-1)	(.945E-4)	(.616E-3)
CPTG - IND										
(Y - Z)	R_1	-.592E-1	.111E-2	.139E-2	.183E-2	-.486E-2	.127E-7	.165E-1	-.238E-5	.256E-4
		(.392E-1)	(.142E-2)	(.142E-2)	(.562E-3)	(.147E-2)	(.590E-7)	(.607E-2)	(.872E-5)	(.567E-4)
	R_2	-.408E-1	.136E-2	-.934E-3	.129E-2	.495E-3	.759E-7	-.186E-4	.307E-5	.549E-5
		(.450E-1)	(.163E-2)	(.163E-2)	(.645E-3)	(.169E-2)	(.677E-7)	(.697E-2)	(1.00E-5)	(.651E-4)
	R_3	1.01	.805E-2	-.118E-1	-.359E-2	.119E-1	.895E-6	-.322E-1	.207E-3	-.891E-3
		(.426)	(.154E-1)	(.154E-1)	(.611E-2)	(.160E-1)	(.641E-6)	(.660E-1)	(.948E-4)	(.617E-3)

APPENDIX A.2
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE SECOND YEAR PRIOR TO ACQUISITION

			INDEPENDENT VARIABLE						
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.529E-1	.205E-2	-.317E-2	.173E-2	-.573E-2	.145E-6	.185E-1	-.503E-5	.152E-4
		(.315E-1)	(.132E-2)	(.132E-2)	(.449E-3)	(.139E-2)	(.493E-7)	(.560E-2)	(.768E-5)	(.394E-4)
	R_2	-.452E-1	.741E-3	-.336E-2	.146E-2	-.322E-2	.991E-7	-.458E-2	-.226E-4	.679E-4
		(.422E-1)	(.177E-2)	(.178E-2)	(.602E-3)	(.186E-2)	(.662E-7)	(.751E-2)	(.103E-4)	(.528E-4)
	R_3	1.36	-.752E-3	-.477E-2	-.891E-2	.550E-1	.133E-5	-.356E-1	.368E-3	-.163E-2
		(.375)	(.157E-1)	(.157E-1)	(.534E-2)	(.165E-1)	(.587E-6)	(.666E-1)	(.913E-4)	(.468E-3)
AFF - CPTG										
(X - Y)	R_1	-.418E-1	-.205E-2	-.308E-2	.167E-2	-.583E-2	.1.39E-6	.205E-1	-.492E-5	.140E-4
		(.319E-1)	(.146E-2)	(.132E-2)	(.455E-3)	(.140E-2)	(.493E-7)	(.613E-2)	(.769E-5)	(.395E-4)
	R_2	-.300E-1	-.434E-2	-.347E-2	.125E-2	-.354E-2	.966E-7	.294E-2	-.220E-4	.603E-4
		(.422E-1)	(.194E-2)	(.175E-2)	(.602E-3)	(.185E-2)	(.652E-7)	(.810E-2)	(.102E-4)	(.522E-4)
	R_3	1.38	-.507E-2	-.504E-2	-.921E-2	.546E-1	.133E-5	-.253E-1	.369E-3	-.164E-2
		(.379)	(.174E-1)	(.157E-1)	(.541E-2)	(.166E-1)	(.586E-6)	(.728E-1)	(.913E-4)	(.469E-3)
CPTG - IND										
(Y - Z)	R_1	-.563E-1	-.381E-3	-.301E-2	.179E-2	-.564E-2	.141E-6	.163E-1	-.522E-5	.183E-4
		(.317E-1)	(.133E-2)	(.133E-2)	(.452E-3)	(.140E-2)	(.497E-7)	(.565E-2)	(.772E-5)	(.396E-4)
	R_2	-.427E-1	.280E-2	-.317E-2	.141E-2	-.333E-2	.89E-7	-.255E-2	-.225E-4	.673E-4
		(.420E-1)	(.176E-2)	(.176E-2)	(.599E-3)	(.185E-2)	(.658E-7)	(.748E-2)	(.102E-4)	(.524E-4)
	R_3	1.36	.487E-2	-.461E-2	-.906E-2	.547E-1	.132E-5	-.302E-1	.369E-3	-.163E-2
		(.374)	(.157E-1)	(.157E-1)	(.534E-2)	(.165E-1)	(.587E-6)	(.667E-1)	(.913E-4)	(.468E-3)

APPENDIX A.3
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE YEAR PRIOR TO ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.983E-1	.196E-2	-.311E-3	.238E-2	-.294E-2	.492E-7	.556E-2	-.105E-5	-.301E-7
		(.230E-1)	(.119E-2)	(.117E-2)	(.322E-3)	(.128E-2)	(.402E-7)	(.480E-2)	(.658E-5)	(.326E-4)
	R_2	-.823E-1	-.138E-2	-.650E-3	.193E-2	.219E-3	-.216E-7	-.196E-2	-.512E-5	.574E-4
		(.261E-1)	(.134E-2)	(.133E-2)	(.365E-3)	(.145E-2)	(.444E-7)	(.544E-2)	(.745E-5)	(.369E-4)
	R_3	.591	-.459E-2	.388E-2	.234E-2	.237E-1	.975E-6	-.837E-1	.175E-3	-.648E-3
		(.252)	(.130E-1)	(.128E-1)	(.352E-2)	(.140E-1)	(.439E-6)	(.525E-1)	(.719E-4)	(.356E-3)
AFF - CPTG										
(X - Y)	R_1	-.952E-1	-.193E-2	-.301E-3	.235E-2	-.297E-2	.474E-7	.718E-2	-.101E-5	.976E-6
		(.232E-1)	(.130E-2)	(.118E-2)	(.324E-3)	(.128E-2)	(.402E-7)	(.518E-2)	(.658E-5)	(.327E-4)
	R_2	-.757E-1	-.268E-2	-.886E-3	.183E-2	.235E-3	-.139E-7	.360E-2	-.501E-5	.518E-4
		(.562E-1)	(.147E-2)	(.132E-2)	(.365E-3)	(.144E-2)	(.452E-7)	(.534E-2)	(.741E-5)	(.368E-4)
	R_3	.569	.112E-1	.424E-2	.262E-2	.238E-1	.968E-6	-.987E-1	.175E-3	-.635E-3
		(.253)	(.142E-1)	(.128E-1)	(.354E-2)	(.140E-1)	(.438E-6)	(.565E-1)	(.718E-4)	(.356E-3)
CPTG - IND										
(Y - Z)	R_1	-.996E-1	-.356E-3	-.193E-3	.242E-2	-.296E-2	.446E-7	.367E-2	-.109E-5	.217E-5
		(.232E-1)	(.119E-2)	(.118E-2)	(.324E-3)	(.129E-2)	(.403E-7)	(.484E-2)	(.661E-5)	(.328E-4)
	R_2	-.794E-1	.357E-2	-.718E-3	.186E-2	.190E-3	-.213E-7	.221E-2	-.504E-5	.541E-4
		(.257E-1)	(.132E-2)	(.131E-2)	(.360E-3)	(.143E-2)	(.448E-7)	(.538E-2)	(.735E-5)	(.364E-4)
	R_3	.591	-.471E-2	.358E-2	.234E-2	.239E-1	.990E-6	-.840E-1	.175E-3	-.650E-3
		(.252)	(.129E-1)	(.128E-1)	(.352E-2)	(.140E-1)	(.438E-7)	(.526E-1)	(.719E-4)	(.356E-3)

APPENDIX A.4
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE YEAR OF ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.891E-1	.672E-3	.215E-3	.226E-2	-.415E-2	.117E-7	.965E-2	.792E-5	-.155E-4
		(.230E-1)	(.121E-2)	(.121E-2)	(.316E-3)	(.139E-2)	(.377E-7)	(.489E-2)	(.602E-5)	(.282E-4)
	R_2	-.987E-1	-.318E-2	-.855E-3	.218E-2	-.883E-3	-.791E-7	.112E-1	.106E-4	-.516E-4
		(.296E-1)	(.156E-2)	(.155E-2)	(.406E-3)	(.179E-2)	(.484E-7)	(.628E-2)	(.772E-5)	(.362E-4)
	R_3	.481	.176E-1	.371E-2	.362E-2	.336E-1	.620E-6	-.646E-1	.127E-3	-.337E-3
		(.211)	(.111E-1)	(.111E-1)	(.290E-2)	(.128E-1)	(.345E-6)	(.448E-1)	(.551E-4)	(.258E-3)
AFF - CPTG										
(X - Y)	R_1	-.864E-1	-.155E-2	.149E-3	.222E-2	-.418E-2	.127E-7	.116E-1	.772E-5	-.157E-4
		(.231E-1)	(.132E-2)	(.121E-2)	(.317E-3)	(.139E-2)	(.376E-7)	(.521E-2)	(.600E-5)	(.281E-4)
	R_2	-.955E-1	-.105E-2	-.105E-2	.211E-2	-.871E-3	-.715E-7	.152E-1	.103E-4	-.528E-4
		(.300E-1)	(.171E-2)	(.157E-2)	(.411E-3)	(.180E-2)	(.487E-7)	(.676E-2)	(.779E-5)	(.364E-4)
	R_3	.475	-.571E-3	.440E-2	.384E-2	.335E-1	.587E-6	-.771E-1	.129E-3	-.332E-3
		(.213)	(.122E-1)	(.111E-1)	(.293E-2)	(.128E-1)	(.347E-6)	(.481E-1)	(.554E-4)	(.259E-3)
CPTG - IND										
(Y - Z)	R_1	-.890E-1	.637E-3	.230E-3	.226E-2	-.417E-2	.103E-7	.964E-2	.793E-5	-.153E-4
		(.231E-1)	(.121E-2)	(.121E-2)	(.316E-3)	(.139E-2)	(.376E-7)	(.490E-2)	(.602E-5)	(.282E-4)
	R_2	-.955E-1	.404E-2	-.107E-2	.208E-2	-.935E-3	-.748E-7	.168E-1	.100E-4	-.524E-4
		(.294E-1)	(.155E-2)	(.154E-2)	(.404E-3)	(.178E-2)	(.480E-7)	(.625E-2)	(.768E-5)	(.359E-4)
	R_3	.466	-.171E-1	.477E-2	.409E-2	.338E-1	.594E-6	-.916E-1	.130E-3	-.333E-3
		(.211)	(.111E-1)	(.111E-1)	(.290E-2)	(.128E-1)	(.344E-6)	(.449E-1)	(.551E-4)	(.258E-3)

APPENDIX A.5
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE FIRST YEAR AFTER ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.126	-.197E-2	.132E-2	.281E-2	-.389E-2	-.176E-7	.247E-2	.685E-5	-.264E-4
		(.299E-1)	(.142E-2)	(.143E-2)	(.403E-3)	(.168E-2)	(.399E-7)	(.582E-2)	(.658E-5)	(.294E-4)
	R_2	-.124	-.520E-4	-.175E-2	.248E-2	-.144E-3	.226E-7	.261E-2	.108E-5	-.636E-5
		(.316)	(.150E-2)	(.151E-2)	(.426E-3)	(.177E-2)	(.421E-7)	(.615E-2)	(.695E-5)	(.310E-4)
	R_3	-.805E-1	.268E-2	.780E-2	.120E-1	.216E-1	.231E-6	-.131	.195E-3	-.575E-3
		(.306)	(.146E-1)	(.147E-1)	(.414E-2)	(.172E-1)	(.409E-6)	(.598E-1)	(.675E-4)	(.301E-3)
AFF - CPTG										
(X - Y)	R_1	-.125	-.155E-3	.119E-2	.278E-2	-.387E-2	-.136E-7	.419E-2	.680E-5	-.277E-4
		(.301E-1)	(.154E-2)	(.144E-2)	(.406E-3)	(.168E-2)	(.401E-7)	(.621E-2)	(.661E-5)	(.295E-4)
	R_2	-.126	.142E-2	-.167E-2	.252E-2	-.138E-3	.201E-7	.488E-3	.115E-5	-.520E-5
		(.316)	(.162E-2)	(.151E-2)	(.427E-3)	(.177E-2)	(.421E-7)	(.652E-2)	(.694E-5)	(.310E-4)
	R_3	-.694E-1	-.716E-2	.751E-2	.118E-1	.216E-1	.240E-6	-.122	.195E-3	-.579E-3
		(.307)	(.157E-1)	(.147E-1)	(.415E-2)	(.172E-1)	(.409E-6)	(.634E-1)	(.675E-4)	(.301E-3)
CPTG - IND										
(Y - Z)	R_1	-.125	.209E-2	.119E-2	.276E-2	-.390E-2	-.139E-7	.556E-2	.676E-5	-.281E-4
		(.298E-1)	(.142E-2)	(.143E-2)	(.403E-3)	(.168E-2)	(.398E-7)	(.582E-2)	(.658E-5)	(.293E-4)
	R_2	-.124	-.116E-2	-.175E-2	.250E-2	-.127E-3	.228E-7	.176E-2	.111E-5	-.608E-5
		(.315)	(.149E-2)	(.151E-2)	(.425E-3)	(.177E-2)	(.420E-7)	(.615E-2)	(.694E-5)	(.310E-4)
	R_3	-.804E-1	.343D-2	.794E-2	.119E-1	.216E-1	.226E-6	-.130	.195E-3	-.574E-3
		(.306)	(.145E-1)	(.147E-1)	(.414E-2)	(.172E-1)	(.408E-6)	(.598E-1)	(.675E-4)	(.301E-3)

APPENDIX A.6
RAW REGRESSION COEFFICIENTS FOR TESTS MADE ON DATA FROM THE SECOND YEAR AFTER ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.990E-1	.277E-4	-.781E-3	.243E-2	-.647E-2	.422E-7	.815E-2	.889E-5	-.311E-4
		(.281E-1)	(.126E-2)	(.122E-2)	(.378E-3)	(.160E-2)	(.301E-7)	(.515E-2)	(.542E-5)	(.229E-4)
	R_2	-.217	-.906E-2	.736E-2	.426E-2	-.207E-1	-.179E-6	-.467E-1	-.137E-4	.579E-4
		(.206)	(.921E-2)	(.894E-2)	(.276E-2)	(.117E-1)	(.220E-6)	(.377E-1)	(.397E-4)	(.167E-3)
	R_3	-.479E-1	.121E-1	.861E-2	.113E-1	.235E-1	.417E-6	-.977E-1	.661E-4	-.104E-3
		(.277)	(.124E-1)	(.120E-1)	(.373E-2)	(.158E-1)	(.297E-6)	(.508E-1)	(.535E-4)	(.226E-3)
AFF - CPTG										
(X - Y)	R_1	-.965E-1	-.136E-2	-.884E-3	.240E-2	-.649E-2	.446E-7	.103E-1	.896E-5	-.325E-4
		(.282E-1)	(.136E-2)	(.122E-2)	(.379E-3)	(.160E-2)	(.301E-7)	(.550E-2)	(.541E-5)	(.229E-4)
	R_2	-.209	-.358E-2	.673E-2	.407E-2	-.208E-1	-.158E-6	-.340E-1	-.136E-4	.491E-4
		(.207)	(.100E-1)	(.898E-2)	(.278E-2)	(.117E-1)	(.221E-6)	(.404E-1)	(.398E-4)	(.168E-3)
	R_3	-.187E-1	-.172E-1	.778E-2	.110E-1	.233E-1	.427E-6	-.796E-1	.670E-4	-.116E-3
		(.278)	(.135E-1)	(.121E-1)	(.374E-2)	(.158E-1)	(.297E-6)	(.543E-1)	(.534E-4)	(.226E-3)
CPTG - IND										
(Y - Z)	R_1	-.983E-1	.112E-2	-.821E-3	.242E-2	-.649E-2	.423E-7	.905E-2	.895E-5	-.316E-4
		(.281E-1)	(.125E-2)	(.122E-2)	(.378E-3)	(.160E-2)	(.300E-7)	(.515E-2)	(.541E-5)	(.228E-4)
	R_2	-.208	.120E-1	.657E-2	.398E-2	-.209E-1	-.163E-6	-.299E-1	-.131E-4	.466E-4
		(.205)	(.914E-2)	(.892E-2)	(.276E-2)	(.117E-1)	(.219E-6)	(.377E-1)	(.396E-4)	(.167E-3)
	R_3	-.487E-1	.245E-2	.900E-2	.114E-1	.235E-1	.397E-6	-.105	.663E-4	-.991E-4
		(.278)	(.124E-1)	(.121E-1)	(.374E-2)	(.158E-1)	(.297E-6)	(.510E-1)	(.536E-4)	(.226E-3)

APPENDIX A.7
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE THIRD YEAR AFTER ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.195	-.500E-3	-.342E-3	.365E-2	.630E-3	.699E-7	.385E-2	.362E-5	-.247E-4
		(.396E-1)	(.132E-2)	(.129E-2)	(.523E-3)	(.173E-2)	(.278E-7)	(.549E-2)	(.575E-5)	(.203E-4)
	R_2	-.385E-1	.521E-3	.674E-3	.134E-2	-.189E-3	-.749E-7	-.395E-2	-.566E-5	.218E-4
		(.473E-1)	(.157E-2)	(.154E-2)	(.625E-3)	(.207E-2)	(.332E-7)	(.657E-2)	(.687E-5)	(.243E-4)
	R_3	-.757	.731E-2	.298E-2	.211E-1	.440E-1	.457E-6	-.189	-.288E-4	.158E-3
		(.385)	(.128E-1)	(.126E-1)	(.509E-2)	(.169E-1)	(.270E-6)	(.534E-1)	(.559E-4)	(.198E-3)
AFF - CPTG										
(X - Y)	R_1	-.195	-.668E-3	-.443E-3	.365E-2	.649E-3	.722E-7	.511E-2	.341E-5	-.251E-4
		(.396E-1)	(.143E-2)	(.129E-2)	(.522E-3)	(.173E-2)	(.278E-7)	(.576E-2)	(.575E-5)	(.203E-4)
	R_2	-.397E-1	.322E-2	.103E-2	.136E-2	-.246E-3	-.153E-7	-.874E-2	-.491E-5	.234E-4
		(.468E-1)	(.169E-2)	(.153E-2)	(.618E-3)	(.205E-2)	(.329E-7)	(.682E-2)	(.680E-5)	(.240E-4)
	R_3	-.748	-.172E-1	.177E-2	.210E-1	.442E-1	.483E-6	-.171	-.315E-4	.152E-3
		(.384)	(.139E-1)	(.126E-1)	(.507E-2)	(.168E-1)	(.270E-6)	(.559E-1)	(.558E-4)	(.197E-3)
CPTG - IND										
(Y - Z)	R_1	-.196	.105E-2	-.410E-3	.365E-2	.636E-3	.714E-7	.494E-2	.347E-5	-.251E-4
		(.395E-1	(.131E-2)	(.128E-2)	(.522E-3)	(.173E-2)	(.276E-7)	(.549E-2)	(.573E-5)	(.203E-4)
	R_2	-.370E-1	-.323E-2	.812E-3	.134E-2	-.190E-3	-.102E-7	-.660E-2	-.534E-5	.226E-4
		(.467E-1)	(.155E-2)	(.152E-2)	(.616E-3)	(.204E-2)	(.327E-7)	(.648E-2)	(.677E-5)	(.240E-4)
	R_3	-.758	.723E-2	.325E-2	.211E-1	.439E-1	.450E-6	-.189	-.284E-4	.158E-3
		(.385)	(.128E-1)	(.125E-1)	(.509E-2)	(.169E-1)	(.270E-6)	(.535E-1)	(.559E-4)	(.198E-3)

APPENDIX A.8
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE FOURTH YEAR AFTER ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	.490E-2	-.134E-2	-.289E-2	.104E-2	-.240E-2	.603E-8	.624E-2	.659E-5	-.207E-4
		(.723E-1)	(.193E-2)	(.190E-2)	(.953E-3)	(.285E-2)	(.332E-7)	(.829E-2)	(.750E-5)	(.248E-4)
	R_2	-.404E-1	.344E-3	-.394E-3	.139E-2	-.276E-2	-.386E-7	.559E-2	.200E-5	.615E-6
		(.707E-1)	(.188E-2)	(.186E-2)	(.932E-3)	(.279E-2)	(.324E-7)	(.811E-2)	(.733E-5)	(.242E-4)
	R_3	-1.00	.154E-1	.261E-1	.238E-1	.287E-1	.630E-7	-.643E-1	.567E-4	-.178E-3
		(.541)	(.144E-1)	(.143E-1)	(.714E-2)	(.213E-1)	(.248E-6)	(.621E-1)	(.561E-4)	(.186E-3)
AFF - CPTG										
(X - Y)	R_1	.471E-2	-.272E-2	-.332E-2	.103E-2	-.208E-2	.145E-7	.106E-1	.624E-5	-.237E-4
		(.719E-1)	(.206E-2)	(.190E-2)	(.948E-3)	(.284E-2)	(.332E-7)	(.858E-2)	(.746E-5)	(.247E-4)
	R_2	-.403E-1	.119E-2	-.226E-3	.139E-2	-.288E-2	-.419E-7	.385E-2	.213E-5	.180E-5
		(.706E-1)	(.202E-2)	(.187E-2)	(.931E-3)	(.279E-2)	(.326E-7)	(.843E-2)	(.732E-5)	(.243E-4)
	R_3	-1.00	.133E-1	.261E-1	.239E-1	.290E-1	.676E-7	-.568E-1	.567E-4	-.183E-3
		(.542)	(.155E-1)	(.143E-1)	(.715E-2)	(.214E-1)	(.250E-6)	(.647E-1)	(.562E-4)	(.186E-3)
CPTG - IND										
(Y - Z)	R_1	.105E-2	.364E-2	-.307E-2	.106E-2	-.222E-2	.105E-7	.949E-2	.643E-5	-.229E-4
		(.714E-1)	(.189E-2)	(.187E-2)	(.940E-3)	(.281E-2)	(.326E-7)	(.819E-2)	(.739E-5)	(.244E-4)
	R_2	-.390E-1	-.135E-2	-.339E-3	.138E-2	-.282E-2	-.400E-7	.448E-2	.205E-5	.135E-5
		(.706E-1)	(.187E-2)	(.185E-2)	(.931E-3)	(.278E-2)	(.322E-7)	(.811E-2)	(.732E-5)	(.242E-4)
	R_3	-1.00	-.388E-2	.277E-1	.239E-1	.277E-1	.347E-7	-.764E-1	.580E-4	-.170E-3
		(.544)	(.144E-1)	(.143E-1)	(.717E-2)	(.214E-1)	(.248E-6)	(.625E-1)	(.564E-4)	(.186E-3)

APPENDIX A.9
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE FIFTH YEAR AFTER ACQUISITION

			INDEPENDENT VARIABLE							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	.570E-1	-.615E-3	-.145E-2	.330E-3	.235E-2	-.154E-7	.178E-2	.633E-5	-.223E-5
		(.885E-1)	(.166E-2)	(.166E-2)	(.117E-2)	(.308E-2)	(.403E-7)	(.751E-2)	(.577E-5)	(.193E-4)
	R_2	-.144	.380E-2	-.181E-2	-.267E-2	.243E-2	.579E-7	-.285E-2	.183E-5	-.164E-4
		(.145)	(.271E-2)	(.271E-2)	(.192E-2)	(.503E-2)	(.660E-7)	(.123E-1)	(.944E-5)	(.316E-4)
	R_3	.927	.518E-2	.238E-1	.278E-2	.195E-1	.382E-6	-.122E-1	-.104E-3	-.259E-3
		(1.02)	(.191E-1)	(.190E-1)	(.135E-1)	(.535E-1)	(.463E-6)	(.862E-1)	(.662E-4)	(.221E-3)
AFF - CPTG										
(X - Y)	R_1	.494E-1	-.171E-2	-.184E-2	.425E-3	.282E-2	-.105E-7	.447E-2	.619E-5	-.428E-5
		(.882E-1)	(.179E-2)	(.167E-2)	(.117E-2)	(.308E-2)	(.404E-7)	(.777E-2)	(.574E-5)	(.193E-4)
	R_2	-.123	.308E-2	-.779E-3	.244E-2	.129E-2	.481E-7	-.947E-2	-.156E-5	-.113E-4
		(.146	(.296E-2)	(.277E-2)	(.193E-2)	(.510E-2)	(.669E-7)	(.129E-1)	(.950E-5)	(.319E-4)
	R_3	.922	-.170E-1	.212E-1	-.211E-2	.230E-1	.427E-6	.701E-2	.102E-3	-.273E-3
		(1.01)	(.206E-1)	(.192E-1)	(.134E-1)	(.354E-1)	(.465E-6)	(.893E-1)	(.660E-4)	(.221E-3)
CPTG - IND										
(Y - Z)	R_1	.507E-1	.206E-2	-.167E-2	.393E-3	.268E-2	-.102E-7	.357E-2	.617E-5	-.359E-5
		(.876E-1)	(.164E-2)	(.163E-2)	(.116E-2)	(.305E-2)	(.401E-7)	(.744E-2)	(.571E-5)	(.191E-4)
	R_2	-.120	-.640E-2	-.907E-3	.243E-2	.121E-2	.411E-7	-.966E-2	-.130E-5	-.112E-4
		(.141)	(.264E-2)	(.263E-2)	(.187E-2)	(.492E-2)	(.646E-7)	(.120E-1)	(.920E-5)	(.308E-4)
	R_3	.962	.922E-2	.238E-1	-.268E-2	.201E-1	.402E-6	-.945E-2	.103E-3	-.261E-3
		(1.01)	(.190E-1)	(.189E-1)	(.134E-1)	(.353E-1)	(.465E-6)	(.862E-1)	(.662E-4)	(.221E-3)

APPENDIX A.10
RAW REGRESSION COEFFICIENTS FOR TESTS
MADE ON DATA FROM THE SIXTH YEAR AFTER ACQUISITION

			INDEPENDENT VARIABLES							
COMPARISON	TEST	Constant	Bank Type	M	C	L	S	H	I	D
IND - AFF										
(Z - X)	R_1	-.526E-1	.651E-3	-.314E-2	.189E-2	-.109E-2	-.746E-7	-.661E-2	.282E-4	-.966E-4
		(.298)	(.356E-2)	(.377E-2)	(.393E-2)	(.525E-2)	(.899E-7)	(.177E-1)	(.157E-4)	(.451E-4)
	R_2	-.243	.547E-2	-.339E-2	.413E-2	-.259E-2	-.187E-7	-.762E-3	-.330E-5	-.332E-4
		(.390)	(.466E-2)	(.493E-2)	(.515E-2)	(.688E-2)	(.118E-6)	(.232E-1)	(.206E-4)	(.591E-4)
	R_3	4.93	.181E-1	.495E-1	-.559E-1	.124E-1	.932E-6	.856E-1	.133E-4	.104E-3
		(2.26)	(.270E-1)	(.286E-1)	(.298E-1)	(.398E-1)	(.682E-6)	(.134)	(.119E-3)	(.342E-3)
AFF - CPTG										
(X - Y)	R_1	-.325E-1	-.604E-2	-.501E-2	.163E-2	.183E-3	-.488E-7	.417E-3	.248E-4	-.953E-4
		(.290)	(.398E-2)	(.384E-2)	(.382E-2)	(.517E-2)	(.890E-7)	(.177E-1)	(.155E-4)	(.439E-4)
	R_2	-.229	-.467E-2	-.405E-2	.397E-2	-.203E-2	-.594E-7	.103E-2	-.568E-5	-.335E-4
		(.394)	(.540E-2)	(.522E-2)	(.520E-2)	(.703E-2)	(.121E-6)	(.241E-1)	(.210E-4)	(.596E-4)
	R_3	5.02	-.249E-1	.442E-1	-.569E-1	.163E-1	.105E-5	.103	.559E-7	.106E-3
		(2.26)	(.310E-1)	(.299E-1)	(.298E-1)	(.402E-1)	(.693E-6)	(.138)	(.120E-3)	(.341E-3)
CPTG - IND										
(Y - Z)	R_1	-.439E-1	.406E-2	-.373E-2	.175E-2	-.594E-3	-.552E-7	-.503E-2	.262E-4	-.969E-4
		(.293)	(.356E-2)	(.371E-2)	(.387E-2)	(.518E-2)	(.901E-7)	(.173E-1)	(.156E-4)	(.444E-4)
	R_2	-.249	-.201E-2	-.219E-2	.425E-2	-.333E-2	-.885E-7	-.580E-2	-.197E-5	-.346E-4
		(.397)	(.482E-2)	(.502E-2)	(.523E-2)	(.701E-2)	(.122E-6)	(.234E-1)	(.211E-4)	(.600E-4)
	R_3	4.93	.786E-3	.522E-1	-.558E-1	.110E-1	.945E-6	.727E-1	.139E-4	.992E-4
		(2.27)	(.276E-1)	(.288E-1)	(.300E-1)	(.402E-1)	(.698E-6)	(.134)	(.121E-3)	(.344E-3)

APPENDIX B

DIRECTION OF EFFECT THE INDEPENDENT VARIABLES HAVE ON THE DEPENDENT VARIABLES

TABLE B.1
DIRECTION OF EFFECT ON DEPENDENT
VARIABLES FROM STATE BRANCHING LAW*

	YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON	-3	-2	-1	0	1	2	3	4	5	6
Z - X										
R_1	-	-	-	-	-	-	+	-	+	-
R_2	+	-	+	-	-	-	-	-	+	-
R_3	+	+	+	+	+	+	+	+	+	+
X - Y										
R_1	-	-	-	-	-	-	+	-	+	+
R_2	+	-	+	-	-	-	-	-	+	-
R_3	+	+	+	+	+	+	+	+	+	+
Y - Z										
R_1	-	-	-	-	-	-	+	-	+	-
R_2	+	-	+	-	-	-	-	-	+	-
R_3	+	+	+	+	+	+	+	+	+	+

*A plus sign represents a direct relationship between the dependent variables and movement from unit to limited area branching.

TABLE B.2
DIRECTION OF EFFECT ON DEPENDENT
VARIABLES FROM COUNTY PERSONAL INCOME

	YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON	-3	-2	-1	0	1	2	3	4	5	6
Z - X										
R_1	-	-	-	+	+	+	+	+	+	+
R_2	+	-	-	+	+	-	-	+	-	-
R_3	+	+	+	+	+	+	+	+	+	+
X - Y										
R_1	-	-	-	+	+	+	+	+	+	+
R_2	-	-	-	+	+	-	-	+	-	-
R_3	+	+	+	+	+	+	-	+	+	+
Y - Z										
R_1	-	-	-	+	+	+	+	+	+	+
R_2	+	-	-	+	+	-	-	+	-	-
R_3	+	+	+	+	+	+	-	+	+	+

TABLE B.3
DIRECTION OF EFFECT ON DEPENDENT VARIABLES
FROM DEPOSITS AT COMPETING FINANCIAL INSTITUTIONS

	YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON	-3	-2	-1	0	1	2	3	4	5	6
Z - X										
R_1	+	+	-	-	-	-	-	-	-	-
R_2	+	+	+	-	-	+	+	+	-	-
R_3	-	-	-	-	-	-	+	-	-	+
X - Y										
R_1	+	+	+	-	-	-	-	-	-	-
R_2	+	+	+	-	-	+	+	+	-	-
R_3	-	-	-	-	-	-	+	-	-	+
Y - Z										
R_1	+	+	+	-	-	-	-	-	-	-
R_2	+	+	+	-	-	+	+	+	-	-
R_3	-	-	-	-	-	-	+	-	-	+

TABLE B.4
DIRECTION OF EFFECT ON DEPENDENT VARIABLES FROM CALENDAR YEAR*

	YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON	-3	-2	-1	0	1	2	3	4	5	6
Z - X										
R_1	+	+	+	+	+	+	+	+	+	+
R_2	+	+	+	+	+	+	+	+	+	+
R_3	-	-	+	+	+	+	+	+	-	-
X - Y										
R_1	+	+	+	+	+	+	+	+	+	+
R_2	+	+	+	+	+	+	+	+	+	+
R_3	-	-	+	+	+	+	+	+	-	-
Y - Z										
R_1	+	+	+	+	+	+	+	+	+	+
R_2	+	+	+	+	+	+	+	+	+	+
R_3	-	-	+	+	+	+	+	+	-	-

*A plus sign represents a direct relationship between the dependent variables and the passage of time. A negative sign represents an inverse relationship.

TABLE B.5
DIRECTION OF EFFECT ON DEPENDENT VARIABLES
FROM FEDERAL RESERVE SYSTEM MEMBERSHIP*

	YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON	-3	-2	-1	0	1	2	3	4	5	6
Z - X										
R_1	+	-	-	+	+	-	-	-	-	-
R_2	-	-	-	-	-	+	+	-	+	-
R_3	-	-	+	+	+	+	+	+	-	+
X - Y										
R_1	+	-	-	+	+	-	-	-	-	-
R_2	-	-	-	-	-	+	+	-	-	-
R_3	-	-	+	+	+	+	+	+	+	+
Y - Z										
R_1	+	-	-	+	+	-	-	-	-	-
R_2	-	-	-	-	-	+	+	-	-	-
R_3	-	-	+	+	+	+	+	+	+	+

*A plus sign represents a direct relationship between the dependent variables and movement from non-member to member status.

TABLE B.6
DIRECTION OF EFFECT ON DEPENDENT
VARIABLES FROM BANK ASSET SIZE

	YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON	-3	-2	-1	0	1	2	3	4	5	6
Z - X										
R_1	+	+	+	+	-	+	+	+	-	-
R_2	+	+	-	-	+	-	-	-	+	-
R_3	+	+	+	+	+	+	+	+	+	+
X - Y										
R_1	+	+	+	+	-	+	+	+	-	-
R_2	+	+	-	-	+	-	-	-	+	-
R_3	+	+	+	+	+	+	+	+	+	+
Y - Z										
R_1	+	+	+	+	-	+	+	+	-	-
R_2	+	+	-	-	+	-	-	-	+	-
R_3	+	+	+	+	+	+	+	+	+	+

TABLE B.7
DIRECTION OF EFFECT ON DEPENDENT VARIABLES FROM MARKET CONCENTRATION*

		YEAR RELATIVE TO ACQUISITION YEAR									
COMPARISON		-3	-2	-1	0	1	2	3	4	5	6
Z - X											
	R_1	+	+	+	+	+	+	+	+	+	-
	R_2	-	-	-	+	+	-	-	+	-	-
	R_3	-	-	-	-	-	-	-	-	-	+
X - Y											
	R_1	+	+	+	+	+	+	+	+	+	+
	R_2	-	+	+	+	+	-	-	+	-	+
	R_3	+	-	-	-	-	-	-	-	+	+
Y - Z											
	R_1	+	+	+	+	+	+	+	+	+	-
	R_2	-	-	+	+	+	-	-	+	-	-
	R_3	-	-	-	-	-	-	-	-	-	+

*Market concentration is measured by the Herfindahl Index.

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