

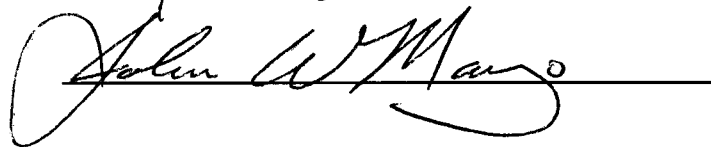
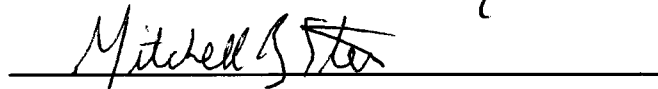
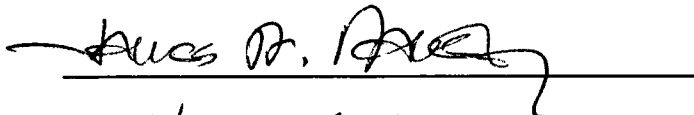
To The Graduate Council:

I am submitting herewith a dissertation written by Breck Ledo Robinson entitled "Too-Big-To-Fail and Bank Holding Company Behavior." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.



Harold A. Black, Major Professor

We have read this dissertation
and recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor
and Dean of the Graduate School

Too-Big-To-Fail and Bank Holding Company Behavior

A Dissertation

Presented for the

Doctor of Philosophy Degree

The University of Tennessee, Knoxville

Breck Ledo Robinson

December 1994

DEDICATION

This dissertation is dedicated to my parents, Dewey and Ruby Robinson. My parents gave me many treasures, but at this moment the gift to dream, the vision to believe and the opportunity to achieve are most apparent. I pray that these treasures do not end with me.

It is also necessary to dedicate this dissertation to the Lord. Many a time in my life, I've needed his strength to help me carry my load and he has never let me fall. May I give all praise unto him, for all things are possible who believe.

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ABSTRACT

On September 19, 1984, the Comptroller of the Currency declared that some banks are "too-big-to-fail" (TBTF). In the event of failure, the largest 11 banks would receive, *de facto*, 100 percent deposit insurance which would mitigate against bank runs by uninsured depositors. This dissertation explores the impact of TBTF on the market and the BHC.

This research examines the TBTF doctrine in the following areas: (1) the market's reaction to the TBTF doctrine on the security price of BHCs, (2) differences in the market's reaction to dividend cuts and omissions between the pre- and post-TBTF periods, (3) changes in BHC asset composition associated with the incentives related to the TBTF doctrine, and (4) changes in BHC efficiency caused by the TBTF doctrine.

The first section of this dissertation shows that positive price appreciation was experienced by BHCs outside those 11 BHCs mentioned by the Wall Street Journal following the Comptroller's announcement. Subsequent results from a cross-sectional regression show that the market does not regard asset size or portfolio risk as the primary factors when regulators make the determination of who receives TBTF coverage.

The second section of this dissertation uses an event study to observe the market's reactions to dividend cuts and omissions. The results show that the market's reaction to dividend cuts and omissions were significantly stronger prior to the Comptroller's announcement than after. Further segmentation of the market's reaction, based on asset size and institutional involvement, reinforces the above results.

The third section uses a cross-sectional time-series regression to observe changes in asset portfolio composition. The results show that only those publicly traded BHCs with asset size over \$12 billion dollars experienced significant increases in asset size, increases in letters of

credit, and reductions in capital. For BHCs under \$12 billion dollars, the results show that changes in asset composition is not consistent with either the asset or periphery growth strategies.

The last section uses a multi-product quadratic cost function to observe changes in BHC efficiency. The results show that all BHCs, regardless of asset size or whether the BHC has publicly traded equity, experienced a significant reduction in efficiency after TBTF.

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CHAPTER 1

INTRODUCTION

1.1 Purpose of This Research

The topic of too-big-to-fail (TBTF) in the banking literature has been debated among participants such as stockholders, depositors, taxpayers and regulators, who have competing interests. Their disagreement revolves around the necessity of the too-big-to-fail doctrine, the incentives it creates, and the identification of its beneficiaries.

The too-big-to-fail doctrine was introduced by the Comptroller of the Currency on September 19, 1984 and was precipitated by the collapse of Continental Illinois. The failure and bailout of Continental Illinois is discussed in Chapter 2. The TBTF doctrine was initiated by Federal Regulators following a series of depository runs by negotiable CD holders at Continental Illinois. The TBTF doctrine gave all depositors, regardless of denomination, the full backing of the FDIC.

The Comptroller's statement implied that complete depository coverage was applied to the eleven largest banking organizations. A number of questions arise when discussing the TBTF doctrine: (1) is too-big-to-fail necessary, (2) is bank size the only relevant factor when determining which banks are completely covered, (3) will application of TBTF induce increased risk-seeking behavior, and (4) are there efficiency gains or losses in the banking industry as a result of TBTF.

The purpose of this dissertation is to determine if the TBTF doctrine caused a change in the perception of the market toward BHCs and in the behavior of BHCs. If the market perceives that the TBTF doctrine has altered the default risk of BHCs, then the TBTF doctrine should cause a change in the market. If BHCs are perceived to be less risky following the TBTF announcement, then there should be a reaction in their stock prices. The interesting question is whether the reaction extends beyond the eleven largest BHCs.

Two methods are used to observe the market's interpretation of the applicability of the TBTF doctrine: (1) market reaction to the TBTF announcement, and (2) the change in market reaction to dividend cuts and omissions between the pre- and post-TBTF periods. If the market responds differently to dividend cuts due to a perceived broader applicability of the TBTF doctrine, there will be incentives for BHCs to increase the riskiness of their asset portfolios in order to receive/maximize the subsidy associated with complete depository coverage. The BHCs' behavior can also be observed through changes in efficiency. A decrease in the efficiency of BHCs is due to an overall increase in the riskiness of the banking system. Increased riskiness is associated with risk taking activities of TBTF banks as well as the subsidy awarded to TBTF banks allowing them to have a competitive advantage when acquiring purchased funds against non-TBTF banks.

In order to address these questions, this research consists of four parts. The first section analyzes the market's reaction to the Comptroller's announcement. It is contended that if the TBTF doctrine is perceived to have an applicability beyond the eleven largest banks, then banks smaller than the eleven largest will receive positive price appreciation surrounding the TBTF announcement. If the market indicates that asset size is the sole criteria when regulators make the determination regarding who receives TBTF coverage, then other factors such as portfolio risk become important.

The second section of this dissertation analyzes the impact of the TBTF doctrine by observing the market's reaction to dividend cuts and omissions by bank holding companies (BHCs). If TBTF reduces the probability of default for protected BHCs, the market's reaction to dividend cuts should be altered. Hence, dividend announcements should not convey the same information pre- and post-TBTF.

The third section of this dissertation deals with the bank holding companies' response to TBTF. It is hypothesized that the introduction

of the too-big-to-fail doctrine has altered the incentives of large bank holding companies. The benefits from complete depository coverage create incentives for non-covered BHCs to engage in strategies in order to become a TBTF bank.

TBTF banks benefit from complete depository coverage because their cost of capital is not reflective of their asset portfolio risk. The disparity between cost and return on capital creates a profit opportunity for TBTF banks. This profit opportunity that is allotted to TBTF banks may in turn, be actively pursued by non-TBTF banks. Moreover, since TBTF banks already have complete depository coverage through the TBTF doctrine, they are postulated to engage in a strategy that will further increase bank profitability through asset growth strategies.

The fourth section of this dissertation analyzes the effect of TBTF on the operating efficiency of bank holding companies. If the holding company attempts to follow a strategy that will allow it to derive benefits from being included in the TBTF category, it should affect its efficiency. Changes in bank efficiency are documented in the dissertation.

Another change in efficiency created due to the introduction of TBTF is the increase in risk experienced by banks throughout the whole banking system. If certain banks within the banking system experience preferential treatment through complete depository coverage, then these banks can increase the riskiness of their portfolios without having to pay a corresponding higher cost of purchased funds.

The opposite is true for banks outside of the protection of the TBTF doctrine. The introduction of the TBTF doctrine causes non-TBTF banks to pay a higher cost of funds than TBTF banks which have a smaller risk of default. Non-TBTF banks may be forced to seek riskier investments in order to offset their higher costs.

1.2 Relevance of the Research

This dissertation results indicate that the behavior of both the BHC and the market is contrary to the statement that the TBTF doctrine is applicable to only the eleven largest BHCs. Reactions of the BHC and the market indicate that TBTF clearly altered BHC behavior. Moreover, this alteration was not confined to the eleven largest BHCs.

This research contributes to two strands of literature: corporate finance and banking literature. The first test is built upon the information content of dividends. Since the first part of the dissertation looks at market reactions to dividend cuts and omissions pre- and post-TBTF doctrine, it is necessary to build a bridge from the general corporate dividend policy to the dividend policy literature of banks and, subsequently, to TBTF.

A controversy surrounding why firms pay dividends has existed since the 1950s [Walter (1956) and Lintner (1956)]. The dividend question to writers during this time period asks why firms pay dividends and whether the discounted value of future dividend payments reflects the firm's underlying value.

Recently the dividend controversy has taken on a different twist. Watts (1972) attempted to determine if dividends conveyed any additional information about the firm's future earnings. Other articles [Ezzell (1974), Feldstein and Green (1983) and Miller and Rock (1985), among others] attempted to resolve this controversy by looking at the firm's previous dividends and earnings. Subsequent studies by Brickley (1983), Healy and Palepu (1988) and DeAngelo and DeAngelo (1990) have supported the hypothesis that changes in dividend policy usually follow one or two years of significant earnings increases or decreases. Although dividend changes can in part be predicted by changes in past and current earnings [Watts (1973)], past and current earnings cannot perfectly predict this result. In other words, dividends convey new information.

The banking literature has similarly evolved with respect to the importance of dividend policy. Early studies by Magen (1971), and Gupta and Walker (1975) have attempted to determine the optimal dividend policy for banks and how dividend policy affects the bank's cost of capital. Although Magen found that dividend policy does not affect the firm's cost of capital, Gupta and Walker concluded that dividend policy decision cannot be over-emphasized. These studies are similar to other studies during this time period for they applied traditional dividend methodology to banking and do not make the distinction that banks are unique.

Keen (1978) was one of the first writers to state that banks are unique. His depiction of the uniqueness of banks stems from the market's perception of the information content of dividends. He states that unlike dividend cuts by non-financial institutions, dividend cuts by financial institutions convey information to the market concerning the oncoming collapse of the bank. Subsequent articles by Keen (1983), and Black, Ketcham and Schweitzer (1990) have built upon Keen's earlier conclusions regarding the market's unique response to dividend cuts and omissions by banks.

The uniqueness of banks has been supported in articles by Fama (1985), James (1987), and Lummer and McConnell (1989). The conclusions of these articles range from the uniqueness of banks to pass reserve costs on to customers to the information banks convey to the market through their lending activities.

The issue of bank uniqueness has been tested and found in many areas. There is another form of bank uniqueness specifically tied to this study that has not been discussed in previous literature. It is asserted that banking is unique because it has an added dimension to the traditional principal/agent relationship discussed in Jensen and Meckling (1976). Similar to a non-financial institution, stockholders are considered principals within the financial institution, and managers

are considered agents. But unlike a non-financial institution, the presence of regulators causes banks to hold a truly unique position. Regulators use legislation and supervision to act as intermediaries between both the principal and the agent. Legislation is used not only to bring together the interests of both principals and agents, but the interests of stakeholders (depositors, taxpayers and regulators) are also important in shaping the types of legislation and the degree of supervision. The TBTF doctrine can be considered as one of those times when the interests of stakeholders are emphasized.

The emphasis during the 1980s [Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of 1980 and Garn-St Germain Depository Institutions Act (Garn-St Germain) of 1982] on deregulation and, more importantly, the too-big-to-fail doctrine, has caused the incentives facing the banking industry to significantly change [Cook (1993) and Wall (1993)]. This period and area of research should be of much interest to all stakeholders and bank regulators.

DIDMCA and Garn-St Germain were written mainly to increase the competitiveness of commercial banks and other depository institutions with respect to non-depository institutions. Deregulation and non-bank encroachment into traditional banking activities has increased the cost of bank financing and decreased investment opportunities causing banking to become more competitive. As a result of increased competition, more expensive sources of financing have caused banks to engage in riskier lending activities in order to remain profitable [Cook(1993)].

Encroachment by non-banks, changes in regulation, and riskier lending activities have not come without costs. Increases in the number and size of bank failures during the 1980s and early 1990s give testimony to the costs incurred by the banking industry.

The too-big-to-fail doctrine represents the culmination of a period of deregulation and at the same time, the impetus for change through future regulation. The complete coverage of deposits eliminates

the need for large depositors to run on financially distressed banks. The elimination of bank runs, in essence, eliminates the probability that specific large banks will default. By eliminating the probability of default, regulators have changed the market's perception of the viability of certain banks that have dividend cuts and omissions.

If the market believes the Comptroller's statement, TBTF coverage should eliminate bank runs for the eleven largest banks, since all depositors in these banks will be guaranteed to recover their deposits in full if the bank eventually fails.¹ Under a TBTF environment, there is no need for depositors to withdraw their funds in the event of financial difficulties at a covered financial institution. If depository runs are unlikely to occur, the probability of bank failure will be reduced. These banks should derive benefits from TBTF coverage by acquiring financing at lower costs (less risk for depositors) and increasing the riskiness of their lending activities.²

The too-big-to-fail doctrine also has an influence on the market's perception of TBTF banks. Based on the traditional view, a dividend cut is viewed by the market as a signal of financial stress and an increased probability of failure for the financial institution. But for TBTF banks, the probability of failure has been reduced due to the TBTF doctrine. As a result, the traditional view should no longer hold for

¹The eleven BHCs mention in the Wall Street Journal article following the Comptroller's announcement are BankAmerica, Bankers Trust, Chase Manhattan, Chemical Bank, Citibank, Continental Illinois, First Chicago, J.P. Morgan, Manufacturers Hanover Trust, Security Pacific and Wells Fargo.

²A direct test to determine if the cost of purchased funds for both TBTF and non-TBTF banks cannot be performed due to data limitations. Since the TBTF doctrine occurred during the fourth quarter of 1984, the availability of only annual data does not allow for differences in the cost of capital to be accurately observed.

TBTF banks, and the market's reaction to dividend cuts by these banks should be significantly reduced.

The next question is to determine if the benefits from the TBTF doctrine can be applied to non-TBTF banks. It is contended that the ambiguity in statement and inconsistency in action by the Comptroller regarding the banks to be covered by the TBTF doctrine has caused the benefits associated with the TBTF doctrine to be applied not only to TBTF banks, but to non-TBTF banks as well. It is conceivable that an expansion of the TBTF doctrine, without an explicit statement recognizing its expanded applicability, would cause banks previously considered outside the protection of the TBTF doctrine to receive benefits similar to an original TBTF bank. Examples of the increased application of the TBTF doctrine can be observed with the treatment of First Oklahoma Corp. (1986), First Republic Corp. (1988) and MCorp. (1989).

Because of the expanded use of the TBTF doctrine beyond the original eleven TBTF banks, it is conceivable that the market has associated probabilities to each large BHC regarding its likelihood to receive TBTF coverage. If this is the case, then there should be a positive relationship between bank size and the probability of receiving TBTF coverage among the original non-TBTF banks. This positive relationship between size and the probability of receiving TBTF coverage should further weaken the traditional view when applied to all BHCs, for the probability of default for all large bank holding companies should be reduced by an amount related to size.

As a result of TBTF, dividend cuts and omissions by banks in the post-TBTF time period should result in smaller market reactions when compared to the pre-TBTF time period. In other words, the TBTF doctrine should significantly affect the market's perception and reaction to dividend cuts and omission.

As stated previously, the TBTF doctrine should also cause the operating incentives of holding companies to change. Before TBTF, the riskiness of any bank's portfolio was represented by its cost of capital. Banks with riskier portfolios paid higher costs in order to attract financing. This positive relationship between return and cost created a somewhat moderating force in the benefits that most banks received from increasing portfolio risk (market discipline). Other costs, such as increased regulatory examination, also contributed to this moderation, but the examination process is considered to be a long-term moderating force due to the difficulty in assigning risk to the bank's asset portfolio.

The introduction of TBTF causes the market to stop tying the riskiness of the holding company's portfolio to its cost of capital. In essence, the TBTF doctrine creates a cost transfer from TBTF banks to the FDIC. This cost transfer is a subsidization of the cost associated with default for TBTF banks. Covered banks can increase the FDIC subsidization while simultaneously increasing the benefits from TBTF coverage by increasing the riskiness of their portfolio. By increasing portfolio risk, TBTF banks can broaden the differences between the cost and return on capital.

Realizing the benefits that are associated with being a TBTF bank, it would seem rational that banks that are not one of the eleven original TBTF banks would attempt to become a TBTF bank in order to receive the benefits associated with TBTF coverage. Also, the incentives to become a TBTF bank have been further enhanced in subsequent years as the FDIC used the TBTF doctrine to bail out banks and bank holding companies that were not included among the original TBTF group.

If banks perceive that the only criteria for becoming a TBTF bank is asset size, then it would be expected that non-TBTF banks would attempt to significantly increase asset growth over the post-TBTF time

period in an attempt to become a TBTF bank. But, the problem exists that banks already considered members of the TBTF category will also engage in an asset growth strategy in order to increase profitability. However, there may be other criterion that the FDIC uses when applying TBTF coverage to a failing bank, such as the influence on payment systems, interbank liabilities and geographic or competitive importance [Kaufman (1983), Wall and Peterson (1990) and Wall (1993)]. The banking industry may perceive that another means to becoming a TBTF bank is through the significant disruption in certain banking activities which regulators have deemed important if the bank were allowed to fail.

In order to test whether this hypothesis is appropriate, it is not necessary to determine whether the holding companies actually received TBTF coverage by engaging in some strategy to become a TBTF bank. It is only necessary to provide evidence that the activities of large BHCs have significantly changed from the pre- and post-TBTF time periods. For it is during post-TBTF time periods that a large bank is defined as a bank that can take advantage of the opportunities created by the TBTF doctrine. This hypothesis can be tested by observing specific operating activities of all holding companies.

In order to observe the asset or periphery growth strategies, it is appropriate to distinguish between those holding companies that have publicly and non-publicly traded common stock. It has been stated in articles written by Arbel and Strebel (1983) and Moyer, Chatfield and Sisneros (1989) that having analysts covering a firm's securities prevents both the neglected firm effect and perquisite consumption. In other words, both papers view the market as having a role in monitoring and disciplining the firm. It would be expected that BHCs with publicly traded securities will react more cautiously in adjusting the asset portfolio to opportunities created by the TBTF doctrine.

If BHCs perceive that there are benefits associated with being a TBTF bank, then they will engage in some strategy that will allow them

to move toward becoming a TBTF. However, this strategy is not totally profit-maximizing/cost-minimization based and as a result, non-TBTF banks who are attempting to become members of the TBTF category should become less efficient. A reduction in efficiency will not occur just for non-TBTF banks, but for TBTF banks also. TBTF banks realize that they can further increase the difference between the cost of financing and the return from operations by engaging in riskier activities. By switching operations to activities that have higher returns (regardless of expertise), TBTF and non-TBTF banks will become less efficient.

Thus, the incentives associated with the TBTF doctrine should cause all BHCs to engage in activities which reduce their efficiency. As discussed previously, increased inefficiency can also be attributed to an increase in the riskiness of the banking system as a whole. The higher costs non-TBTF banks are required to pay in order to attract purchased funds, combined with the increased risk of their asset portfolio as a means to gain higher returns, also increases the riskiness of the banking system.

Segmenting the sample of BHCs based on publicly traded or non-publicly traded common stock also seems appropriate in the inefficiency section of this dissertation. It is consistent with the literature that BHCs having an additional monitor (the market) will be required to operate more efficiently as a stipulation to gaining future access to capital markets.

The following sections of the dissertation proceed as follows: Chapter 2 provides a review of the literature surrounding dividend policy and market reactions, bank asset risk and inefficiencies. Chapter 3 gives a detailed analysis of the data to be used. Chapter 4 provides a theoretical framework of the empirical techniques used in the research. Chapter 5 provides results from the empirical research. Descriptive statistics for each variable are provided for in the analysis. Also, regression results are presented for both bank holding

companies and market reactions. Chapter 6 provides a summary of the empirical results along with concluding remarks.

CHAPTER 2

LITERATURE REVIEW

In order to analyze the market and holding company reactions to the introduction of the too-big-to-fail doctrine, this section reviews the relevant literature. This literature is from the following areas: dividend policy, market reactions to bank failure, Continental Illinois, bank legislation and too-big-to-fail, institutional ownership, bank risk and efficiency.

2.1 The Dividend Literature

The purpose of this section is to provide evidence that dividends can be used as a signal for future firm profitability and to give a background for the evolution of the dividend literature in the banking industry. The acceptance of the information content of dividends allows this dissertation to analyze the difference in market reactions occurring due to the introduction of the too-big-to-fail doctrine.

The papers in this section represent a historical perspective of stock valuation. Although early papers in this area do not specifically analyze the dividend policies of banks and bank holding companies (BHCs), they find that dividend policy is positively related to stock valuation and dividend policy decision is important to management and stockholders. Later articles in this section provide justification for the use of dividends as a signal of present and future firm performance.³

³The information content of dividends and dividend policy was not explicitly stated until the 1970s. Articles written by Ross (1977), Bhattacharya (1979), and Miller and Rock (1985) are some of the first to explicitly state that due to information asymmetries, dividend announcements as a signal to the market of future firm profitability was often used by management.

One of the earliest dividend papers was written by Walter (1956). That paper finds a relationship between the dividend a company pays (or dividend payout) and the ensuing stock price. The use of dividend valuation models is the basis in establishing this relationship. Since all stock prices do not behave in a uniform manner, it is necessary to distinguish among security behaviors based on dividend payout policies. Three security categories are developed as a means to differentiate among stock price behavior. The categories are growth, intermediate stocks and creditor stocks. A fourth category can be included for stocks that have declining values.

Walter associates a dividend distribution (or payout) behavior with each of the above categories. Growth stocks are expected to pay little in the form of dividends, intermediate stocks should pay medium or high dividend, and creditor stocks should pay a fixed dividend payout ratio. The foundation behind the grouping of securities in this manner is that investors are willing to forego current consumption in the form of dividends, as long as the return on retained earnings is greater than the cost of capital.

The relevant aspect of this paper is in the definition of the basic stock valuation model. The emphasis on dividends (present value of future dividend income) as the determining factor in stock valuation models is the precursor for following studies to emphasize the importance of dividends in both the banking and non-banking literature.

Unlike Walter's (1956) theoretical models, which associate dividend policy to stock price behavior, Lintner's (1956) models analyze the motivation behind the establishment of and changes in dividend payout. Lintner uses both survey data and regression analysis over the time period 1947-1953 to explain dividend behavior.

The surveys convey management's perception that most stockholders prefer a stable dividend payment and that the market puts a premium on stability or gradual growth in dividends. This belief is so strong

among management that dividend changes are initiated only when these changes can be sustained for at least a year. Also, during time periods when management perceives that increases in dividend payments can be maintained for an extended period of time, dividend payments generally only partially increase by the amount of the dividend that management perceives can be maintained. Adjusting dividends gradually when higher dividend payments can be maintained is called a partial adaptation policy.

Lintner develops two models. The first model uses the stated target payout ratio and the previous dividend payment as explanatory variables in the change in dividends equation. The second is a naive model that uses the current dividend as the dependent variable and the current earnings level and the previous period's dividend payment as explanatory variables.

The results support the theory stated: that firms are gradually adjusting to new higher levels of profits in order to maintain the same dividend policy that was established in prior periods. Also, it appears that earnings projections are the primary factor in determining the appropriate dividend payout ratio. Industry growth prospects, growth prospects for the firm, availability of capital markets, and cyclical movements of investment opportunities are also considered by management when determining dividend payout.

Watts (1973) is one of the first authors to attempt to determine if dividends convey information about future earnings. If dividends convey information about future earnings, then including dividends as an explanatory variable will add information about future earnings. However, if markets are considered efficient, dividend and earnings information should already be incorporated into the security's price.

Monthly observations for 310 firms over the period 1945-1968 were collected for dividend and earnings data. Two models were used to determine the information content of dividends. The first model used

future earnings (one period lead) as the dependent variable. Current and the previous periods dividends and earnings are the independent variables. The results showed little support that dividends convey information.

The second model is a variation of Lintner's (1956) model where the dividend/earnings relationship is hypothesized to be strongest among dividend changes, not dividend levels. In other words, earnings are good indicators of when a firm is likely to change its dividend but not a good indicator of the actual dividend amount. Results show that dividend changes are positively related to earnings. Thus, higher earnings precede increases in dividends. In the end, Watts could not support or reject the information content of dividends theory.

Ezzell (1974) uses a series of models to explain dividend and earnings behavior over the time period 1952-1971 for 395 firms. A series of dividend and earnings models are estimated where actual dividends and earnings are regressed against an expected variable. The expected variable is classified in a variety of ways ranging from a naive approach (previous periods dividends or earnings) to an exponential trend. In order to determine the information content of dividends, the error term from the dividend model is compared against the error term from the earnings model. The error term is a one-period lead.

If dividends convey information, there will be a positive relationship between the error terms of the dividends and earnings models that are correctly specified. The results support Lintner's claim that dividends are gradually adjusted to earnings increases. Also, Ezzell concludes that the information content of dividends is highly dependent on the expectation models used.

2.1.1 Reasoning

Dividends are a credible signal regarding the future profitability of the firm. Information regarding the firm's future profitability causes the market to react to dividend cuts and omissions. Based on the aforementioned literature, dividends are an important source of information regarding the firm's future profitability [Lintner (1956), Watts (1972) and Ezzell (1974)]. Lintner states that management perceives both investors and the market as preferring stable dividends. The preference is so strong that the market is willing to pay a premium for this behavior. If stable dividend growth is valued by both management and the market, then dividend changes must be due to some change in management's earnings projections [Watts (1972)]. If dividends convey information regarding the firm's future profitability, and the market responds to dividend changes based on the information dividends convey regarding the firm's future profitability, then the use of dividend cuts and omissions as a means to test market reactions is strongly based in the historical literature.

By using an event study methodology to determine the market's reaction to dividend cuts and omissions, problems in determining the model that is best appropriate in testing the information content of dividends are eliminated. Although the information content of dividends is not explicitly tested in this dissertation, the use of dividends as a signal indirectly tests the information content of dividends hypothesis [see Ross (1977), Bhattacharya (1979), and Miller and Rock (1985)]. By testing the information content of dividends, a joint test is created to test the viability of the information signal and the use of security prices to as a mechanism to respond th this information. If dividends convey no information, the use of dividends as a signal to test the reduction of default risk associated with the introduction of the too-big-to-fail doctrine cannot be tested.

2.2 Dividend Policy of Banks

This section shows that the market distinguishes between bank specific information and information that affects all banks in general. In order to accurately predict the impact of the TBTF doctrine, it is important that the market distinguish between these two types of information. In order to show TBTF doctrine's impact; unsystematic or contagion effects cannot exist. The existence of contagion effects would confound the market model results used to determine the impact of TBTF on the default risk of large BHCs.

The papers presented in this section establish evidence that the only effects influencing the market's valuation of bank securities is information considered systematic in nature. It is necessary to distinguish between types of information, systematic versus unsystematic, and their impact on the market's valuation of bank securities to accurately evaluate the impact of the TBTF doctrine.

The dividend policy papers in the banking literature have followed the traditional corporate finance literature with a lag of roughly 15 years. For some time bank dividend policy was considered to be similar to the dividend policies of other non-financial institutions. The literature during this time period used empirical methods developed for non-financial institutions to analyze the dividend policy of banks [see Magen (1971), Gupta and Walker (1975) and Mayne (1980)]. In the early 1970s, the dividend policies of banks began to be explored separately, and consequently, bank uniqueness was proposed. Subsequent articles recognize that the dividend decision of banks are structurally different from non-financial institutions. Differences in making the dividend decision precede other revelations of bank uniqueness [see Keen (1978 and 1983) and Black, Ketcham and Schweitzer (1990)]. The articles in this section build upon the theory and methodology of the traditional dividend literature. Second, this section distinguishes between the market's perceptions regarding financial and non-financial institutions

that initiate dividend cuts and omissions. The distinction in the market's perceptions is important. For example, at one time the market viewed a bank dividend cut and omission as a signal of impending collapse [Keen (1978)].

Gupta and Walker (1975) determine what part of a commercial bank's earnings should be retained in the firm to increase net worth. Similar to the dividend theories of Lintner (1956), the authors develop a dividend theory that requires the decomposition of dividend disbursements into three parts: profits, growth and liquidity.

The profit component consists of the level of current profits, the change in profits, and the cumulative level of profits over the past history. It is assumed that as the bank's profitability increases, a corresponding increase in dividends occurs.

The growth component is defined as the change in total assets from the preceding two years. Banks that have higher asset growth would be expected to pay higher dividends. Also, more assets should increase interest and investment income, which would increase profitability and dividends.

The liquidity component is defined as loans, investments and fixed assets divided by total liabilities. Less liquidity causes lower dividends as income that could be allocated for dividends is redirected to income earning endeavors.

The data consists of 980 banks of various sizes over the period 1965-1968. A cross-sectional step-wise regression is estimated restricting various variables within the model. The model that includes current profits, lagged cumulative profits, growth rate, and liquidity is found to be the most significant. Contrary to the conclusion in

Magen (1971), the authors find support that managerial decisions regarding the allocation of earnings could not be over-emphasized.⁴

The significance of the variables in the Gupta and Walker model is consistent with the results reported in Walter (1956), Lintner (1956) and Watts (1972). The similarity in results between the financial and non-financial literature reinforces the importance of the dividend signal for commercial banks.

A survey article by Kennedy and Scott (1983) investigates whether large banks target a percentage of their earnings toward cash dividends and what influences management's determination regarding the appropriate payout percentage. The authors find two dimensions to the dividend policy of banks: the determination of the appropriate dividend payout ratio and the ability to maintain a stable cash dividend per share overtime. Questionnaires were sent to commercial banks to obtain information on asset size, geographic location, and actual payout ratio. Respondents were asked to rank the importance of these variables within their bank, along with other factors.

The most important factor stated by respondents when determining the appropriate dividend policy is avoiding future dividend reductions. Consistent with the survey results reported in Lintner (1956) for non-financial institutions, managers of large banks determine a payout ratio that can be maintained over time.

Keen (1978) is one of the first researchers to state that the banking industry is unique and perceived differently by the market when dividend cuts and omissions occur. Keen acknowledges there is a traditional view of banking that perceives the cutting of dividends as information signaling the impending collapse of the financial

⁴Magen (1971) attempted to determine the optimal capital structure for the 50 largest commercial banks. His results found little relationship between the cost of capital, dividends, earnings and leverage. Magen concluded that dividend policy did not contribute to firm value.

institution. Evidence is provided by the failure of Franklin National Bank, the first money center bank to cut its dividend. The severity of the market's reaction to bank dividend cuts is attributed to the income needs of investors. Current dividends may be a source of income for investors and a interruption of consistent dividend payments may cause investors to adjust their portfolios away from firms that cut or omit their dividends. But, the main reason behind the different reactions between financial and non-financial institutions is that suppliers of funds view their resources as being in a riskier institution due to a perceived higher probability of default caused by the dividend reduction. The perceived higher probability of default may force the financial institution to pay more in order to attract additional sources of financing.

Keen's data consists of 28 banks that cut their dividends during 1974-1977. In order to compare the performance of the dividend cutting banks with non-dividend cutting banks, a matching group of sixteen banks that did not cut dividends was formed of roughly the same size and geographic location.

Keen (1978) concludes that the traditional view of banking is not totally supported by the results. Consistent with the traditional view, dividends are reluctantly cut by financial institutions. Also, financial institutions that cut their dividends tend to perform worse than non-dividend cutting financial institutions. However, dividend reductions do not endanger the survivability of the financial institution.

In a subsequent article, Keen (1983), seeks to determine if the announcement of a dividend cut conveys any new negative information to investors. The data consist of banks that had dividend cuts during the 1970's. The methodology consists of a two pass regression technique, where a market and industry index is used in the market model.

The results from the market model show that significant abnormal returns existed during the event week of the dividend announcement. In conclusion, the results support the theory that dividend announcements convey new information to the market and this new information tends to be negative in content.

Black, Ketcham and Schweitzer (1990) analyze stock price behavior of BHCs that have experienced dividend cuts and omissions. Data on bank holding companies that have cut or omitted their dividends over the period 1974-1987 are collected. In order to make a comparison to Keen's (1983) results, the Black, Ketcham and Schweitzer sample is divided into two sub-samples. The first correspond to the sample used by Keen (1983) and the second encompasses the time period 1978-1987. Standard event study methodology is used with an equally weighted index and the Scholes-Williams correction technique for non-synchronous trading.

Similar to the results found by Keen (1983), negative significant abnormal returns during the event day and the following day exist for the time period 1974-1977. However, the negative abnormal returns from the event period are completely reversed in the days following the event. A similar result occurred for the time period 1978-1987, but the post-event period did not find a reversal of the negative abnormal returns from the event period.

A cross-sectional regression is run in order to determine the factors that influence the cumulative abnormal returns from the event study. The results show that for the time period 1974-1977, earnings are the only significant variable. After 1977, all variables in the model increase in significance. These variables include the percentage cut in dividends, the firm's net worth, and the earnings. In conclusion, the authors find evidence that the market has become more familiar with the factors influencing dividend cuts and omissions over time. This familiarity is also represented in the cross-sectional regression and the lack of over-reaction in the event study.

2.2.1 Reasoning

This section provides evidence that the dividend policy of commercial banks' convey information to the market. The information that is conveyed through the dividend policy of a financial institutions is similar to the information that is conveyed by non-financial institutions.

Dividend cuts and omissions by financial institutions increase the concern of suppliers of funds regarding the probability of default of financial institutions [Keen (1978)]. The relationship between the perceived increase in the probability of default and the cost of financing tends to be the distinguishing factor in the market reactions among financial and non-financial institutions. The relationship is the basis of the traditional view of banking [Keen (1978)].

It has been stated in the previous section that financial and non-financial institutions prefer a stable dividend policy [Lintner (1956), Kennedy and Scott (1983), and Keen (1978)]. It has also been stated that dividend cuts and omissions tend to cause significantly negative market reactions [Keen (1983), and Black, Ketcham and Schweitzer (1990)]. Based on the results presented above, dividends may be used as a signal to determine if the market's perceptions of large BHC default risk has changed due to the introduction of the TBTF doctrine.

2.3 Measuring the Effects of Bank Failure

The purpose of this section is to show that the market distinguishes between information affecting a specific bank, or a group of banks, and the banking industry as a whole. It is important that the market be able to distinguish between bank specific and industry specific information in order to determine the impact of the TBTF doctrine on bank holding companies.

If bank specific information affects the banking industry in general, then the impact of the TBTF doctrine cannot be determined by

using the market model. By using the market model, differences in market reactions to dividend cuts and omissions based on the TBTF doctrine can be determined provided the dividend cut of one bank does not impact the market's valuation of the whole banking industry (no contagion).

For this section, a firm specific signal, like dividends, is connected with information that affects the banking industry (the TBTF doctrine) and incorporates both through the market's reaction to dividend cuts and omissions. This connection cannot be completed if contagion effects exist, because the dividend signal would affect the valuation of all banks, and the impact of TBTF doctrine would not be observable.

From the previously discussed section, the rationale for using dividends as a signal has been established. The information conveyed in dividends is representative of certain firm characteristics such as current and future profitability and management perceptions. By incorporating the contagion literature, a connection can be established between dividends and TBTF and the market's reaction. As a result, the impact of the TBTF doctrine can be observed.

In an attempt to detect contagion effects in the banking industry, Aharony and Swary (1983) analyze the three largest bank failures in U.S. history. A contagion effect, in the banking literature, is a loss of public confidence in the banking system resulting from the failure of a large bank.

The banks analyzed are Franklin National Bank of New York, United States National Bank of San Diego and Hamilton National Bank of Chattanooga. Previous studies have suggested that the above failures were the result of fraud, internal irregularities, and losses due to bad loans and investments. In the case of bank failures due to fraud and internal irregularities, it is assumed that no contagion effect should take place because there is no correlation between individual bank

failure due to fraud and the possible failure of other banks. Bank failure due to bad loans and investments may also cause a negative market reaction on the security prices of other banks. This reaction is a response by the market to a common bad signal.

Aharony's and Swary's data consists of the 3 failed banks, along with 12 money center banks, 31 medium sized banks and 30 small banks. To be included in the sample, each solvent bank must have had weekly returns for the period 1969-1977. The methodology used in this study is a standard event study.

The results of the event study do not support the pure contagion effect hypothesis. In the case where fraud was the primary reason behind the banks' failure, no contagion is found. Thus, poorly run banks do not cause the public to lose confidence in the banking system. However, the failure of FNB was due to heavy foreign exchange losses. This failure significantly affected the market's reaction to the group of solvent banks engaging in foreign exchange transactions. In other words, investors reacted to a common type of unfavorable information that affected the group of solvent banks rather than a pure contagion effect.

Lamy and Thompson (1986) examine the failure of Penn Square Bank of Oklahoma City and its impact on both the equity market and risk characteristics of the banking industry. According to the authors, deregulation of the banking industry during the 1970s, along with innovations in lending and loan syndications, have placed banks in poorer loan markets where they are under increased pressure to seek higher yielding, riskier loans. In this new environment, one bank's bad loan can cause several banks, and possibly the whole industry, to suffer.

Fifty-four banks made up the industry test sample. These banks did not purchase loans from Penn Square during the period of analysis. Also, the banks in the sample came from a variety of geographic areas

and were representative of the banking industry with respect to asset composition.

The equity market results indicate that stockholders were concerned about the future solvency of the 54 sample banks due to Penn Square's failure. The banking industry's risk results show that the average firm-specific risk component had significantly changed due to the Penn Square failure. The results can be explained as stockholders being concerned over the increased probability of default within the banking industry.

The authors conclude that their results tend to reflect that regulators' preoccupation with large bank failures may be misguided (ex.: TBTF). Even though Penn Square is not considered a large bank, its failure caused considerable market revaluation. The nature and extent of the inter-relationships between banks must be considered in shaping regulatory policy.

An in-depth analysis of the Penn Square failure is made by Peavy and Hempel (1988). Their study examines the extent of the market's anticipation, and reaction to key events surrounding the Penn Square failure. In order to test the effects of the failure, the authors hypothesize that different groups of size-based banks are affected differently. The three groups consist of: (1) four bank holding companies that purchased loans from Penn Square, (2) six large regional banks in the Southwest, and (3) ten major national bank holding companies located outside the region.

The results of the event study on the respective groups of banks show that the group of banks that purchased loans from Penn Square and banks located in the Southwest, but did not purchase loans from Penn Square, experienced significant negative abnormal returns during Penn Square's failure. However, the market reaction to Southwest banks that did not purchase Penn Square loans is less severe than the loan purchased bank group. It seems the market regarded the Penn Square

failure as firm specific and unrelated to economic problems associated with all banks in that region. The group of banks located outside the Southwest region did not experience any significant stock price revaluation as a result of the Penn Square failure.

In conclusion, the authors state that the market reacted to the Penn Square failure as idiosyncratic and limited to certain banks. The further the bank is located from Penn Square and the Southwest, the Penn Square failure had less effect.

Dickinson, Peterson and Christiansen (1991) examine the failure of First RepublicBank and the presence of contagion effects associated with its failure. First RepublicBank was the largest bank holding company in Texas and the 13th largest bank in the country in 1987.

In order to determine the impact of the failure, three bank groups are established. These are Texas banks, Southwest region banks, and large banks outside the Southwest region. The authors hypothesize that each bank group should have varying degrees of sensitivity to the failure of First RepublicBank.

In order to take into account non-synchronous trading, the the standard market model is used with a lag and lead market return variable. This model is estimated five times, once for each portfolio consisting of the original three groups and two combinations of the three groups.

The results show that on the days First RepublicBank related news was released, the portfolios of Texas and Southwest region banks were affected. There is no significant impact on the twenty five largest banks and the non-Southwest region banks. This indicates that contagion effects related to the collapse of First RepublicBank were localized.

2.3.1 Reasoning

This section provides evidence that if contagion effects exist, they are limited and not systemic. Evidence of contagion effects would

reveal that the market interprets all forms of information as potentially shedding light on all financial institutions. The ability of the market to distinguish between firm and industry specific information, regardless of bank size, re-enforces the use of the dividend signal when evaluating the impact of TBTF on the market's perceptions of BHC default risk.

Since there is considerable evidence that industry wide contagion effects do not exist, conclusions regarding the market's reaction to dividend cuts and omissions can be drawn due to the introduction of the TBTF doctrine. If the market views that the TBTF doctrine applies only to the eleven largest banks, then TBTF will cause no revaluation of discount factors associated with non-TBTF banks. Therefore, differences in the market's reaction pre- and post-TBTF should be statistically insignificant. However, the impact of a broader application of the TBTF doctrine, beyond the eleven largest banks, is evidence of a revaluation of discount factors for TBTF and non-TBTF banks. This revaluation due to TBTF will be observable through a difference in market reaction pre- and post-TBTF .

2.4 Continental Illinois

Continental Illinois experienced significant growth in loans and deposits during the mid-1970s and early 1980s [see Congressional Quarterly (1984), Federal Reserve Bank of San Francisco Weekly Letter (1984) and the Federal Deposit Insurance Corporation/Federal Reserve Board (1984)]. Continental grew by offering super-CDs at higher interest rates than the general market. The main source of Continental's funding came from these super-CDs and other uninsured deposits. In 1984, \$20.7 billion of the \$28.3 billion of deposits at Continental were in the form of time deposits in excess of \$100,000 [Federal Reserve Board of San Francisco Weekly Letter (1984)].

A significant portion of Continental's loans were to oil and gas producers. The early 1980s saw many of these loans fall into default due to declining oil and gas prices. Problem energy loans became apparent when Penn Square National Bank of Oklahoma City collapsed in July 1982. Following Penn Square's failure, Continental was forced to recognize losses on loans acquired from Penn Square. At the same time, loans to other corporations such as Braniff, AM International, and Nucorp Energy were in question. As a result, the bank's non-performing loans increased to \$2.7 billion in August 1983 from \$2.1 billion in July 1983. Increasing non-performing loans and reported losses in earnings caused Continental's solvency to be questioned. Potential solvency problems caused a flight of funds from the Continental, especially by non-insured super-CD holders. By the end of June, the bank had lost over \$10 billion in interest bearing deposits and \$1.5 billion of non-interest bearing deposits. This constitutes over 40% of its total deposit base.

On May 17, 1984, the FDIC, the Federal Reserve, and the Comptroller of the Currency announced a temporary financial assistance package for Continental. Providing time to resolve the bank's problems, the participants designed a package aimed at liquidity pressures. The agencies decided to provide sufficient permanent capital, and other direct assistance, to restore the bank as a viable concern. Factors influencing the agencies' decision included cost to the FDIC, competition consequences, and the public's banking needs.

The package devised by bank regulatory agencies consisted of a loan purchase and capital infusion program. The FDIC agreed to purchase \$5.1 billion dollars in troubled loans in two stages. The FDIC purchased \$3.6 billion in troubled loans for \$2 billion dollars at the introduction of the permanent assistance program. The second installment of loans occurred over the next 3 years at a face value of \$1.5 billion.

The FDIC recovered some of its costs through debt retirement. Debt retirement occurred over a 5 year period through quarterly payments of interest and loan collections. If the loan portfolio acquired from Continental turned out to be equal to the debt's value, Continental would only be required to pay back the expenses of the FDIC. However, if at the end of five years any FDIC losses incurred from purchasing Continental's loans they would be "made whole" by the acquisition of the appropriate portion of the 40 million shares of outstanding Continental stock. As a consequence, shareholders would absorb any losses incurred by the FDIC.

Capital infusion was provided to Continental by the FDIC through the purchase of \$1.0 billion in preferred stock. Seven hundred and twenty million dollars of the preferred stock was converted into 160 million shares of newly authorized common stock. The remaining \$280 million of preferred stock was an adjustable rate issue, paying the highest rate of the three-month, six-month, or one-year Treasury bill.

Swary (1986) and Wall and Peterson (1990) analyze the effects of the failure of Continental Illinois and whether the introduction of the too-big-to-fail doctrine is justified. Both of these articles analyze the TBTF doctrine's effect on market values of TBTF banks and banks of other risk classifications. This section provides evidence that the TBTF doctrine alters the market's view of TBTF banks and non-TBTF banks' market value.

Swary's (1986) article analyzes if Continental Illinois's failure and determines whether it adversely affects other banks through bank run or information effects. The bank run effect is defined as when depositors lose confidence in the solvency of their financial institution and withdraw their funds. In order for a financial institution to meet the drains on their liquidity, the bank is required to sell off assets or borrow. Both of these actions will make the bank

less profitable. If bank runs are too extensive, government action may be necessary in order to keep the bank viable.

The information effect occurs when a bank failure causes the market to revalue regulatory policies and asset quality of the failed bank and other banks in the industry. The information effect is similar to a contagion effect [Aharony and Swary (1983), Lamy and Thompson (1986), Peavy and Hempel (1988), and Dickinson, Peterson and Christiansen (1991)].

To determine the effects of Continental's failure, Swary collected a sample of sixty eight banks including Continental Illinois. The market model was used to obtain abnormal returns and volume was adjusted in logarithmic form. The event used in the market model is the interim rescue plan announced by the FDIC that would guarantee all deposits including those deposits above the \$100,000 maximum.

In order to determine whether the bank run or information effect exist, the sample is divided into questionable solvency liability-managed banks, questionable solvency banks, and solvent banks. The results show that all banks experience significant negative abnormal returns and volume on and around the event day. The questionable solvency liability managed banks experienced the largest negative abnormal return, followed by the group of questionable solvent banks.

In order to determine if bank runs are causing fund suppliers to withdraw their financing from the sample banks, the author calculates changes in the sources of financing (demand deposits, time deposits and borrowed funds). There appears to be no significant outflow of deposits due to the failure of Continental.

In conclusion, the results show that the group of questionable solvency banks experienced significant changes in both price and trading activity surrounding the Continental crisis. The stronger market response for the banks with questionable solvency is due to their portfolio similarity with that of Continental.

Wall and Peterson examine the effect of Continental's failure on the equity value of other large banks. Their study focuses on the time period from May 8, 1984 to June 1, 1984. This period is chosen because it encompasses the interval during which rumors concerning Continental and other banks were in the media.

Wall and Peterson find nine events they perceive could affect the market's response to Continental Illinois and other large banks. The authors hypothesize how each event would change the value of purchased funds, the value of the overall loan portfolio, the value of Latin American debt, and the total effect. This process is necessary when analyzing the results of the cross-sectional regression later in the paper.

The data is obtained from Swary's 1986 paper in order to make comparisons between the results. Similar to Swary, four groups are established consisting of Continental, liability managed insolvent banks, insolvent banks, and solvent banks.

Results from the event study show that Continental experienced negative significant abnormal returns through almost all the events. The liability managed insolvent bank group experienced more significant negative abnormal returns than the other two groups.

Next, in order to determine the relationship between bank characteristics and the nine events, a cross-sectional regression is run where the standardized cumulative abnormal return is regressed against specific balance sheet and event variables. The results of the regression do not support the regulators' assertions that the bailout of Continental Illinois was necessary to avoid the failure of other large banks within the banking industry. However, the authors do not recognize the possibility that the preceding events could have dampened the impact of the TBTF announcement. Also, the authors contend that the bailout of Continental further weakens the mechanisms which allow the market to exert discipline on financial institutions.

2.4.1 Reasoning

This section shows that the TBTF doctrine significantly altered the market's valuation of both TBTF and a random sample of non-TBTF banks and BHCs (O'Hara and Shaw (1990)). It seems reasonable that if TBTF is expanded beyond the original eleven TBTF banks, there should be market revaluation for those banks the market perceives to be under TBTF coverage. The expansion of TBTF coverage, without a formal statement concerning its expansion, can be observed through the market's reaction to dividend cuts and omissions. This change in the market's reaction to dividend cuts and omissions is caused by a perceived change in the default risk of those new banks considered covered under the TBTF doctrine.

2.5 Bank Legislation and Too-Big-To-Fail

This section provides evidence that the TBTF doctrine impacts the valuation of banks under its protection. Moreover, the TBTF doctrine causes protected banks to engage in increased risk taking behavior.

A lack of clarity regarding which banks are to be covered under the TBTF doctrine can cause the market to revalue the securities of affected banks. Therefore, in order to analyze market reactions to dividend cuts and omissions, and its relationship with default risk, it is necessary to show this lack of clarity.

O'Hara and Shaw (1990) analyze the effects of TBTF on bank equity value. They seek to determine which banks are considered covered under the doctrine. The Comptroller of the Currency stated that the eleven largest banks are to be covered under the TBTF doctrine, but the Comptroller only has jurisdiction over nationally chartered banks. The question O'Hara and Shaw ask is: Did the market interpret that only nationally chartered banks are covered by the Comptroller and not state chartered banks?

When looking at raw returns from the eleven largest banks on the day of the Comptroller's statement before Congress (September 19, 1984), nine of the eleven banks experienced positive returns. Since raw returns are influenced by factors outside the firm, the authors used event study methodology as a means to isolate the TBTF doctrine. The sample consists of the ten TBTF banks mentioned in The Wall Street Journal sample (excluding Continental Illinois), plus fifty three other banks considered outside the protection of the TBTF doctrine. The results show that TBTF banks experienced significant positive abnormal returns on the event day, while non-TBTF banks experienced negative insignificant abnormal returns.

It was discussed earlier that the banks which have the riskiest portfolios will benefit most from the TBTF subsidy. Solvency ratios were established for every bank in the sample in order to determine if there is a positive correlation between risk and return. When correlation tests were run between TBTF and non-TBTF banks, a positive relationship exists between size and abnormal return for TBTF banks, while the opposite is the case for non-TBTF banks. In other words, those banks that are close to the TBTF cutoff paid the greatest costs from the introduction of the TBTF doctrine. When solvent and insolvent TBTF banks were compared using the same technique, riskier banks seemed to benefit most from TBTF

In another study, Kaufman (1990) analyzes the validity of regulatory fears that a large bank failure could reduce the availability of services and set off a series of bank failures that could affect the macroeconomy.

TBTF has been in practice since 1984, but the FDIC has modified TBTF three times since the Continental failure in an attempt to increase the number of creditors whose funds are at risk. The 1984 bailout of Continental Illinois did not allow uninsured creditors and depositors from the bank and the holding company to incur losses, but stockholders

were allowed to experience significant losses. In 1986, the default of First Oklahoma Corp permitted the bank to fail legally but did not allow creditors to incur losses. Another modification in the TBTF doctrine took place in 1988 when First Republic Corp was allowed to legally fail, and creditors of the bank's holding company incurred losses. The last modification occurred in 1989 when uninsured interbank depositors of MCorp were not completely covered. This action was authorized under Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) to impose costs on interbank deposits of affiliated banks. Kaufman proposes that the gradual modification of the TBTF doctrine to increase costs to uninsured depositors has not increased bank runs or contagions in the banking system.

In conclusion, Kaufman states the current application of TBTF is far less extreme than the original TBTF doctrine initiated after the Continental Illinois crisis. Modifications to the TBTF doctrine have proven that the fears surrounding the original initiation of the TBTF doctrine were exaggerated and unfounded.

The purpose of Wall's 1993 paper is to review the provisions of the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA). The primary goals of the FDICIA are to reduce systemic problems and bank regulatory incentives to follow a TBTF policy.

Systemic risk arises from a fear that a single bank failure could cause other banks to fail. The failure of a series of banks could interfere with the availability of financial services and reduce overall economic activity. The above scenario has been specifically attributed to the effects from a large bank failure.

A large bank failure can harm many non-bank customers, because interfering with the availability of services will inconvenience creditors and depositors. Reductions in the availability of credit, loss of confidence in certain financial markets and delays in payment systems can all be reflected in a large bank failure.

Although the reforms enacted by the FDICIA call for higher bank capital ratios and timely supervisory intervention, regulators are still allowed considerable flexibility when dealing with the failure of TBTF banks.

Even with the modifications enacted by the FDICIA, two unresolved issues remain: the effect of a large bank failure on financial markets and the effect of a sudden massive loss at one or more banks. With these unresolved issues, it may be necessary to continue using TBTF in order to maintain the efficient operation of financial markets. Wall contends that TBTF should be used to maintain the operational functions of large banks in order to keep markets functioning. But the complete coverage of uninsured creditors should not be included under TBTF. Regulators should use the TBTF doctrine to allow markets to gradually adjust to the adverse influences from a bank failure.

The three most commonly expressed concerns regarding large bank failures deal with interbank liabilities, contagious bank runs, and payment systems. The author states that the concerns associated with large bank failures have been historically overstated.

Cook (1993) looks at attempts by the regulatory authorities to deregulate/reregulate the banking industry and how these attempts have caused banks to behave differently (DIDMCA and Garn-St Germain). The author focuses on the 1980s for his analysis, because this decade is considered unique. Legislation to deregulate the banking industry provided financial institutions the opportunity to engage in increased risk-taking.

The sample consists of banks and savings institutions from all major exchanges. Each institution is matched with their accounting information from the previous year. The market model is used where both market and interest rate indices are incorporated into a three step procedure. The results from the three step procedure show a positive relationship between bank risk and bank size. The results support the

hypothesis that large banks during the 1980s engaged in riskier investments.

An interest rate index is formed in order to take into account the sensitivity of bank stock returns to market interest rates. The results show that the interest rate betas become larger, but they do not become progressively large over time. The interest rate betas have a positive relationship with stock returns. Thus, there is a negative relationship between stock returns and interest rates.

A cross-sectional regression is run where bank size is regressed against several bank specific variables. The results of the regression show that size is positively related to stock returns. This supports the hypothesis that the TBTF doctrine benefited large banks relative to small banks.

In determining whether banks actually increase the risk of their investments in order to take advantage of the deregulation of the 1980s, bank risk is regressed against activities that are considered risky. The results tend to support that large banks engaged in riskier investments during the 1980s.

Cook concludes that his results are consistent with the theory that acts to deregulated banking, including the TBTF doctrine, create incentives for large financial institutions to select riskier investments.

2.5.1 Reasoning

This section provides justification for analyzing the bank holding company's balance sheet in order to determine the portfolio incentives associated with the TBTF doctrine. Kaufman (1990) and Wall (1993) provide a theoretical explanation of the incentives of TBTF banks to undertake more risk as a means to extract the maximum subsidy from the TBTF doctrine. Cook (1993) provides an empirical tool to analyze the impact of TBTF on the asset asset composition of BHCs. Unlike Cook

(1993) who primarily emphasized the impact of deregulation by analyzing the asset composition of BHCs using year-end 1990 data, this dissertation will focus exclusively on the TBTF doctrine by applying Cook's model over the interval 1983-1985. Such a short observation window reduces possible contamination from deregulation and other events outside the TBTF doctrine.

The expansion of the number of banks to be covered under the TBTF doctrine should lead to a similar market reaction to that observed in O'Hara and Shaw's article. Expansion of the TBTF doctrine to previously uncovered banks, without formal statements regarding its expansion, should cause the market to attach probabilities to all bank holding companies regarding their probability of receiving complete depository coverage. The probability of receiving TBTF coverage should cause the default risk of all large bank holding companies to decline and should be observable in the market's reaction to dividend cuts and omissions.

2.6 Institutional Ownership

When looking at the market response to bank dividend cuts and omissions, it is necessary to incorporate the literature on institutional ownership. Institutions are large participants in the market for bank equity, and as a result, institutional ownership should be a factor when determining the market's response to dividend cuts and omissions. The crux of the argument is that if the TBTF doctrine has significantly altered the market's reaction to dividend cuts and omissions then there should be an impact on the behavior of institutional holders. By observing the institutional ownership along with market reactions to dividend cuts and omissions, some conclusions can be drawn regarding institutional perceptions of bank risk pre- and post-TBTF.

Arbel and Strebel (1983) analyze the performance of non-banking firms by forming portfolios based on the amount of analyst coverage.

Their study is an extension of an earlier paper in which they found that firms neglected by security analysts tend to perform better compared to those firms that were under strong scrutiny.

Three portfolios are formed using two criterion: the number of analysts regularly following the firm's securities and the number of analysts reporting earning forecasts. The sample consists of S&P 500 firms over a the period 1970-1979.

The results show that neglected firms perform better than the other two portfolios in nine of the ten years. Consistent with finance theory, neglected firms tend to have a higher variation in returns. However, even when each portfolio's return is adjusted by its appropriate risk level, the neglected firm portfolio still outperforms the more scrutinized portfolios.

In order to control for a small firm effect, the original three portfolios are segmented based on the degree of analysts' scrutiny and firm size. Even when size is taken into account, the results support the existence of a small firm effect. However the small firm effect disappears on a risk adjusted basis.

The authors conclude that what is being observed is different pricing based on the intensiveness and reliability of analysts' coverage. Securities intensively covered by analysts will tend to have higher stock prices and lower returns (relative to less intensive coverage). Investors tend to be willing to pay higher prices for securities they perceive to have more reliable information. Therefore, neglected firms' security prices are discounted using a higher discount factor, because their riskiness is higher due to less confidence and lack of information.

Moyer, Chatfield and Sisneros (1989) build upon the neglected firm theory by studying analyst monitoring activity with respect to the level of potential agency costs for commercial banks, utilities, and firms in other industries. Consistent with a Jensen and Meckling (1976)

framework, it is hypothesized that security analysts provide a monitoring role when agency problems exist. The role of analysts should be greatest in industries where the economic consequences from agency-related problems are most prevalent. Consistent with the above theory, inside ownership and firm growth should be positively related to the degree of outside monitoring. Higher monitoring activity can be used to reduce incentives in order to increase perquisite consumption associated with significant inside ownership along with the higher risk associated with rapid firm growth.

The model used regresses the number of analyst estimates against the proportion of stock held by insiders, the firm's growth in total assets, the percentage of long-term debt, the percentage of stock held by institutions, the market value of stock, volatility of earnings, and the dummy variables symbolizing whether the company is a commercial bank and S&L or utility. The sample period for the independent variables is 1984, while the dependent variable is from the following year. The authors hypothesize that the coefficient associated with the finance dummy variable should have a positive sign. It is stated that deposit insurance protects depositors against losses. However, deposit insurance increases the incentives of banks to increase the riskiness of their portfolios, thus putting equity holders at greater risk of default (not the case with too-big-to-fail).

In the results, all variables are significant in the model except the volatility variable. In conclusion, the authors find support for the hypotheses that analyst monitoring activity is used to reduce agency problems, and the interest in analyst monitoring is influenced by the information demands of investors.

Szewczyk, Tsetsekos and Varma (1992) analyze whether institutional stock ownership affects the capital market's reaction to new equity issues by industrial firms. By analyzing the market's reaction to new equity issues based on the degree of institutional ownership, an

additional hypothesis incorporating both institutional ownership and market reaction can be incorporated into the model. The authors postulate that one of management's concerns when dealing with institutional ownership is the price discount necessary to initiate the sale of new shares. There are three hypotheses that are presented in this paper. The first is the liquidity-reduction hypothesis which predicts that larger institutional ownership requires a larger price discount in order to initiate a new sale of common stock. This hypothesis is based on a downward sloping demand curve for a firm's securities. The second theory is the liquidity-enhancement hypothesis which states that institutions prefer the availability of more funds, because it adds to the stock's liquidity. This preference for liquidity will make the demand curve less inelastic and reduce the price discount needed to sell new shares. The third hypothesis is the information asymmetry, or asymmetry reduction hypothesis. If information asymmetries exist, investors will prefer more institutional ownership (asymmetry-reduction hypothesis). Under an asymmetric information framework, it is reasonable that the information content of a given firm's stock price will be positively related to the degree of institutional ownership. If there is a positive relationship between information and institutional ownership, it will be expected that the market reaction to new equity issues should be smaller the larger the institutional ownership. The smaller market reaction is based on investors being more informed prior to the new equity issue announcement.

The sample of stock offerings is taken from 1968 to 1984. All firms are listed on the New York and American exchanges. The final sample consists of three hundred and fifty-six public announcements. A standard event study methodology is used to measure abnormal returns.

Two regression models are run. One model is used to test price pressure hypothesis, and the other model is used to test the asymmetry-

reduction hypothesis. The only difference between the two models is that the price pressure hypothesis dependent variable is the announcement period abnormal return, and the asymmetry-reduction hypothesis dependent variable is the absolute value of the announcement period abnormal return. The independent variables in both models are the number of institutional holders, percentage of shares owned by institutions, and the size of the new offering.

The results of the regressions show a significant negative relationship between institutional ownership and the absolute magnitude of the abnormal return. This result supports the asymmetry-reduction hypothesis that higher degrees of institutional ownership are associated with smaller stock market reactions. The results of this paper are consistent with the neglected firm results found in the Arbel and Strebel (1983) paper.

2.6.1 Reasoning

It is important to determine if the market for bank equity perceive changes in the default risk of large bank holding companies due to the introduction of the TBTF doctrine. The hypotheses associated with the institutional ownership literature are the: (1) monitoring activity hypothesis, (2) information asymmetry hypothesis, and (3) neglected firm hypothesis. All of these hypotheses draw a relationship among the amount of institutional ownership, analyst activity, and/or abnormal returns.

By analyzing the impact of institutional ownership on the market reaction to bank dividend cuts and omissions, some motivation for differing market responses can be determined from the above hypotheses. Institutional ownership is a proxy for both information quality and quantity. Institutional investors use various sources of information, such as analysts' forecasts, to obtain information on securities. Current information allows institutions to react to information

(anticipated and actual) quicker than other investors. This ability to obtain and react to information will dampen the market's response to dividend cuts and omissions, as institutions react to information prior to the official announcement.

2.7 Bank Risk

In the second empirical section of this dissertation, bank operating behavior is observed over a three year period (1983-1985) to determine if the too-big-to-fail doctrine caused banks to change their operating behavior. Similar to what has been observed with deposit insurance, complete depository coverage should create incentives for large banks, and banks that have an opportunity to be included within the TBTF category, to increase their operating and portfolio risk. There has been only one article that has attempted to empirically observe changes in portfolio risk due to TBTF [Cook (1993)]. However, due to similarity in the incentives that are created with the introduction of deposit insurance, the empirical methodology in the deposit insurance literature can be applied to TBTF and bank risk.

Kim and Santomero (1988) use a theoretical model to show the incentives associated with increased risk taking in an fixed deposit insurance system. The authors contend that the use of fixed-rate deposit insurance rewards risk taking by insulating banks from market discipline. Regulation can be used to encourage banks to engage in non-risk seeking activities by switching to the following: market value accounting, risk based deposit insurance premiums, and additional capital regulation.

Under the present fixed rate deposit insurance system, regulators require banks to maintain a desired equity-to-asset ratios, and regulators use periodic exams in an attempt to reduce bank risk seeking activities and to reduce the probability of insolvency. However, banks can reach higher levels of risk/return by meeting the equity-to-asset

ratios established by the regulators while obtaining riskier assets in the short run. The difficulty in evaluating the asset portfolio risk of large BHCs makes this strategy optimal only in the short run. In the long run, regulators will be able to evaluate the riskiness of any BHC's portfolio, thereby limiting the ability of BHCs to increase portfolio risk.

Risk related capital requires banks to use more capital to finance risky investments and to support off-balance sheet activities. Risk weights are needed for each banking activity in order for this plan to be effective. Theoretically, by establishing the appropriate risk weights for each banking activity, the benefits from engaging in increased portfolio riskiness can be nullified. As a result, regulators are able to keep insolvency risk at acceptable levels by reducing the amount of risk in the bank's portfolio.

Avery, Belton and Goldberg (1988) build upon Kim and Santomero (1988) by analyzing the use of subordinated notes and debentures (SNDs) to impose market discipline on banks. The authors analyze the default-risk premium on SNDs in order to determine if market and regulatory perceptions of risk are consistent. Also, Avery, Belton and Goldberg seek to determine whether market discipline imposed through SNDs is consistent with bank regulatory objectives.

The authors contend that SND holders are a source of market discipline, because holders of these instruments are subject to a larger risk of loss when compared to uninsured depositors. The larger risk of loss, and their junior status, make SND holders more sensitive to bank insolvency risk.

The sample used in the study consists of one hundred and thirty-seven SND issues from seventy-one bank holding companies over the time period 1983 and 1984. The dependent variable is the average premium of all outstanding SND issues for each holding company per year. A list of

balance sheet, income statement, and debt specific independent variables are obtained for each holding company.

First the authors determine the risk premiums of the various debt issues by comparing them to accepted default risk measures (Standard and Poor's, Moody's and FDIC Index). The FDIC index is a weighted average of several ratios computed from the institution's statement of condition and income reports. These ratios reflect the regulators best estimates of factors influencing the bank's risk. The authors find a positive relationship between risk premium and risk rating by S&P and Moody's. However, the positive relationship observed with S&P and Moody's is not consistent with the FDIC Index.

A generalized least squares regression is estimated where the default risk measures are used as dependent variables. The results show that the sale price and length of maturity are the driving variables in these models. Also, contrary to previous literature, there appears to be very little relationship between balance sheet variables and the market's assessment of default risk.

In conclusion, the authors find support that risk premiums on bank related SNDs are unrelated to traditional accounting measures on bank performance and the index proposed by the FDIC.

2.7.1 Reasoning

As stated above, only Cook (1993) has attempted to determine the relationship between bank risk taking behavior and deregulation, including the TBTF doctrine. If TBTF gives banks complete depository coverage on all accounts, then the theories associated with risk taking behavior under partial depository coverage should apply.

It has been shown in the deposit insurance literature that banks have an incentive to increase asset risk in order to increase the subsidy associated with having deposit insurance [Kim and Santomero (1988) and Avery, Belton and Goldberg (1988)]. This depository

guarantee allows banks to disassociate the cost of capital with the riskiness of their asset portfolio. TBTF coverage expands the range of financing that is covered under this depository guarantee by insulating the firm from a source of failure.

By incorporating asset risk variables that are considered risky from the deposit insurance literature, these same variables can be used to observe bank risk changes over time due to the introduction of the TBTF doctrine.

2.8 Bank Efficiency

The third empirical section of this dissertation analyzes changes in BHC efficiency due to the introduction of TBTF. As of today, no other study is known to have combined both bank efficiency and TBTF. This dissertation is the first to look at the impact of regulatory change on the operating efficiency of financial institutions. Since there is no literature combining both efficiency and the TBTF doctrine, the important literature in the bank efficiency area is discussed in this section.

DeYoung (1993) and Shaffer (1993) analyze the pre- and post-firm efficiencies of bank mergers by using a thick frontier technique. Both studies attempt to determine if bank mergers are used as a means to convert cost inefficiencies into cost savings. Previous literature has noted that scale economies in banking tend to be positively related to firm size. As a result, bank mergers may be used to take advantage of size induced scale economies by engaging in mergers.

Berger and Humphrey (1991) use a thick frontier cost function to examine bank efficiency, and seek to observe the impact of deregulation on all banking institutions, regardless of size. It is contended that deregulation makes banking more competitive. Increased competition causes banks of all sizes to reduce costs, merge with more efficient banks, or exit the industry.

For all insured commercial banks, the time period examined is 1984.. The results show that inefficiencies are greatest among small banks. Further segmentation of the sample shows that differences in the factors causing inefficiency occur between branch and unit banking states. Banks residing in branch banking states have inefficiencies driven by operating costs, while unit banking banks' inefficiency is driven by interest on purchased funds. Both branch and unit banking banks have a majority of their inefficiency derived from operating costs. Further inefficiency from operation is caused by the overuse of labor and physical capital. The authors conclude that increased competition from deregulation will pressure banks that are inefficient, relative to banks of similar size and product mix, to cut costs, merge with more efficient banks, or exit the industry.

DeYoung examines a sample of three hundred and forty-eight mergers approved by the Office of the Comptroller of the Currency in 1987 and 1988. The banks in the sample vary in size. DeYoung observes that both target and acquiring bank are relatively cost inefficient when compared to a group of peer banks. However, in roughly half of the non-purchase and assumption (P&A) mergers, relatively more efficient acquiring banks obtained a less efficient target.

Additionally, the results showed that, in general, mergers do not cause a reallocation of cost efficiencies toward the acquiring bank. However, there appear to be some efficiency gains from non-P&A mergers if the merged firm survives three years after the merger. DeYoung concludes that efficiency gains are related to the amount of inefficiency present in both acquirer and target prior to the merger.

Shaffer uses a different approach to analyze bank efficiency by simulating bank mergers. In his sample, only banks that have assets exceeding \$1 billion for the time period 1984 to 1989 are included. Shaffer finds that 50 percent of the predicted mergers reduced costs. Of the cost reducing mergers, 99 percent of those mergers were inter-

state mergers. The author concludes that differences in complementary product mixes, result in cost reductions. Thus, the results of this study are that product mix effects transfer benefits to merging banks.

Berger, Hancock and Humphrey (1993) use a profit function to examine bank efficiency. The time period studied is 1984 to 1989 for commercial banks where complete data could be obtained. Their study allows for joint determination of whether the bank's input and output is optimal. This procedure does not take into account the bank's existing profitability, because the bank is assumed to be operating under a sub-optimal profit scenario.

The results show that banks operate at differing levels of efficiency based on whether they reside in a unit banking, limited and statewide branching state. In all three cases, it is found that banks are producing less of an output, or employing more of an input, than a hypothetically fully efficient firm (technical inefficiency). However, the type of technical inefficiency banks experience tends to be related to the branching requirement within the residing state. Further segmentation of technical inefficiency shows that output inefficiencies tend to dominate over input inefficiencies. Also, size segmentation shows that inefficiencies tend to be substantially larger for smaller banks.

2.8.1 Reasoning

The bank efficiency literature has not yet explored the impact of the TBTF doctrine, or any regulatory event, on the efficiency of banks or BHCs. However, the literature presented above does provide justification for exploring this issue in an efficiency framework.

The TBTF doctrine is expected to alter the operating policy of banks and BHCs. If possible both TBTF and non-TBTF banks should attempt to change their operating activities in order to take advantage of a regulatory induced subsidy that is only given to those BHCs that are

perceived to be covered under the TBTF doctrine. If BHCs are no longer strictly following a profit maximization motive, then the relative efficiency of those BHCs should decline. Increases in bank inefficiency should also be observed through the increase in system-wide risk within banking. Increased risk within the system should increase bank inefficiency even if the incentives to change investment strategy did not exist.

Berger and Humphrey (1991), DeYoung (1993) and Shaffer (1993) provide the empirical justification to explore inefficiencies in this section of the dissertation. DeYoung and Shaffer analyze the impact of bank mergers on bank efficiency, while Berger and Humphrey analyze the impact of deregulation on efficiency. The empirical models used in these papers will be altered in order to be applied here.⁵ The DeYoung and Shaffer articles use a translog cost function; however, where a multi-product cost function will be applied in this dissertation.⁶

The dominance of output inefficiencies in the Berger, Hancock and Humphrey sample provides encouragement that BHCs may be increasing certain operating activities in order to become a TBTF bank (see section 4.5 in Chapter 4). Also, it is hypothesized that smaller BHCs residing in states that have more restrictive branching laws may find it more

⁵Problems associated with the translog functions have produced papers by Mayo (1984) and Roller (1990), Pulley and Braunstein (1992) and Saxena (1993) which use a multi-product quadratic cost function. The benefits associated with the multi-product cost function are the ability to model cost behavior with zero outputs, does not impose separability conditions and is more desirable when examining multi-product firms with linearly homogeneous input price structure.

⁶The translog function is flexible enough to accurately determine between economies and diseconomies, along with interdependencies between bank products. The translog function is an improvement on the Cobb-Douglas function in the specification of bank production. Primarily, a U-shaped long run average cost curve is not possible in a Cobb-Douglas framework.

difficult to achieve the TBTF threshold through an asset growth strategy. Higher levels of inefficiency for smaller banks residing in states that have more restrictive branching laws provides encouragement that TBTF may be an unexplored contributor to these results.⁷

⁷Literature measuring the degree of inefficiency in other regulated industries like utilities has not been found. As a result, a comparison cannot be made between the amount of inefficiency between regulated industries.

CHAPTER 3

DATA COLLECTION

In this chapter, a discussion of the data used in the three empirical components of the dissertation is presented. The data is discussed in the context of market reaction to the to the following: TBTF doctrine, market reactions to dividend cuts and omissions, changes in BHC asset composition, and changes in BHC efficiency.

3.1 Data Description

3.1.1 Market Reactions to the Introduction of the TBTF Doctrine

IF they were in existence as of the announcement of the TBTF doctrine, all BHCs identified on the CRSP tapes are candidates to be included in the sample. It is postulated that the introduction of the TBTF doctrine has caused not just the eleven largest bank holding companies to derive positive price appreciation.⁸ If the Comptroller's statement was taken literally by the market, then only the eleven largest BHCs would experience significant price appreciation. When the abnormal returns from the event study are regressed against asset and risk variables, asset size should be found to be positively related to the market's reaction. If the market does not believe that size is the only criteria used in determining which banks are to receive TBTF coverage, then the event study will show that banks beyond the eleven

⁸The eleven TBTF BHCs mentioned in the Wall Street Journal following the Comptroller's announcement are BankAmerica, Bankers Trust, Chase Manhattan, Chemical Bank, Citibank, Continental Illinois, First Chicago, J.P. Morgan, Manufacturers Hanover Trust, Security Pacific and Wells Fargo.

largest will receive positive price appreciation and size will not be a significant variable in the cross-sectional regression.

In order to determine which BHCs receive positive price appreciation from the introduction of the TBTF doctrine, all publicly held BHCs are extracted from the CRSP tapes as of September 19, 1984. There are one hundred and seventy-seven BHCs on the CRSP tapes, of which one hundred and twenty-three are NASDAQ firms, and fifty-four are NYSE/AMEX firms.

The variables used in the cross-sectional model comes from the bank failure, Continental Illinois, and TBTF literature. The independent variables are included in the model to help explain asset size, asset composition and risk factors which may explain differing market reactions to the TBTF doctrine. The independent variables used in the model are real estate loans, commercial and industrial loans, foreign loans, capital, negotiable certificates of deposits, deposits less than \$100,000, agricultural loans, total assets, loans to banks, letters of credit, consumer loans, and provision for loan losses. Summary statistics are provided in table 1 for all the variables. All of the independent variables from the cross-sectional model are collected from the Federal Financial Institutions Examination Call and Income Reports. After matching the BHCs obtained from the CRSP tapes with the holding company codes from the Call Report tapes, there were one hundred and three BHCs that were found to be consistent between the two tapes.

3.1.2 Market Reactions to Dividend Cuts and Omissions

For this section of the dissertation, all bank holding companies that are identified on the CRSP tapes, and have not been classified as a "too-big-to-fail" bank in O'Hara and Shaw (1990), are possible candidates for the analysis. By excluding the eleven TBTF banks mentioned in the Wall Street Journal sample of O'Hara and Shaw (1990),

the sample is left with only BHCs that are considered outside the TBTF category or non-TBTF BHCs.

For these non-TBTF banks, the CRSP tapes are used to determine those BHCs that experienced dividend cuts and omissions during the time period 1974-1991. All listed dividends are adjusted for stock splits and stock dividends. After adjusting for stock splits and stock dividends, the dates and names of those non-TBTF BHCs that experienced dividend cuts and omissions are identified.

The Wall Street Journal Index is used to verify the dates and names of those non-TBTF BHCs that experienced dividend cuts and omissions. Only those BHCs that had publicly announced dividend cuts and omissions are included in the sample.

The Wall Street Journal Index is also used to determine if any of the BHCs experienced other firm specific information during a 5 day period centered around the dividend announcement. If any of the BHCs in the sample experienced other information releases during the 5 day period centered around the dividend announcement, they are excluded from the analysis. The exclusion of BHCs that had other information releases during the dividend announcement period allows the event study to observe the impact of the TBTF doctrine on the market's reaction to dividend cuts and omissions without any contaminating information or events.

BHCs are also eliminated from the sample if that BHC experienced more than one dividend cut or omission within a 200 day period following their previous dividend cut or omission. If a BHC experienced more than one dividend cut or omission within a 200 day period, the first dividend cut is retained and the subsequent dividend cuts are omitted from the sample.

Based on the screens in this section, there are 94 BHCs that announced dividend cuts and omissions during the time period 1974-1991. There are 74 firms in the sample that have first time dividend cuts only

and there are twenty firms that experienced more than one dividend cut. Of the ninety-four firms in the total sample, forty-eight are NASDAQ firms and forty-six are NYSE/AMEX firms. Thirty-eight cuts (22 NASDAQ and 16 NYSE/AMEX) and omissions occur during the pre-TBTF period, and fifty-six (26 NASDAQ and 30 NYSE/AMEX) occur during the post-TBTF period.

The variables used to differentiate the market's reaction to dividend cuts and omissions between the pre- and post-TBTF periods are total assets, number of institutional investors, and relative shares held by institutional investors. The institutional ownership, Continental Illinois, and TBTF literature provide the rationale behind using these variables. Table 9 presents summary statistics for the entire sample, as well as for the pre- and post-TBTF periods, and indicates significant differences between the periods. Information on BHC total assets were collected from the Moody's Bank and Finance Manuals. The total asset variable is deflated into 1991 dollars in order to make comparisons between the pre- and post-TBTF periods. Of the ninety-four total dividend cuts and omissions, total assets information could be obtained for sixty of the ninety-four BHCs. The mean total asset size for the entire sample is \$15.638 billion. Total asset size in the post-TBTF period is \$17.147 billion, and the difference between the pre- and post-TBTF periods is significantly different at the 5 percent level. This results from using a difference in means test (pre-TBTF total asset size of \$8.670 billion).

The difference in means test indicates that BHCs that cut and/or omit their dividends are considerably larger after the introduction of the TBTF doctrine as compared to the dividend cutting group before the introduction of TBTF. This result is consistent with the hypothesis that the expansion of the applicability of the TBTF doctrine has caused the information contained in dividends to have been fundamentally changed.

The institutional involvement variable shows that the average number institutional holders owning shares is 84.81, and the average relative share held by institutions is 30.93 percent. The average number of institutional investors, and the relative shares held by institutions during the pre-TBTF period, are 47.93 and 19.94 percent. The average number of institutional investors, and the relative shares held by institutions during the post-TBTF period, are 110.92 and 38.70 percent. In both cases, the institutional involvement variables during the post-TBTF period are significantly larger than the same variables during the pre-TBTF period.

The difference in institutional involvement is an indication of two possible occurrences. First, the amount of institutional involvement during the period 1974-1991 has followed an upward trend. Second, increased involvement in the post-TBTF period may be attributed to institutional investors moving toward safer investments as the market perceives a reduction in default risk for large BHCS due to the expansion of the TBTF doctrine.

In order to determine if the increased institutional involvement in financial institutions are due to a general market increase in institutional involvement or a movement by institutions toward higher quality securities, a difference in means test is performed. The relative shares held by institutions are collected for a random sample of BHCs and S&P 500 firms for the time periods 1974 and 1991. The results show that the change in institutional ownership was significantly greater for the sample of BHCs. This result supports that institutional involvement increased in the securities of BHCs, relative to the market. It follows that institutions increased involvement in the securities of BHCS is consistent with a movement toward safer, and higher quality investments.

3.2 Changes in BHC Asset Composition

This section of the dissertation analyzes changes in BHC asset composition. It is postulated that there are benefits associated with being a TBTF bank. The benefits revolve around the reduction in the cost of capital - such that the cost of capital is no longer reflective of the firm's asset portfolio risk. It is hypothesized that there are two possible strategies which will allow a firm to become a TBTF bank. One strategy recognizes a literal interpretation of the Comptroller's statement regarding asset size as the stated criteria for determining who is considered TBTF (asset growth strategy).

The second strategy recognizes that other factors may be deemed important by regulators when making the TBTF determination. The periphery growth strategy looks at the relative importance of the financial institution with respect to the financial system. Each one of these strategies require the financial institution to engage in different asset growth strategies in order to achieve the TBTF objective.

The Federal Financial Institutions Examination Call and Income Reports are used to obtain the necessary data for this section of the dissertation for the time period 1983-1985. Once the data is collected, variables are classified as either asset or peripheral growth variables. It is expected that the asset growth variables will be positively related to asset size and the peripheral growth variables are expected to be negatively related to asset size. The classification of variables into either the asset growth or periphery growth strategies is based on recent literature in the deposit insurance and too-big-to-fail areas [Kim and Santomero (1988), Avery, Belton and Goldberg (1988), and Wall (1993)].

The dependent variable is BHC asset size. Asset size reinforces the emphasis regulators have in protecting the investments of claimants. Variables that are classified as asset growth regression variables are

real estate loans, commercial and industrial loans, loans to foreign governments, bank capital, negotiable certificates of deposits, deposits of less than \$100,000, consumer loans, and agricultural loans. Variables classified as peripheral growth variables are foreign exchange contracts, loans to depository institutions, letters of credit, and negotiable certificates of deposit.

It is also necessary to include a binary variable to take into account factors impacting the BHC's decision regarding which strategy to follow. A variable representing whether the BHC is a one- or multi-BHC will help determine the ability of the holding company to attain additional financing in order to achieve either an asset or periphery growth strategy. It is assumed that there should be a positive relationship between the size of the BHC and whether the BHC is a multi-BHC.

In order to compare dollar amounts equally, all variables in the model are deflated into 1991 dollars. Also, all independent variables are divided by the BHC's deflated total asset amount for the respective year. As a result, all summary statistics represent that variables amount as a percentage of total assets.

In order to observe the impact of the TBTF doctrine to the investment incentives of BHCs, a binary variable is created to represent the time period following the TBTF doctrine (1984 and 1985). The TBTF binary variable is interacted with the independent variables in the model. Also, in order to represent the difference in asset size following the introduction of the TBTF doctrine, the TBTF binary variable is included in the model by itself.

Lastly, the sample of BHCs is divided into two groups based on whether the BHC has publicly traded common stock. The total number of BHCs that have publicly traded common stock is one hundred and sixteen. Summary statistics for the BHCs are provided in table 12.

3.3 Changes in BHC Efficiency

This section of the dissertation analyzes changes in BHC efficiency due to the introduction of the TBTF doctrine. It is postulated that the TBTF doctrine has affected the operating incentives of BHCs. Based on the discussion in section 3.2 of this chapter, BHCs that are not members of the TBTF category will undertake one of two possible strategies in order to become TBTF. The emphasis of BHCs toward becoming TBTF should reduce the efficiency of financial institutions, because the emphasis in becoming a TBTF bank is an added variable in the firm's operational structure. The emphasis of the financial institution to become a TBTF bank should move the firm away from its most efficient operational form and towards an operational form that is less than optimal.

As discussed previously, increases in inefficiency should also result due to an increase in overall banking risk that is associated with the introduction of the TBTF doctrine. In other words, even if the incentives associated with changing the BHC's investment strategy does not entice the BHC to put forth those incentives into action, an overall increase in inefficiency should still occur following the TBTF doctrine.

The variables in this section come from the Call and Income Reports. The time period is 1983 to 1985. An observation period of 3 years allows for an adequate period in which to analyze BHC inefficiency prior to the introduction of the TBTF doctrine. This occurs without observing the impact of other regulatory actions which could influence the bank's efficiency.

The variables used in the multi-product quadratic cost function are consistent with the intermediation approach where dollar amounts of the various products offered by the bank are included in the model. Under the intermediation approach, outputs are defined as earning assets. The value-added criterion is presented by Berger, Hanweck and Humphrey (1987). Here a product is considered an output if consumers

value the product more highly in the form produced by the bank than if consumers produced the same product themselves. The dependent variable in the model is the total cost of the BHC. Total cost is defined as both operating and interest expense. Independent variables in the model that are classified as outputs are real estate, agricultural loans, commercial and industrial and consumer loans. Cost variables are identified as inputs that are also included in the model. These inputs are loanable funds, wages, and physical capital. The cost of loanable funds is defined as total interest expense, divided by total interest bearing deposits. Total salary expense plus employee benefits divided by the number of full-time equivalent employees, comprise the cost of wages variable. The cost of physical capital equals total rental costs and other fixed costs divided by total deposits.

All non-binary variables are deflated into 1991 dollars in order to take into account inflationary effects over the time period 1983-1985. By deflating the non-binary variables into 1991 dollars, changes in efficiency can be truly attributed to the TBTF doctrine.

A binary variable representing whether the BHC is a one-bank or multi-bank BHC is also included in the model. The binary variable will help distinguish between differences in cost structures that are related to the BHCs operational form.

Similar to the previous section, the entire sample of BHCs is divided into two groups based on whether the BHC has publicly traded common stock. Summary statistics for both BHCs with publicly traded and non-publicly traded common stock are presented in table 28.

CHAPTER 4

METHODOLOGY

There is very little literature that tests the market's and bank holding companies' reactions to the introduction of too-big-to-fail. Most studies in this area have examined the impact of the Comptroller of the Currency's statement on the security price of the original eleven TBTF banks by using an event study methodology around the announcement date [Swary (1986) and O'Hara and Shaw (1990)]. Event studies are viable as a means to test a particular event. A cross-sectional time-series model is also used to observe changes in asset composition surrounding the TBTF announcement. Lastly, a multi-product quadratic cost function is used as a means to observe changes in bank inefficiency. Cost functions have previously been used in the banking literature, but this dissertation is the first to analyze the change in efficiency due to a regulatory event.

4.1 Market Reaction Determinants

A standard two-index market model is the first method used to determine the market's reaction to the introduction of the TBTF doctrine and to BHC dividend cuts and omissions. In the case of the market's reaction to the introduction to the TBTF doctrine, the market model is used to ascertain whether the market reacted literally to the Comptroller's announcement that only the 11 largest BHCs mentioned by the Wall Street Journal in the O'Hara and Shaw (1990) paper were to receive complete depository coverage. The other part of this section uses the market model to determine if the market reacted differently to dividend cuts and omissions by large BHCs in the pre- and post-TBTF periods.

The two-index market model is the method used to calculate abnormal returns. The first index is the daily stock market return from

an equally-weighted CRSP index. The second index uses the daily yield on 10 year U.S. Treasury bonds. This accounts for the interest sensitivity of financial institutions' portfolios and returns [Mikkelsen and Partch (1986)].

Excess returns are calculated for each BHC over a 180 day window, from day -200 to day -21. The estimated regression coefficients are adjusted using the Scholes-Williams [1977] technique for non-synchronous trading. Daily returns are calculated as:

$$R_{it} = \alpha_i + \beta_{1i}R_{mt} + \beta_{2i}R_{bt} + e_{it} \quad (1)$$

where

t = day measure relative to an event,

R_{it} = daily stock return for the market is represented by the equally weighted CRSP index for day t ,⁹

R_{mt} = daily U.S. treasury bond return for day t ,

R_{bt} = daily interest measure is represented by the return on 10-year U.S. Treasury bonds for day t and,

α_i , β_{1i} and β_{2i} = estimated coefficients from the market model using an 180 day estimation window.

Using the estimated regression coefficients α_i , β_{1i} and β_{2i} , the abnormal return for firm i on day t is calculated:

$$AR_{it} = R_{it} - [\alpha_i + \beta_{1i}R_{mt} + \beta_{2i}R_{bt}]. \quad (2)$$

The two day excess return can be determined around the event date ($t = -1, 0$) and is defined as:

$$AR_{-1,0} = (1/N) \sum AR_{it} \quad (3)$$

⁹An equally weighted index is constructed using the NYSE/AMEX and NASDAQ equally weighted indexes.

where N is the number of BHCs used in the market model that are on the CRSP tapes at the time to the TBTF doctrine was introduced (first part) or N is the number of BHCs that are used in the market model that have experienced dividend cuts and omissions.

4.2 Market Reaction to the Introduction of the TBTF Doctrine

The event study is conducted for the BHCs that have publicly traded common stock at the time of the introduction of the TBTF doctrine. This sample of BHCs should provide evidence as to whether the market literally interpreted the Comptroller's statement stating that the eleven largest banks would receive complete depository coverage. If the market literally interprets the Comptroller's statement, then it is expected that only the eleven largest banks would experience significant positive price appreciation due to the Comptroller's announcement. A significant market reaction beyond the eleven largest banks following the Comptroller's statement is an indication that the market perceives size is not the only criteria used by federal regulators when making their determination regarding who will receive TBTF coverage.

If the results from the event study show that the Comptroller's statement was not taken to apply to just the eleven largest banks, justification is provided to further explore this issue. This is done through a cross-sectional regression where the two-day standardized abnormal returns for each BHC is regressed against asset size, along with certain risk and asset variables.

The market's reaction to the introduction of the TBTF doctrine is postulated as being associated with the following variables¹⁰:

¹⁰Swary (1986), Lamy and Thompson (1986), Kaufman (1990), O'Hara and Shaw (1990), Wall and Peterson (1990), Dickinson, Peterson and Christiansen (1991) and Wall (1993).

$$\begin{aligned}
SAR_{-1,0} = & \beta_0 + \beta_1 RE + \beta_2 CI + \beta_3 FL + \beta_4 CAP + \beta_5 NCD + \beta_6 DEP + \\
& \quad \quad \quad (+) \quad (+) \quad (+) \quad (-) \quad (+) \quad (?) \\
& \beta_7 AG + \beta_8 TA + \beta_9 BL + \beta_{10} LET + \beta_{11} C + \\
& \quad \quad \quad (?) \quad (0) \quad (+) \quad (+) \quad (?) \\
& \beta_{12} LOSS + \beta_{13} MBHC + \varepsilon \quad (4) \\
& \quad \quad \quad (+) \quad (?)
\end{aligned}$$

where,

SAR_{-1,0} = the two day standardized abnormal return calculated in the event study,

RE = total real estate loans divided by total assets,

CI = total commercial and industrial loans divided by total assets,

FL = total foreign loans divided by total assets,

CAP = total bank capital divided by total assets,

NCD = total negotiable certificates of deposits divided by total assets,

DEP = total deposits less than \$100,000 divided by total assets,

AG = total agricultural loans divided by total assets,

TA = total assets,

BL = total loans to other depository institutions divided by total assets,

LET = total letters of credit divided by total assets,

C = total consumer loans divided by total assets,

LOSS = total provision for loan losses divided by total assets,

MBHC = binary variable where multi-bank BHC equals 1 and 0 otherwise.

The total asset variable in the cross-sectional model shows the relationship between asset size and the market's reaction. If the market interpreted a literal interpretation of the TBTF doctrine, two possible results could occur. It is expected that BHCs protected under the TBTF doctrine should receive positive price appreciation, while BHCs outside the protection of the TBTF doctrine will either experience negative change, or no change, in security price. In other words, it is possible that the asset size variable be either statistically insignificant or significantly positive, depending on the market's

reaction to the group of non-TBTF BHCs. If the market has not taken the Comptroller's statement literally, again two possible results could occur. If the market perceives that all BHCs with publicly traded equity have an increased probability of receiving TBTF coverage, then both TBTF and non-TBTF banks will receive positive price appreciation. If the market perceives that there is either an asset size cut, or some other criterion regulators use when making their determination regarding who is to receive TBTF coverage, then the asset size variable will be statistically insignificant. In order to obtain a clearer picture of the relationship between asset size and the market's reaction it is necessary to divide the data into asset size quartiles.

Swary (1986) and O'Hara and Shaw (1990) have explored the importance of asset portfolio riskiness as a variable of importance for BHCs that are protected by the TBTF doctrine. However, if the results from the event study show that the market perceives the TBTF doctrine as extending beyond the eleven largest banks, then perhaps the riskiness of the asset portfolios of the BHCs within the sample could be a variable of importance.

As a result, it would be expected that if asset portfolio risk is a significant variable, there should be a positive relationship between the variables in the model that are used as indicators of portfolio risk (foreign loans, capital ratio, real estate loans, commercial and industrial loans, and provision for loan losses) and the two day standardized abnormal return. If portfolio risk is not an indicator of what the market's perceives as an important factor in federal regulator's decisions regarding who receives TBTF protection, then these variables should not be statistically significant.

Kaufman (1990), Wall and Peterson (1990) and Wall (1993) have stated that regulators may view factors other than asset size as important when determining which bank is to receive TBTF coverage. Regulators may view factors such as payment systems, interbank

liabilities, and foreign exchange contracts important enough to prevent a bank from failing. It is assumed that banks with the ability to cause significant disruptions to other financial institutions and systems have a higher probability of being protected under the TBTF doctrine.

The variables which proxy for potential financial disruption are bank loans to other financial institutions, letters of credit, and negotiable certificates of deposits. It is expected that if the market perceives that potential financial disruption is an important factor when deciding who receives TBTF coverage, then there should be a positive relationship between the market's reaction and the variables proxying for potential financial disruption.

The above model is divided into asset quartiles to determine if the market perceives that the Comptroller's statement regarding the importance of asset size is correct. The use of asset quartiles will provide insight into whether the market perceived the actual number of banks to be protected under the TBTF doctrine to be larger than that stated by the Comptroller.

4.3 Market Reaction to Dividend Cuts and Omissions

The event study is used to examine whether the abnormal returns from the pre- and post-TBTF period are associated with the following variables:

$$AR_{-1,0} = f(TA, INST, RSHR) \quad (5)$$

(? - -)

where

AR_{-1,0} = the two day abnormal return calculated in the event study,

TA = the BHC's total assets deflated to 1991 dollars,

INST = number of institutional investors holding shares in the BHC,

RSHR = number of shares held by institutional investors divided by the total number of shares the BHC has outstanding.

The event study is conducted on a sample of BHCs originally considered outside the protection of the TBTF doctrine. In order to determine if the TBTF doctrine was perceived to have a broader applicability beyond the eleven largest banks, only those non-TBTF BHCs that experienced dividend cuts and omissions are included in the sample. If the market literally interpreted the Comptroller's announcement, there should be no significant difference in the market's reaction to dividend cuts and omissions between the pre- and post-TBTF periods for the group of non-TBTF banks. However, differences in market reaction between the pre- and post-TBTF periods may be attributed to the Comptroller's announcement.

4.3.1 Too-Big-To-Fail (TBTF)

In the event study model, the too-big-to-fail doctrine date is used as a demarcation point to analyze differences in market reactions to dividend cuts and omissions. The September 19, 1984 announcement by the Comptroller of the Currency is the point where market comparisons will be made. There are two hypotheses that are tested:

(1) TBTF variable is insignificant

An insignificant difference in the market's reactions pre- and post-TBTF is consistent with the TBTF doctrine having no systematic influence on the market's perception of the traditional view of bank dividend cuts and omissions. Since the banks in the sample exclude the eleven largest banks, an insignificant change in the market's response to dividend cuts and omissions can be interpreted in two ways: (1) the TBTF doctrine has no impact on the market's perception of bank default risk, or (2) the market perceives that TBTF coverage is only applied to the eleven largest BHCs.¹¹ If the TBTF doctrine is only applicable to

¹¹None of the TBTF banks that have cut or omitted their dividends are represented. Only non-TBTF banks that did not experience other information releases during the event window are represented.

TBTF banks, banks outside the protection of the TBTF doctrine should experience no significant change in market reaction pre- and post-TBTF.

(ii) TBTF variable is significant

A significant market reaction for the sample of non-TBTF banks that have experienced dividend cuts and omissions is attributed to anticipation by the market of those BHCs that will actually receive TBTF coverage. This would cause the market to react to dividend cuts and omissions less severely. If the market attached non-zero probabilities to all large banks regarding their probability of receiving TBTF coverage, then the market reactions pre- and post-TBTF should be significantly different. The difference in market reaction between the pre- and post-TBTF periods should result in a less severe or less negative market reaction to dividend cuts.

4.3.2 Number of Institutional Holders (INST) and Relative Number of Shares held by Institutions (RSHR)

In order to determine the importance of institutional holders and the market's reaction to dividend cuts and omissions, two variables are created. The INST variable represents the percentage of shares held by institutional investors in the bank holding company during the month of the dividend announcement. The RSHR variable represents the holdings of institutions divided by the number of shares the holding company has outstanding at the time of the dividend announcement.

There are three hypotheses that can be tested by the statistical significance of either one of these variables. The significance of the INST and RSHR variables will lead to the rejection of either, all, or none of the hypotheses.

(i) Monitoring activity hypothesis

The monitoring activity hypothesis suggests that security analysts monitor the firm to control agency costs occurring due to the separation of ownership and management. This monitoring activity reduces the

incentives while increasing the costs to management for engaging in perquisite consumption.

Institutional investors use analysts who have specialized abilities in gathering information to monitor firms. Thus, the implication is these investors require monitoring beyond that provided by regulators. The need for monitoring is further enhanced by the presence of deposit insurance. Deposit insurance creates incentives for banks to increase asset risk [Kim and Santomero (1988) and Avery, Belton and Goldberg (1988)]. Since the role of analysts is to monitor the firm, it is expected that the market's reaction to dividend cuts and omissions will be negatively related to the number of institutional investors. The number of institutions holding shares in the firm should be a proxy for the amount of analysts coverage the financial institution is receiving. As the number of analysts covering the firm increases, investors are more likely to anticipate the dividend cut, reducing the market's reaction [Moyer, Chatfield and Sisneros (1989)].

(ii) Information asymmetry hypothesis

The information asymmetry hypothesis states that there is a positive relationship between the number of institutional investors trading in a security and the quality and quantity of information that is revealed about the firm. This relationship exists because institutional investors: (1) obtain economies of scale in acquiring information, (2) maintain close business relations with the firm, (3) tend to be large blockholders and therefore have an incentive to closely monitor the firm, and (4) engage in more frequent trading, which increases the likelihood of new information being released.

As the quality and quantity of information increases with the amount of institutional ownership, the market's reaction to dividend cuts and omissions should be more positive. More information allows institutions and other investors to react to information regarding the firm's financial condition prior to the dividend announcement. This

causes a smaller negative market reaction than if institutions were not active participants in the firm's securities [Szewczyk, Tsetsekos and Varma (1992)].

(iii) Neglected firm hypothesis

The neglected firm hypothesis states that firms closely followed by analysts do not perform as well as firms that are not closely followed. The higher performance of neglected firms is attributed to a lower amount of information received by investors in neglected firms. This lower amount of information received by investors in neglected firms causes them to use a higher discount rate when valuing the securities of neglected firms. As stated previously, the amount of institutional involvement in a firm's stock can be a proxy for the amount of analyst coverage. When applying this theory to dividend cuts and omissions, investors in firms with lower institutional involvement are more likely to be surprised by dividend cuts and omissions, causing larger negative market reactions [Arbel and Strebel (1993)].

4.3.3 Post-TBTF: Number of Institutional Holders (INST) and Relative Number of Shares held by Institutions (RSHR)

The interaction between the too-big-to-fail variable, the number of institutional holders, and the ratio of the number of shares held by institutions, divided by the number of shares outstanding, will help determine if the need for information by institutions has been substantially changed by the too-big-to-fail doctrine. Based on the hypotheses stated above, (INST and RSHR variables) the following hypotheses are established:

(i) Monitoring activity hypothesis

After the introduction of the TBTF doctrine, large bank holding companies have an incentive to increase their asset portfolio risk, but the potential costs to investors is reduced, because TBTF coverage eliminates default risk for TBTF banks. This is also the case if the

market perceives that all holding companies have some probability of receiving TBTF coverage. As a result, there is a reduced need for high amounts of monitoring activity, because investors perceive their probability of investment loss is reduced. Because investors are receiving less information on bank stocks, dividend cuts and omissions should be perceived as a surprise resulting in larger market reactions when compared to the pre-TBTF period.

(ii) Information asymmetry hypothesis

The introduction of the TBTF doctrine should not change the information needs of the institution. The information that was relevant to institutions prior to the TBTF doctrine should be important in the post-TBTF period. The quality and quantity of information should not change since the information asymmetry hypothesis states that institutions release information via frequent trading. As a result, the market reaction to dividend cuts and omissions should not be statistically different between the pre- and post-TBTF periods, provided that the TBTF doctrine had no impact on the market's perception of default risk. The TBTF doctrine should cause the number of institutional investors to respond less severely to dividend cuts and omissions if the market perceives that a broader application of the TBTF doctrine is used by regulators.

(iii) Neglected firm hypothesis

With respect to the TBTF issue, if the market perceives a broader application of the TBTF doctrine, then fewer banks will be perceived as neglected as the number of institutional investors move to safer investments. The reduction in the number of neglected firms should cause the market to anticipate dividend cuts and omissions, causing a smaller market reaction after the introduction of the TBTF doctrine. BHCs that have larger amounts of institutional ownership are less likely

to be neglected and more likely to have dividend cuts and omissions anticipated.¹²

4.3.4 Total Assets (TA)

In order to determine if the size of market reactions to dividend cuts and omissions are dependent on the size of the financial institution, the total assets of the financial institution at the end of the dividend cutting year is included as a stratifying variable. Since dividend cuts and omissions usually follow periods of poor earnings, small bank holding companies tend to be more vulnerable to failure. One explanation for increased vulnerability is due to lower asset diversification among small bank holding companies. Based on the increased vulnerability of bank holding companies that are smaller in size, it would be expected that BHCs with smaller asset size experience a stronger negative market reaction.

4.3.5 Post-TBTF: Total Assets (TA)

As established above, prior to the TBTF doctrine, dividend cuts and omissions by small BHCs are expected to be perceived by the market as more serious because of the less asset diversification. The introduction of the TBTF doctrine is expected to be negative and significant if the market attaches a non-zero probability to each bank holding company regarding possible TBTF depository coverage. If the TBTF doctrine causes all BHCs to have a lower probability of default risk (negative relationship between probability of default and total assets), then all BHCs will receive a smaller negative market reaction

¹²The neglected firm effect is not analyzed as a possible explanation for differing market reactions to dividend cuts and omissions between pre- and post-TBTF periods. Due to the size of the banks in the study and the role of regulatory agencies in monitoring banks, it seems unlikely that these banks would be considered a member of the neglected firm category.

to dividend cuts and omissions following the TBTF doctrine (lower probability of default). The market should react less negatively to dividend cuts and omissions following the TBTF doctrine, because the non-TBTF BHCs in the sample are perceived as having a smaller probability of default. However, the negative relationship between the size of the BHC and the market's reaction should still apply. If the market interprets that size may not be the only criteria in determining which banks are possible candidates for TBTF coverage, then the relationship between asset size and market reaction will not apply.

4.4 Changes in BHC Asset Composition

It is expected that the too-big-to-fail doctrine has changed the incentives of large bank holding companies, both TBTF and non-TBTF, to engage in higher levels of risk taking.¹³ This increased level of risk taking should be observed through increased levels of asset allocation into those activities deemed risky. By engaging in higher levels of risk taking activity, the holding company can engage in a strategy that creates benefits from being a TBTF bank.

If the default risk component of the cost of capital for TBTF banks is eliminated due to the TBTF doctrine, then the cost of capital for these banks is no longer a true reflection of the riskiness of the asset portfolio. Thus a rational profit maximizing TBTF bank will attempt to:

¹³A large BHC is defined as a holding company that has the investment opportunities available to take advantage of the incentives created by the TBTF doctrine. The term "large" is used to describe this type of firm because only BHCs above a certain asset size will be able to take advantage of the incentives created by the TBTF doctrine.

(1) increase the risk/return relationship of their asset portfolio in order to further widen the spread between the cost and return on capital.¹⁴

Additionally, BHCs outside the TBTF category have received encouragement from federal regulators that becoming a TBTF member is possible. This is due to subsequent application of the TBTF doctrine to several smaller non-TBTF members.

If becoming a member of the TBTF category benefits TBTF banks, and the hurdle distinguishing a TBTF bank from a non-TBTF bank exists at a lower level than the original eleven largest BHCs, then BHCs and the market should perceive there are factors other than asset size which regulators use to make their TBTF determination. At the same time, non-TBTF BHCs may attempt to follow a strategy that will allow them to cross over the lowered hurdle used by regulators in making their decision regarding TBTF status.

If non-TBTF BHCs perceive that it is feasible and desirable for them to become TBTF banks, these banks will participate in one of two strategies:

(1) **The Asset Growth Strategy** states that certain BHCs will increase their asset size in order to receive TBTF coverage. It seems reasonable to assume that the asset growth strategy may be limited to certain large bank holding companies originally not included under the TBTF doctrine. Large bank holding companies may find increasing assets size the optimal strategy to becoming a TBTF bank, because the original asset size hurdle of being the eleventh largest bank is not very far away. Due to the availability of financing and investment opportunities, BHCs may find it easier to achieve the regulators perceived asset size hurdle.

(2) **The Periphery Growth Strategy** states that certain bank holding companies will increase the amount of contact they have with other banks, financial markets, and government agencies, in an attempt to be covered under the TBTF doctrine. Banks undertaking this strategy are attempting to gain TBTF coverage by increasing their importance in a specific activity regulators deem important. By engaging in a periphery growth strategy, BHCs are attempting to increase their importance due to the adverse impact of its failure

¹⁴The spread between cost and return on capital should widen following the TBTF announcement as the cost of purchased funds should decline to reflect the elimination of default risk.

on other economic sectors and financial institutions. This strategy would be more accessible for smaller bank holding companies given that the perceived asset size hurdle may be beyond the small BHCs's asset growth ability.

The dependent variable employed here is BHC asset size. Asset size reinforces the emphasis that regulators have in protecting the investments of claimants. Variables to be included in the model to proxy for the asset growth strategy are real estate loans, commercial and industrial loans, loans to foreign governments, bank capital, negotiable certificates of deposits, deposits less than \$100,000, consumer loans, and agricultural loans. Variables to be included in the model to proxy for the peripheral growth strategy are foreign exchange contracts, loans to depository institutions, letters of credit and negotiable certificates of deposit.

In order to observe the impact of the TBTF doctrine on the investment decisions of BHCs, all of the independent variables in the model are interacted with a binary variable representing the period following the TBTF announcement. The interaction terms show if the BHCs in the sample significantly changed their use of any of the independent variables in the model between the periods prior to and following the TBTF doctrine. Significant changes in the usage of the independent variables following the TBTF announcement provide an indication of the incentives facing BHCs to change their investment strategies. A lack of significant movement in the interaction terms is an indication that the TBTF doctrine is not a strong enough incentive for BHCs to change their investment strategy.

Two binary variables are also included in the model. The TBTF binary variable that is to interact with the independent variables remain in the model. The TBTF binary variable will provides evidence if the asset size of BHCs has significantly changed following the Comptroller's announcement. This variable is important, because it is possible that BHCs may be using off-balance sheet activities to increase their size or importance. The use of off-balance sheet activities is

not accounted for as an independent variable in the model. Multi-bank BHC binary variable is used to differentiate between banks that are one-bank and multi-bank BHCs. It would be expected that multi-bank BHCs are larger in size and have a greater ability to engage in the asset growth strategy.

$$\begin{aligned}
 \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} \\
 & + \beta_8 \text{BL} + \beta_9 \text{LET} + \beta_{10} \text{C} + \beta_{11} \text{FXPUR} + \beta_{12} \text{FXSALE} + \beta_{13} \text{TBTF} \\
 & + \beta_{14} \text{TBTF*RE} + \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} \\
 & + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*BL} \\
 & + \beta_{22} \text{TBTF*LET} + \beta_{23} \text{TBTF*C} + \beta_{24} \text{TBTF*FXPUR} + \beta_{25} \text{TBTF*FXSALE} \\
 & + \beta_{26} \text{MBHC} + \varepsilon
 \end{aligned}$$

$\begin{matrix} (+) & (+) & (+) & (-) & (+) & (?) & (?) \\ (+) & (+) & (?) & (+) & (+) & (+) & \end{matrix}$
 $\begin{matrix} (+) & (+) & (+) & (+) & (-) & (-) & (-) \\ (-) & (-) & (?) & (+) & (+) & (+) & \end{matrix}$
 $\begin{matrix} (+) & (-) & (?) & (-) & (-) & (-) & \end{matrix}$
 $\begin{matrix} (-) & (?) & (+) & (+) & (+) & (+) & \end{matrix}$
 $\begin{matrix} (+) & & (6) & & & & \end{matrix}$

where,

TA = total assets deflated in 1991 dollars,

RE = total real estate loans divided by total assets,

CI = total consumer and industrial loans divided by total assets,

FL = total foreign loans divided by total assets,

CAP = total bank capital divided by total assets,

NCD = total negotiable certificates of deposits divided by total assets,

DEP = total deposits less than \$100,000 divided by total assets,

AG = total agricultural loans divided by total assets,

BL = total loans to other depository institutions divided by total assets,

LET = total letters of credit divided by total assets,

C = total consumer loans divided by total assets,

FXPUR = foreign exchange contracts purchased divided by total assets.

FXSALE = foreign exchange contracts sold divided by total assets,

TBTF*RE = interaction term between TBTF and RE,

TBTF*CI = interaction term between TBTF and CI,

TBTF*FL = interaction term between TBTF and FL,

TBTF*CAP = interaction term between TBTF and CAP,
TBTF*NCD = interaction term between TBTF and NCD,
TBTF*DEP = interaction term between TBTF and DEP,
TBTF*AG = interaction term between TBTF and AG,
TBTF*BL = interaction term between TBTF and BL,
TBTF*LET = interaction term between TBTF and LET,
TBTF*C = interaction term between TBTF and C,
TBTF*FXPUR = interaction term between TBTF and FXPUR,
TBTF*FXSALE = interaction term between TBTF and FXSALE,
MBHC = binary variable where multi-bank BHC equals 1 and 0 otherwise,
 ε = error term that is assumed to be well behaved.

It is expected that the largest BHCs will attempt to engage in an asset growth strategy, while the BHCs that are large in size, but unable to successfully engage in an asset growth strategy, will follow the periphery growth strategy. The strategy that any bank will follow in order to derive benefits associated with TBTF coverage is dependent on perceptions of the bank's management, the bank's ability to raise financing, and the investment opportunities available. There are several models that have been used to measure bank risk (Avery, Belton and Goldberg [1988], Cook [1993], and Wall [1993]). A model devised by Cook (1993) is appealing because of its simplicity. Cook regresses certain holding company variables that are considered measures of asset risk against bank size (market size) for the year-end 1990. Instead of using market size as the dependent variable, it is more appealing to use asset size. Using asset size as the dependent variable reinforces the emphasis that regulators have in protecting the investments of claimants through the use of deposit insurance. Also, in order to determine the incentives associated with the introduction of the TBTF doctrine, a longer period of observation is needed than used by Cook. A longer window surrounding the Comptroller's announcement beginning in 1983 and

ending in 1985 should be sufficient to observe changes in asset composition.

In order to determine if BHCs of different sizes are more likely to engage in one strategy over another, the sample of BHCs are divided into asset quartiles as of year-end 1983. It is expected that larger BHCs are more likely to follow the asset growth strategy in order to take full advantage of the regulatory subsidy associated with the TBTF doctrine. Smaller BHCs that perceive the asset size hurdle as beyond their reach, but wish to receive TBTF protection, are more likely to follow a peripheral growth strategy. In the peripheral growth strategy there is no increase in asset size, but the composition of the BHC's assets portfolio is significantly changed. Increasing asset size is representative of the asset growth strategy. Following the asset growth strategy leads to changes in the composition of the asset portfolio with the explicit purpose to increase asset size. Dividing the sample into asset size quartiles provides a cleaner method for observing these postulated movements.

Another distinction made is between BHCs that have publicly traded common stock and those BHCs that do not. Because of the monitoring role of the equity market and the potential need to enter public markets for future financing, it is expected that BHCs with publicly traded common stock may be less willing to take advantage of opportunities to increase the riskiness of their financial institution. If markets perform a monitoring role, then it is expected that BHCs with non-publicly traded common stock will be more aggressive in adjusting their investment strategies following the introduction of the TBTF doctrine, when compared to BHCs with publicly traded common stock.

4.5 Changes in BHC Efficiency

A multi-product quadratic cost function is used to estimate the impact of the TBTF doctrine on the efficiency of BHCs. There are two

sources of inefficiency created by the introduction of the TBTF doctrine. First, similar to the literature on deposit insurance, depository coverage creates incentives for financial institutions to increase the riskiness of their portfolios, in order to extract the largest subsidy from the regulatory insurance backers (FDIC). This example of increased risk taking is magnified when applied to the TBTF doctrine, because the TBTF doctrine provides deposit insurance to previously unprotected depositors. Full depository coverage reduces the need of previously unprotected depositors to demand a higher cost to obtain their financing. In other words, BHCs protected under the TBTF doctrine are able to obtain an additional source of financing at a lower cost than that offered by non-TBTF banks. The benefits associated with receiving TBTF coverage create incentives for non-TBTF banks to follow a strategy that will allow them to become TBTF if possible. Also, the TBTF doctrine creates an incentive for TBTF banks to increase the riskiness of their operations in the short-term in order to increase profitability. In other words, including another variable into the firms operating strategy that is not consistent with profit maximization/cost minimization will reduce efficiency.

Another source of inefficiency created by the TBTF doctrine is due to a movement away from equilibrium for all participants in the banking system. Previously, banks and stakeholders operated under an established system that maintained a state of equilibrium based on the economic environment at that time. However, following the Comptroller's announcement, the incentives associated with the previous economic environment changed, causing banks and stakeholders to be pushed into disequilibrium. It is this movement out of equilibrium that subsequently creates the inefficiency.

One source of disequilibrium is created by a wealth transfer away from banks considered outside the protection of the TBTF doctrine and to banks considered protected under the TBTF doctrine. As stated above,

non-TBTF banks are operating at a competitive disadvantage following the TBTF announcement, because some of their sources of financing are perceived more risky. Having a higher risk perception requires non-TBTF banks to pay a higher cost in order to attract purchased funds. This higher cost of capital paid by non-TBTF banks requires them to invest in riskier investments in order to remain profitable. Riskier investments by non-TBTF banks cause an overall increase in the riskiness of the banking system, thereby decreasing efficiency.

Previous studies have used the thick frontier cost function to estimate X-efficiencies across banks [DeYoung (1993) and Shaffer(1993)]. But the simplicity of the multi-product quadratic cost function to measure inefficiency makes it appealing to use in this section of the dissertation. When applying the multi-product quadratic cost function model to determine inefficiency among BHCs, the model assumes deviations from predicted costs within the lowest cost quartile of BHCs represents random error, while deviations in predicted costs between the highest and lowest quartiles represents inefficiencies.

The intermediation approach to the multi-product quadratic cost function uses total costs of the BHC as the dependent variable.¹⁵ Total costs include both operating and interest expenses.

Independent variables represent the inputs and outputs of the BHC. There are three input price variables in the model: loanable funds, wages and physical capital.¹⁶ The cost of loanable funds equals total interest expense divided by total interest bearing deposits. Total

¹⁵Murray and White (1983) use the intermediation approach in their study. By including interest expense, the total cost of operations facing a financial institution can be observed.

¹⁶Traditionally, the cost of loanable funds is not included as an input explanatory variable. However, the intermediation approach does not assume constant costs across banks. As a result, the cost of loanable funds variable must be included in the model.

salary expense and employee benefits divided by the number of full-time employees represents the cost of wages. The cost of physical capital equals total rental costs and other fixed costs divided by total deposits. The output variables are agricultural, commercial and industrial, consumer and real estate loans. Outputs are based on the value-added criterion presented by Berger, Hanweck and Humphrey (1987). The value-added criterion states that for a product to be considered part of the bank's output, the product must be more highly valued if it is produced by the bank than if consumers produce the same product themselves. The coefficients on the quadratic terms provide insight on returns to scale from the production of a single output (holding output on other variables constant). A positive (negative) sign symbolizes diseconomies of scale (economies of scale) from the production of an output when all other variables are held constant.¹⁷

The interaction terms represent the rate of change of total cost due to the joint production of two products. The coefficient on these variables represents economies of scope between the two outputs. A positive (negative) sign on these coefficients symbolize diseconomies (economies) of scope from the joint production of the two products.

A binary variable representing whether the BHC is a one-bank or a multi-bank BHC is also included in the model. It is expected that the binary variable will help distinguish between differences in cost structures that are related to the BHCs operational form.

The cost function can be written as follows:

¹⁷All non-binary variables are deflated into 1991 dollars in order to take into account inflationary effects over the time period 1983-1985. By deflating the non-binary variables into 1991 dollars, changes in efficiency can be truly attributed to the TBTF doctrine.

$$\begin{aligned}
TC = & \beta_0 + \beta_1 RE + \beta_2 AG + \beta_3 CI + \beta_4 C + \beta_5 (RE)^2 + \beta_6 (AG)^2 + \beta_7 (CI)^2 + \beta_8 (C)^2 + \\
& \beta_9 RE*AG + \beta_{10} RE*CI + \beta_{11} RE*C + \beta_{12} AG*CI + \beta_{13} AG*C + \beta_{14} CI*C + \beta_{15} LF + \beta_{16} W + \\
& \beta_{17} PC + \varepsilon \quad (7)
\end{aligned}$$

where,

TC = total costs (including interest expense),

RE = total real estate loans,

AG = total agricultural loans,

CI = total commercial and industrial loans,

C = total consumer loans,

(RE)² = squared term for RE,

(AG)² = squared term for AG,

(CI)² = squared term for CI,

(C)² = squared term for C,

RE*AG = interaction term between RE and AG,

RE*CI = interaction term between RE and CI,

RE*C = interaction term between RE and C,

AG*CI = interaction term between AG and CI,

AG*C = interaction term between AG and C,

CI*C = interaction term between CI and C,

LF = cost of loanable funds,

W = cost of employees' wages and benefits,

CP = cost on rental and other fixed costs, and

ε = error term that is assumed to be well behaved.

In order to determine the efficiency of BHCs following the introduction of the TBTF doctrine, a series of intermediate steps must be followed. First, the cost function model is estimated on the entire sample of banks for the year 1983. The year 1983 is the base year from which estimates to determine the measures for inefficiency are determined. This is the year preceding the TBTF doctrine. It is

assumed that under *ceteris paribus* conditions, there should be no difference in the amount of inefficiency in 1983 than in 1984. By using the preceding year (1983) to calculate the parameter estimates which will determine inefficiency in the following years, the possibility of contaminating events biasing the results will be eliminated.

After the model is estimated for 1983 for all the BHCs in the sample, twenty-five percent of the BHCs having the most negative residuals are identified and withdrawn from the sample. These BHCs are the most efficient BHCs in the sample.

Next, the parameter estimates from the most efficient BHCs are used to obtain predicted values for each BHC in the sample for the years 1983-1985. The difference between the predicted costs when using the parameter estimates from the most efficient set of BHCs, and the actual total interest costs for each BHC, is defined as inefficiency. This procedure assumes that if a BHC is not operating with costs as low as the most efficient BHCs, than that BHC is inefficient.

Any difference in efficiency between the base year and subsequent years is attributed to the introduction of the TBTF doctrine given the short window chosen. In order to make the inefficiency measures more comparable, each BHCs measure of inefficiency is divided by the total asset of that BHC. By normalizing inefficiency measures the BHC's inefficiency measure is a percentage of each unit of total assets.

However, it is expected that following the introduction of the TBTF doctrine, there should be an increase in inefficiency for the entire banking system. *Ceteris paribus*, it is expected that the TBTF doctrine should not have any impact on the efficiency of BHCs if the TBTF doctrine only affects the 11 largest banks.

CHAPTER 5

EMPIRICAL RESULTS

5.1 Market Reaction to the Introduction of the TBTF Doctrine

Tables 2 and 3 present the results from the event study for all BHCs with publicly traded equity at the time of the announcement of the TBTF doctrine. Table 3 is further segmented to take into account differences in market reaction to the whole sample of BHCs, the BHCs considered covered under the TBTF doctrine based on the Wall Street Journal announcement, and those BHCs considered to be outside the protection of the TBTF doctrine. The Wall Street Journal sample is used in a paper written by O'Hara and Shaw (1990). It is postulated that only if the market perceives a broader applicability of the TBTF doctrine beyond the 11 largest banks mentioned by the Comptroller will there be a significant positive abnormal return surrounding the TBTF announcement.

The results from the two day abnormal returns for the event study show that the market viewed the TBTF announcement favorably. The cumulative two day abnormal returns for the day before the announcement, and the day following the announcement, is .215%. However, the Z-statistic for this value is 1.517 and is significant only at the 10% level. The percentage of BHCs that experienced positive abnormal returns during this two day period are 49.153%, with an insignificant binomial T-statistic value of -.225. These results provide weak support that the market perceived regulators would use TBTF protection to a broader number of BHCs. The binomial statistics provide evidence that the two day results are not driven by outliers, since a roughly equal number of BHCs experienced positive and negative abnormal returns.

Previous studies by Aharony and Swary (1983), Swary (1986) and Wall and Peterson (1990) have used longer observation windows for events that receive media coverage and can be anticipated by the market.

Aharony and Swary (1983) use a 47 week window to observe contagion effects from three bank failures. Swary (1986) uses a 21 week event window to observe the impact of Continental's failure on the security prices of 67 other banks and BHCs. Wall and Peterson (1990) use one month to observe the impact of news releases surrounding the Continental failure. Based on the work presented by others, using a window longer than two days can be supported in observing the impact of the TBTF announcement on the security prices of BHCs.

When a six day window is used to observe the market's reaction to the Comptroller's announcement ($t=-5,0$), the results show that the market experienced significant positive abnormal returns of 1.927% with a statistically significant Z-statistic of 8.268 at the 1% level. The observation window is expanded from 6 days to 11 days to determine if the market's anticipation of the TBTF doctrine occurred earlier. Using an 11 day window produces a positive abnormal return of 2.861% with a statistically significant Z-statistic of 9.088 at the 1% level.

In order to determine if the market anticipated the TBTF doctrine would have applicability beyond the 11 largest banks, it is necessary to observe the market's reaction following the Comptroller's announcement. It is possible that the market incorrectly identified the number of banks to receive complete depository coverage. If this is the case, it is expected that the market would revalue the security prices of those banks that had incorrectly received price appreciation prior to the announcement. The results following the Comptroller's announcement show that the sample of BHCs experienced a cumulative abnormal return of -.196% over the 10 day period following the Comptroller's announcement. However, the cumulative abnormal return during the 10 day period is not statistically different from zero, with a Z-statistic of .767. In other words, the market's reaction during, and prior to, the Comptroller's

announcement was perceived by the market to have a broader applicability than that stated in the official announcement.¹⁸

In order to determine if the market reacted differently between TBTF and non-TBTF banks based on the Comptroller's announcement, the above analysis is performed on the whole sample of BHCs. However, the complete sample is segmented into two groups based on the names of the BHCs used in O'Hara and Shaw (1990) and stated in the Wall Street Journal article.

The results for the TBTF banks for the day preceding, and the day of, the TBTF announcement show that those BHCs perceived to be protected under the TBTF doctrine received positive abnormal returns of 1.121%. The Z-statistic over this interval is 1.405 and is significant at the 10% level. The results also show that on the day of the Comptroller's announcement, 90% of the BHCs mentioned in the Wall Street Journal received positive abnormal returns. The large number of BHCs receiving positive abnormal returns is consistent with O'Hara and Shaw's results that the TBTF doctrine benefited those BHCs the market perceived to have TBTF protection.

In order to determine if the market anticipated the Comptroller's statement and the names of those banks that would receive TBTF coverage, a longer event window is used to observe the market's reaction prior to the Comptroller's announcement. For the intervals between the TBTF announcement to 5 and 10 days prior to the TBTF announcement, the sample of TBTF BHCs experienced significant abnormal returns of 5.239% and 10.064%. The abnormal returns for both time intervals is significant at

¹⁸To determine if the results of the event study are caused by a shift in the parameter estimates in the market model following the Comptroller's announcement, 401 abnormal returns centered around the announcement date are obtained. The results show that a significant change in the BHC's asset interest sensitivity was experienced following the Comptroller's announcement.

the 1% level. These results indicate that the market anticipated the Comptroller's announcement. However, the 10 days following the Comptroller's announcement, the same group of BHCs experienced a -7.510% abnormal return. This result indicates that the benefits of the TBTF doctrine for those TBTF banks are over-stated if the period prior to the Comptroller's statement is observed.

In order to determine if the market perceived the TBTF doctrine to be applicable beyond the 11 BHCs mentioned in the Wall Street Journal, those BHCs stated as receiving TBTF coverage are excluded from the sample. The sample mentioned in the Wall Street Journal and O'Hara and Shaw (1990) are used throughout the dissertation when distinguishing between TBTF and non-TBTF banks.

The results from the two day abnormal returns surrounding the Comptroller's announcement shows a statistically insignificant .161% abnormal return for the group of non-TBTF banks. During this two day interval, only 48% of the non-TBTF banks received a positive two day cumulative abnormal return. Without further inspection, these results indicate that the market perceives the TBTF doctrine to be applicable to only the 11 largest BHCs.

As previously shown, the results indicate that the market has anticipated the Comptroller's announcement and significant price appreciation occurred prior to the announcement. The results for the non-TBTF banks for the intervals between the TBTF announcement to 5 and 10 days prior to the TBTF announcement show significant abnormal returns of 1.729% and 2.430%. The abnormal returns for both intervals are significant at the 1% level. Unlike the results for the post-announcement period for the sample of TBTF banks, the sample of non-TBTF banks do not experience a negative abnormal returns. To the contrary, non-TBTF banks experience a .242% abnormal return following the Comptroller's announcement which is significant at the 5% level. In other words, the results indicate that the sample of non-TBTF banks

experience significant benefits in price appreciation due to the TBTF doctrine. These results provide evidence that the TBTF doctrine was not perceived as being strictly applicable to only the 11 largest BHCs.¹⁹

As discussed in the previous chapter, another technique that can be used to determine if the market literally interpreted the Comptroller's announcement is to estimate a series of risk, asset composition, and asset size variables in a cross-sectional regression on the two day standardized cumulative abnormal return. If the market perceives that size is the only criteria used by regulators when determining which banks are to receive TBTF protection, then there should be a positive relationship between asset size and the two day abnormal return. If the market perceives that the most risky banks have a higher probability of receiving TBTF protection, then there should be a positive relationship between risk and abnormal return. If the market perceives that regulators use some other criteria to determine who will receive TBTF protection, other than asset size and portfolio risk, then the variables in the model will have no power in explaining the market's reaction.

Tables 4-8 present the results from the cross-sectional regressions. The sample is broken down into the following asset quartiles. The asset quartiles are above \$9.5 billion, between \$9.5 billion and \$5.8 billion, between \$5.8 billion and \$2.4 billion, and less than \$2.4 billion. In order to determine if there are differing market reactions between asset size quartiles, table 4 includes three binary variables representing the four asset size quartiles. The results show that the market perceives neither asset size nor portfolio risk as significant factors when determining who receives TBTF coverage.

¹⁹A difference in means test is performed to determine if the market reacted differently between TBTF and non-TBTF banks due to the Comptroller's announcement. The results show that the two day abnormal return between the two groups was not statistically different.

However, the third largest asset quartile (between \$5.8 billion and \$2.4 billion) when compared to the other three asset quartile groups, did experience a significant two day abnormal return. Only the smallest asset group experienced an average decline in abnormal returns surrounding the TBTF announcement. The positive coefficients on the three largest asset quartile binary variables indicate that the market perceives the TBTF doctrine has applicability beyond the 11 largest BHCs. The negative coefficient on the smallest asset group provides indirect evidence that the market perceives those BHCs with asset size over \$2.4 billion to be candidates to receive TBTF coverage. The results show that the market perceives neither asset size nor portfolio risk as being either the sole, or the major determinant, regarding who receives TBTF protection.

Similar to the studies observed in Aharony and Swary (1983), Swary (1986) and Wall and Peterson (1990), it could be contended that the abnormal returns from the event study need to come from a longer observation window. In order to deflect any potential criticism for using an improper event window, the cross-sectional regression was run using an 11 day event window. The results from the cross-sectional model are consistent with those reported for the two event window. Neither size nor portfolio risk are significant factors in explaining the market's reaction to the TBTF doctrine.

5.2 Market Reaction to Dividend Cuts and Omissions

Table 10 presents the two day excess returns surrounding the dividend cut and omission for the entire sample and for the two sub-samples (pre- and post-TBTF). The results for the entire sample show that the two day excess return for the entire sample of 94 dividend cuts and omissions is -1.129%, with a statistically significant z-statistic of -4.925% (significant at the 1% level). These results are consistent with the works of Nadler (1977), Keen (1978 and 1983) and

Black, Ketcham and Schweitzer (1990), showing that dividend cuts and omissions convey negative information to the market regarding the future profitability of the financial institution.

When observing longer intervals of time, the period beginning 5 days prior to the dividend announcement, and extending through the announcement day, there is an excess return of -1.938%. This is statistically significant at the 1% level. A longer interval beginning 10 days prior to the dividend announcement also shows a statistically significant z-statistic at the 5% level. These results are consistent with other papers that have found dividend cuts and omissions are viewed negatively by the market (Keen [1983], and Black, Ketcham and Schweitzer [1990]).

To determine if the introduction of the TBTF doctrine has caused the market to view dividend cuts and omissions differently for non-TBTF banks, the sample is segmented into pre- and post-TBTF sub-samples. The results show that the market responds differently for the two periods. The market's reaction to dividend cuts and omission during the pre-TBTF period is -2.497%, which is significant at the 1% significance level.²⁰ In contrast, the excess return for BHCs that cut or omit their dividend after the introduction of the TBTF doctrine is -0.200, which is not statistically significant.²¹ These results show that the TBTF doctrine caused the market to alter its reaction to dividend cuts and omissions.

²⁰The excess return over the period beginning 5 days prior to the dividend announcement, and through the announcement day, is -3.324% which is statistically significant. The 11 day excess return beginning 10 days before the dividend announcement, and ending the day following the dividend announcement, is -2.463% which is statistically significant.

²¹The excess return for the 5 days prior to the announcement, and ending on the announcement day, is -0.997%, with a statistically insignificant z-statistic. The 11 day interval from 10 days prior through the announcement produces a -1.176% excess return with a z-statistic of -0.952.

In order to make a comparison between the two periods, a difference in means test is used. The excess return between the two periods show that the market reaction to dividend cuts and omissions is significantly more negative during the pre-TBTF period when compared to the post-TBTF period.²² Thus, the TBTF doctrine has altered the market reaction to dividend cuts and omissions. It is important to note that this test shows that the market perceives a broader applicability of the TBTF doctrine beyond the original 11 TBTF banks.

The number of dividend cuts and omissions for the two periods are also important. Although the pre-TBTF period is three years longer than the post-TBTF period, there are 19 more dividend cuts and omissions in the post-TBTF period. This is an indication that banks during the post-TBTF period have perceived there is less negative market reaction in the post-TBTF period and, as a result, are more apt to engage in dividend cuts and omissions.

The remainder of table 10 consists of showing and comparing the two day excess returns pre- and post-TBTF for firms above and below the median level of: (1) total assets, (2) the number of institutional investors, and (3) the relative share holding of institutions. These results confirm what was shown earlier. In none of the stratification groups did the market react significantly to dividend cuts during the post-TBTF period.

The results from the stratification based on asset size show that pre-TBTF banks, which are larger than the median, experienced the most significant negative market reaction to dividend cuts (two day excess return of -5.366% and statistically significant at the 1% level). Banks smaller than the median bank experienced an insignificant negative

²²When tests were conducted for initial dividend cuts and omissions, the results were found to be similar to the whole sample.

market reaction to dividend cuts and omissions. These results show that the market penalized larger BHCs for cutting their dividends.

However, stratification based on asset size during the post-TBTF period leads to a very different result than that presented above for the pre-TBTF period. The market reaction to dividend cuts and omissions during the post-TBTF period is insignificant regardless of asset size. The lack of significant market reaction during the post-TBTF period, regardless of asset size, is not consistent with a narrowly defined perception of the applicability of the TBTF doctrine. These results show that even the smallest banks benefit from the introduction and broadening applicability of the TBTF doctrine. The broader applicability of the TBTF doctrine results in a reduction in default risk and a less severe market reaction to dividend cuts and omissions.

Stratification based on the institutional involvement variables shows that only during the pre-TBTF period is the market's reaction to dividend cuts and omissions significantly negative. Based on the articles of Arbel and Strebel (1983), Moyer, Chatfield and Sisneros (1989) and Szewczyk, Tsetsekos and Varma (1992), institutional involvement is important when attempting to analyze the market's reaction to major corporate announcements. The results during the pre-TBTF period show that the market responds harsher to dividend cuts regardless of the number of institutional investors. This is especially true for banks having a smaller percentage ownership held by institutions. The results for the pre-TBTF sample show that dividend cuts and omissions prior to the TBTF doctrine were perceived by the market as a signal of the impending collapse of the financial institution. This caused institutions to move their investment out of the financial institution. Consistent with the information asymmetry hypothesis stated by Szewczyk, Tsetsekos and Varma (1992), if the amount of institutional ownership is a proxy for information quantity and quality, then the need for costly information becomes less profitable

for smaller investments. This results in dividend announcements being acted upon like a surprise.

Again, the market reaction to dividend cuts and omissions is significantly different in the post-TBTF period when compared to the pre-TBTF period. In neither the number of institutional owners, or in the percentage of shares held by institutions, is the market's reaction to dividend cuts significantly negative. This result is consistent with the theory that TBTF coverage causes a reduction in default risk and a less severe market reaction to dividend cuts. If investors believe that the TBTF doctrine has applicability beyond the original 11 TBTF banks, then the TBTF doctrine will cause the market to perceive that smaller banks will have a reduction in default risk. As a result, institutional investors will not need to liquidate their holdings in a dividend cutting bank, because the fear of default has been eliminated. Thus, the smaller market reaction to dividend cuts may be attributed to a perceived reduction in default risk for non-TBTF banks.

In conclusion, the results indicate that the Comptroller's announcement, concerning on 11 largest banks receiving coverage, was not completely believed by the market. Differing market reactions between the pre- and post-TBTF periods indicate that the market perceived a broader applicability of the TBTF doctrine. Subsequent expansion of the applicability of the TBTF doctrine has caused large banks to have a perceived reduction in their probability of failure. This results in a smaller negative market reaction to dividend information previously considered essential to the investment decisions of institutions. This reduction in the probability of failure is especially important for uninsured depositors who have traditionally been viewed as the driving force behind the severity in the market's reaction to dividend cuts. With TBTF coverage, uninsured depositors no longer need to fear losing their investment if TBTF coverage is applied to their institution.

In order to determine if the results of Table 10 are driven by events occurring during the TBTF window outside of banking, a random sample of non-financial firms that cut or omit their dividends over the time period 1974-1991 is obtained. Dividend cuts were verified through the Wall Street Journal Index. After adjusting for stock split and stock dividends, 60 dividend cuts were verified. Half of the 60 dividend cuts were experienced during the pre-TBTF period, with the post-TBTF period containing the other 30 dividend cuts.

The results from the event study show that market reactions during the TBTF window are not significantly different. Table 11 shows that non-financial firms that initiated dividend cuts prior to the TBTF doctrine experienced a significant market reaction of -6.244%. Non-Financial firms that initiated dividend cuts following the introduction of the TBTF doctrine experienced a significant market reaction of -2.723%. However, when the market reaction of the two periods are compared against each other by using a difference in means test, the difference in market reaction between the pre- and post-TBTF periods is not statistically significant at the 10% level.

The results show that the market perceives the TBTF doctrine is applicable beyond the original 11 largest banks. The expansion of the TBTF coverage beyond the 11 largest banks causes a reduction in default risk for the BHCs in the sample.

5.3 Changes in BHC Asset Composition

Tables 13-28 presents the results from the time-series cross-sectional regression. Due to problems with multi-collinearity between some independent variables, tables 13-28 will have parts A and B to symbolize the two reduced form equations without multi-collinearity.^{23, 24}

²³Based on Belsley, Kuh and Welch (1980), if the highest eigenvalue divided by the lowest eigenvalue is greater than a score of 30, then problems with multi-collinearity exist.

Based on the results presented in the previous section, BHCs that cut or omit their dividend prior to the Comptroller's statement received significant negative market reactions to dividend cuts and omissions. However, following the Comptroller's announcement, the market did not react as harshly to dividend cuts. The results also indicate that the market does not perceive size as the primary factor in determining who receives TBTF coverage. If the TBTF doctrine has altered the market's perception of the value of the information contained in dividends, then BHCs should be able alter their investment policy to take advantage of this perception of lower default risk. BHCs can increase the riskiness of their portfolio and profitability in the short run, if the market perceives these banks are covered under the TBTF doctrine. The dissociation between cost of capital and risk leads the financial institution to further increase the riskiness of its asset portfolio, passing the cost subsidy on to federal regulators.

The asset growth strategy states that a BHC that wishes to become a member of the TBTF category will increase its activities in those investments that will increase its asset size. This theory is also contingent on the bank's perceived ability to increase its asset size. It is postulated that larger banks who are not members of the TBTF category will be best able to follow the investment growth strategy. This strategy will also be the choice for BHCs that are perceived to be protected under the TBTF doctrine. TBTF banks will use the asset growth strategy to obtain lower cost financing in order to invest in higher return/higher risk investment, thereby increasing asset size.

The periphery growth strategy states that a BHC will increase its activities into those areas that will increase its ability to affect other financial systems upon its failure. This strategy will be

²⁴The TBTF binary variable is not considered biased in its general form. As a result, the general form equation (not the reduced form equations) will be used to interpret the TBTF variable.

followed only if BHCs perceives regulators use another criteria other than size (such as the ability to impact other financial sectors). It is theorized that banks of smaller size will be most likely to follow this strategy, due to their inability to significantly increase size.

Table 12 presents the regression results for the complete sample of BHCs for the time period 1983-1985. The sample is then divided into asset quartiles in order to observe differences in movements in asset composition based on size following the introduction of the TBTF doctrine.

Results for the complete sample, and the complete sample divided into asset quartiles, are presented in tables 13-17. The results for the complete sample indicate that following the TBTF announcement, BHCs experienced significant declines in asset size, foreign loans, capital, loans to banks, agricultural loans, and letters of credit. At the same time, the sample experienced increases in commercial and industrial loans and deposits. The results indicate that the BHCs for the complete sample retreated away from a periphery growth strategy but did not embrace an asset growth strategy.

In order to determine if BHCs with different asset sizes behave differently following the Comptroller's announcement, the sample of BHCs are divided into asset quartiles and the same model is applied to each asset group. The asset quartile groups are above \$116 million, between \$116 and \$51 million, between \$51 million and \$26 million and less than \$26 million. The results from the largest quartile of BHCs show an increase in deposits following the TBTF doctrine. Also, there is a decrease in asset size, foreign loans, capital, loans to banks, and letters of credit. Similar to the results found in the whole sample, the largest quartile of BHCs retreat away from a periphery growth strategy and do not embrace asset growth strategy either.

The results for the second (Table 15) and third asset quartiles (Table 16) do not provide evidence that an asset or periphery growth

strategy is being followed after the Comptroller's statement. The second asset quartile experiences a decline in real estate loans, agricultural loans, and bank loans, while deposits increase. When the second asset quartile is re-run to take into account problems with multi-collinearity, only agricultural loans experience a significant change (decline) following the TBTF doctrine. The third asset quartile does not experience a significant change in any of the variables in the post-TBTF period.

The smallest quartile of BHCs does not present a consistent strategy following the TBTF doctrine. Similarity in results between the reduced form regressions and the complete sample show that BHCs experience an increase in capital and deposits, while asset size and letters of credit decline. Because of the small size of some of these asset quartile groups, it is not expected that engaging in either an asset or periphery growth strategy would lead to a significant increase in the probability that these banks would gain TBTF status. As a result, a finer type of asset distinction may be needed in order to observe the behavior that has been postulated.

5.3.1 Changes in BHC Asset Composition: Non-Publicly Traded and Publicly Traded Equity

In order to determine if the equity market disciplines BHCs with publicly traded equity, it is necessary to divide the sample into two groups. One group consists of BHCs with no publicly traded equity, and the other group represents BHCs with publicly traded equity.

Table 18-18B presents the results for the whole sample of non-publicly traded BHCs. Following the TBTF doctrine, the results show significant increases in C&I, negotiable CDs, and deposits. At the same time, there are significant decreases in asset size, real estate loans, capital, agriculture loans, bank loans, and letters of credit. The results for the whole sample of BHCs with non-publicly traded equity

show that neither the asset nor periphery growth strategies are being followed.

The results for the BHCs without publicly traded equity are divided into asset quartiles to allow for differences in asset composition movements based on asset size. The results for the whole sample, and the whole sample divided into asset quartile for the group of BHCs without publicly traded equity, is presented in tables 19-23. The asset quartile groups are as follows: above \$116 million, between \$116 million and \$2 million, between \$52 million and \$26 million and less than \$26 million.

The results from the regression for the BHCs with no publicly traded equity in the highest asset quartile shows that following the Comptroller's announcement significant changes in asset composition occurred. The BHCs in this asset group experienced an increase in deposits, and C&I loans and a decrease in capital. This is consistent with a BHC following an asset growth strategy. However, the BHCs in the largest asset group experience a reduction in foreign loans and asset size following the TBTF doctrine. A reduction in foreign loans is an indication of a movement away from the asset growth strategy, and the reduction in asset size is consistent with an unsuccessful movement toward an asset growth strategy. Further analysis of the results show that BHCs in this asset quartile also experience a significant decrease in the periphery growth activities of foreign exchange sales, bank loans, and letters of credit.

The second and third asset quartiles for the groups of BHCs without publicly traded equity have little change in asset composition following the TBTF announcement. BHCs in the second asset quartile experience an increase in deposits and decrease in bank loans, while the third asset quartile also has a reduction in deposits. Neither of these activities is consistent with either the asset growth or periphery growth strategies.

The smallest BHCs are represented in the fourth asset quartile. The BHCs in this group present mixed investment signals following the TBTF announcement. The results show an increase in deposits and consumer loans in the post-TBTF period. At the same time, BHCs in this group experience an increase in capital and a decrease letters of credit and asset size.

The results for the quartile of BHCs without publicly traded equity does not provide evidence that either the asset or periphery growth strategies are being followed. The lack of consistent movement in the results shown for the group of BHCs that do not have publicly traded equity may be attributed to their smallness in size. This factor reduces the opportunities to significantly alter their investment strategy. Limitations could be the result of technology and expertise or a function of the opportunities available to the holding company within its geographic area.

The regression results for the sample of BHCs with publicly traded equity are presented in tables 23-28. The sample of BHCs is divided into asset quartiles. The results for the whole sample of BHCs with publicly traded equity show that deposits and letters of credit are significantly changed following the TBTF announcement. The increase in letters of credit provides initial evidence that a periphery growth strategy is being followed by BHCs with publicly traded equity.

The whole sample of publicly traded BHCs is divided into asset quartile groups. The asset quartile groups are divided into above \$12 billion, between \$12 billion and \$6 billion dollars, between \$6 billion and \$2.5 billion and less than \$2.5 billion. The results from the largest asset quartile show significant movements toward asset and periphery strategies. Consistent with an asset growth strategy, BHCs in this asset group experience a significant increase in asset size and a significant reduction in capital following the introduction of the TBTF doctrine. At the same time, these same BHCs experience a significant

increase in letters of credit (consistent with peripheral growth). Large BHCs may also use off-balance sheet activities as a means to increase asset size and peripheral growth.^{25, 26}

The results from the second quartile of publicly traded BHCs show no significant change in portfolio composition following the TBTF doctrine. This result is interesting because these holding companies are quite large and would probably be considered quite capable of attaining TBTF status if the Comptroller's statement were taken literally. The lack of portfolio movement from these BHCs tends to indicate that the incentive to become a TBTF bank does not exist, or perhaps they perceive they are already TBTF members.

The results from the third asset quartile of BHCs with publicly traded equity shows an increase in letters of credit. However, there is no corresponding increase in asset size following the Comptroller's announcement. Quartile three provides evidence that a periphery growth strategy is more attainable when compared to an asset growth strategy.

The results from the fourth quartile are similar to the second and third asset quartiles for the group of BHCs that have publicly traded equity. The lack of portfolio movement may be indicative that the smallest BHCs with publicly traded equity are perhaps too small to engage in either an asset growth or periphery growth strategy. The lack of portfolio movement in the smallest asset quartile may be attributed to the role of equity markets in disciplining BHCs from undertaking

²⁵Another component of the asset growth strategy that would be interesting to analyze is the impact of the TBTF doctrine on the composition of off-balance sheet activities. However, mandatory reporting of off-balance sheet activities was not required until 1986.

²⁶Liang and Savage (1990) show that the percentage of non-bank asset to bank assets for BHCs has increased from 6.43% in 1986 to 7.43% in 1988, but the percentage of non-bank assets remains very small.

increased risk without the corresponding reduction default risk attributed to having TBTF protection.

5.4 Changes in BHC Efficiency

Tables 28-31 present the multi-product quadratic cost function and inefficiency results. In this section of the dissertation it is postulated that the introduction of the TBTF doctrine should create incentives for BHCs to engage in activities that adversely affect operating efficiency. The rationale behind leaving operational optimality for BHCs originally included under the coverage of the TBTF doctrine is to increase the subsidy given to TBTF banks by dissociating the relationship between risk and return. If the TBTF doctrine reduces the penalty to BHCs that have publicly traded equity for increasing the riskiness of their asset portfolio, regardless of asset size, then BHCs should increase the riskiness of their asset portfolio in order to take advantage of the TBTF subsidy. The dissociation between risk and return should create an incentive for BHCs that are originally considered outside the protection of the TBTF doctrine to change their operating behavior in an attempt to achieve TBTF status. However, based on the results from the previous section, little portfolio movement has occurred among the BHCs that is consistent with either the asset or periphery strategies, except among the largest BHCs with publicly traded equity. Due to this movement away from equilibrium, there is a potential for increased risk taking for the entire banking system following the TBTF doctrine. Prior to the doctrine, the banking system was in a state of equilibrium where participants understood the costs associated with the system. Following the introduction of the doctrine, incentives were created that forced banks and stakeholders out of their established equilibrium. An example of one source of increased inefficiency is associated with a higher cost of purchased funds paid by banks outside the protection of the TBTF doctrine. Based on the results

from the previous section, it is this movement away from a previously established equilibrium that will be observed if there is a significant increase in inefficiency following the Comptroller's announcement.

The results from the multi-product quadratic cost function for the whole sample of BHCs for the year 1983 is presented in table 29. The results show that there are statistically significant and positive coefficients on the commercial and industrial, real estate and agricultural loan variables, indicating product-specific scale diseconomies. Only by specializing in consumer loans are scale economies obtained.

The interaction terms among the four output variables provide insights into scope economies and diseconomies. There are significant scope economies between real estate and commercial and industrial loans, as well as agricultural and consumer loans. Economies of scope between real estate and commercial and industrial loans may be attributed to common knowledge among bank officers in processing loans. The results that show scope economies between agricultural and consumer loans is not as apparent. This relationship seems best explained by farmers using the same bank for both agricultural and personal lending. As a result, the bank derives cost savings from knowing the loan recipient by producing the two loans.

There are significant diseconomies of scope between real estate and agricultural loans, real estate and consumer loans, agriculture and C&I loans, and C&I and consumer loans. The cost of wages and physical capital variables are both statistically insignificant, although they are the correct sign. The cost of funds variables is statistically significant at the 5% level and the correct sign. Also, multi-bank BHCs experience statistically significant increases in costs. The model is well specified with an R^2 of 99.04%. Only three parameters that are estimated are not statistically significant at the 5% level.

Table 30 presents the results for the multi-product quadratic function for the most efficient set of BHCs. The results show statistically significant scale economies for agriculture and consumer lending. Scale diseconomies are present for the most efficient set of BHCs in real estate and C&I lending.

Scope economies are present between real estate and agricultural loans, real estate and C&I loans, and agriculture and consumer loans. Scope diseconomies exist between real estate and consumer loans, agriculture and consumer loans, agriculture and C&I loans, and C&I loans and consumer loans. The cost of funds, cost of wages, and cost of physical capital variables are statistically insignificant, although the correct sign. Also, BHCs that multi-bank BHCs experience statistically significant increases in costs. The model is well specified with an R^2 of 99.74%. Only three estimated parameters are not statistically significant at the 1% level.

Table 31 presents measures for BHC inefficiency during the years 1983-1985. The results for the base year of 1983 show that on average, the BHCs in the sample experienced 6.579% of inefficiency for every dollar of assets. For the year following the Comptroller's announcement, the BHCs in the sample experienced a significant increase in the average amount of inefficiency of 13.939% for every dollar of assets. The average amount of inefficiency declined slightly in 1985 to 13.231%. Even though the benefits from the TBTF doctrine are initially bestowed on a few BHCs, these results are consistent with the theory that the TBTF doctrine significantly increased the riskiness to the whole banking system.

The next step is to determine if there are any differences between the costs associated with the TBTF doctrine based on whether the holding company has publicly traded equity. It has been postulated that the monitoring role of equity markets will cause BHCs that have publicly traded equity to be more efficient. The results for the two groups of

BHCs are presented in table 31. The results from the group of BHCs not having publicly traded equity shows that there was a 6.704% average inefficiency for every dollar of total assets in 1983. Following the Comptroller's statement, inefficiency increased significantly to 14.034% in 1984 and 13.338% in 1985. As postulated, the results provide evidence that the TBTF doctrine has increased inefficiency for the sample of non-publicly traded BHCs.

When observing the results from the sample of publicly traded BHCs, the results are similar. In 1983, publicly traded BHCs experienced an average amount of inefficiency of 1.417% for every dollar of total assets. As observed in the non-public group, inefficiency increased significantly to 9.485% in 1984 and 7.532% in 1985. As stated above, these results provide evidence that the TBTF doctrine has increased inefficiency for the sample of publicly traded BHCs.

In order to determine if the TBTF doctrine impacts BHCs differently based on asset size, the two sub-groups of BHCs are divided into asset quartiles. The inefficiency measures for the two sub-groups of BHCs based on their asset quartiles for each year is presented in table 31. The inefficiency measures for 1983 for the group of non-publicly traded BHCs show that the amount of inefficiency for the largest to the smallest asset quartile are 1.987%, 3.471%, 5.635% and 15.270% of total assets. As observed for the whole sample of BHCs, the amount of inefficiency significantly increased for all asset groups by 7% to 8% (9.374%, 11.085%, 13.081% and 22.532%). Only the smallest quartile of BHCs, did the average amount of inefficiency not decline from the year 1984 to 1985. There appears to be very little difference in the impact of the TBTF doctrine across asset groups for the sample of non-publicly traded BHCs. It is also interesting to note that the amount of inefficiency increases as the group's asset size declines.

The inefficiency measures for 1983 for the group of publicly traded BHCs show that the amount of inefficiency for the largest to the

smallest asset quartiles are 1.394%, 1.114%, 1.398% and 1.757% of total assets. As observed for the whole sample of BHCs, the amount of inefficiency significantly increased for all asset groups by 7% to 9%. All quartiles experienced at least a roughly one percent decline in inefficiency from the year 1984 to 1985. There appears to be very little difference in the impact of the TBTF doctrine across asset groups for the sample of publicly traded BHCs.

Although the average asset size for the publicly traded group of BHCs is significantly greater than the average asset size for the group of non-publicly traded BHCs, the largest non-publicly traded group and the smallest publicly traded group do behave differently. The largest asset group of BHCs with publicly traded equity reacts stronger in adjusting to the new operating environment the year following the TBTF doctrine, when compared to the other asset groups. This result is especially interesting when you consider that the largest asset group experienced the largest increase in inefficiency following the TBTF doctrine. The group of BHCs that experienced the greatest benefit from the Comptroller's statement, experienced a larger increase in inefficiency following the statement and experienced the largest decline in inefficiency the year following the announcement. The results show that the beneficiaries of the TBTF doctrine required more time in adjusting to their new equilibrium position.

Another interesting component that corresponds with the dramatic increase in inefficiency following the TBTF announcement for the largest BHC group is the result from the previous section of the dissertation. These results showed that only the largest BHC asset group followed a strategy that was consistent with the asset and periphery growth hypotheses. It was postulated that a profit maximizing BHC would attempt to follow one or both of these strategies in order to take advantage of the opportunities associated with the TBTF doctrine. It appears that the portfolio movements of the largest asset group may have

attributed to a larger increase in inefficiency, but the increased inefficiency was reversed with greater speed the year following the TBTF announcement. This implies that BHCs in the largest asset group incur additional costs in order to take advantage of the incentives created by the TBTF doctrine. After a year, these BHCs find a new equilibrium operating structure that reduces the inefficiencies created by the TBTF doctrine.

The results also show that the group of publicly traded BHCs experience significantly less inefficiency than those BHCs that do not have publicly traded equity. Also, there is a stronger decline in inefficiency following the TBTF doctrine for the group of publicly traded BHCs. This result supports the role of the market in disciplining and monitoring BHCs with publicly traded equity.

Another interesting observation when comparing the non-publicly traded and publicly traded groups is that the average amount of inefficiency increases as the BHCs average asset size decreases. However, this result is not consistent with the group of BHCs with publicly traded equity. Following the Comptroller's announcement, the average amount of inefficiency for the largest asset group of publicly traded BHCs is greater than the smallest asset group of publicly traded BHCs. Only the largest asset group does not exhibit this negative relationship between average inefficiency and average asset size. One explanation for this higher amount of inefficiency for the largest asset group may be attributed to the TBTF doctrine. If TBTF causes a movement away from equilibrium, then the phenomenon that is being observed may be a higher level of inefficiency that is being subsidized by federal regulators through the TBTF doctrine.

CHAPTER 6

CONCLUSIONS

General Summary

This dissertation investigates the impact of the TBTF doctrine on both the market's reaction to the Comptroller's announcement and the operating environment of BHCs. As of this writing, no other study has explored, from either the market's or BHCs position, the TBTF doctrine in this manner. Previous studies that have analyzed the TBTF doctrine's impact on the market's reaction to BHC security prices have always taken the Comptroller's announcement literally. As a result, the market's perception regarding the applicability of the TBTF doctrine, the incentives facing BHCs, and the changes in efficiency resulting from the introduction of the TBTF doctrine have not been previously explored.

6.1 Market Reactions to the Introduction of the TBTF Doctrine

The event study and cross-sectional regression results indicate that the market did not consider asset size as the sole criteria in determining TBTF protection. The event study shows firms of various sizes receiving positive abnormal returns following the announcement. The cross-sectional model reinforces these findings by showing no statistically significant relationship between the market's reaction and asset size or portfolio risk. However, those BHCs with publicly traded equity, and with asset size greater than \$2.45 billion, on average experienced positive abnormal returns. Those BHCs with asset size between \$5.83 billion and \$2.45 billion experienced the largest price appreciation the two days surrounding the Comptroller's announcement. The indication is that the market believes that there are some other criterion federal regulators use when making their determination regarding those who benefit from TBTF protection. The results also show

that the 11 largest banks were not the only beneficiaries of the TBTF doctrine.

6.2 Market Reaction to Dividend Cuts and Omissions

This dissertation shows a significant difference in the market's reaction to dividend cuts and omissions between the pre-TBTF and post-TBTF. During the pre-TBTF period, the market reaction to dividend cuts and omissions was strongest for non-TBTF banks that are larger in size and have fewer shares held by institutions, regardless of the number of institutional investors holding shares.

The post-TBTF period experienced insignificant market reactions to dividend cuts and omission regardless of the point of stratification. Thus the introduction and expansion of the TBTF doctrine caused the information contained in dividends to be significantly altered, especially the information dividends contained regarding default risk. The post-TBTF period analysis reinforced the results that the TBTF doctrine is perceived to have a broader applicability beyond the eleven largest banks. Specifically, the TBTF doctrine caused a statistically significant smaller market reaction to dividend cuts and omissions, because the market perceived a broader applicability of the TBTF doctrine that reduced the default risk of protected institutions.

In order to determine if the market reaction to dividend cuts and omissions was not a market event that coincided with the TBTF doctrine, the same process is applied to dividend cuts and omission for non-financial firms over the same period using the TBTF doctrine as the point of demarcation. The results show that the market did not react differently to dividend cuts and omission for non-financial firms between the pre- and post-TBTF periods.

In order to determine if the increase in institutional involvement in the securities of BHCs was a general market occurrence or specific to banks, a difference in means test was performed for the period 1974 and

1991. The results show that institutional involvement in bank stocks was significantly greater than that of a random sample of S&P 500 firms. This result is consistent with institutions perceiving a reduction in default risk for BHCs following the TBTF doctrine, both TBTF and non-TBTF BHCs.

6.3 Changes in BHC Asset Composition

It is postulated that receiving TBTF coverage benefits a financial institution by loosening the relationship between portfolio risk and the cost of capital. The dissociation between portfolio risk and cost of capital creates an incentive for BHCs to increase the return of their investments through greater risk taking.

The results show that neither the asset nor periphery growth strategies were consistently enacted as hypothesized following the TBTF doctrine. To determine if BHCs behaved differently based on other differences, further segmentation of the sample was engaged based on asset size and whether the BHC had publicly traded equity. The results show that those BHCs with publicly traded equity, and with asset size over \$12 billion, experienced consistent increases in activities consistent with both the asset and periphery growth strategies. The results indicate that only the BHCs within the largest asset group are able to take advantage of the opportunities created under the TBTF doctrine. The results also indicate that none of the other asset groups experienced consistent movement into either investment strategy.

There was a lack of movement in portfolio composition by the second largest asset group of BHCs with publicly traded equity. This lack of movement is a demarcation point where the asset growth strategy may no longer be applicable. BHCs in this asset group should be able to attain the necessary size characteristics to obtain TBTF coverage, but their asset composition movements show no significant changes.

6.4 Changes in BHC Efficiency

This dissertation analyzes changes in BHC efficiency following the TBTF doctrine. It is postulated that the TBTF doctrine will create incentives for BHCs to adjust their investment strategies in order to take advantage of becoming a TBTF bank. However, the TBTF doctrine should also produce increased inefficiency through an overall increase in the riskiness of the banking system as TBTF banks increase the riskiness of their asset portfolios and non-TBTF banks compete with subsidized TBTF banks for purchased funds and other sources of financing. The TBTF doctrine creates a movement away from equilibrium for all participants in the banking system that produces an overall increase in inefficiency.

The results from the multi-product quadratic cost function show that inefficiency substantially increased for BHCs following the TBTF announcement. Additional segmentation is done in order to determine if BHCs of different size and trading status are affected differently. The results show that publicly traded BHCs become less efficient following the TBTF doctrine.

Segmentation based on whether the BHC has publicly traded equity shows that publicly traded firms have a stronger movement toward decreasing their inefficiency the year following the Comptroller's announcement. This stronger movement toward becoming more efficient may be attributed to the role the market plays in disciplining firms that have publicly traded equity.

Also, when compared to the other asset groups of publicly traded BHCs, there appears to be a greater amount of inefficiency among the largest BHCs with publicly traded equity. This higher amount of inefficiency is not consistent with the role of market discipline but is consistent with the role of federal subsidization caused by the TBTF doctrine. This subsidy given to banks that are protected by the TBTF doctrine creates less incentive to operate efficiently as the cost of

default associated with inefficiency is transferred to federal regulators.

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APPENDICES

Table-1**Descriptive Statistics: Publicly traded BHCs**

Descriptive statistics for BHCs with publicly traded equity surrounding the announcement of the TBTF doctrine on September 19, 1984. All variables are deflated into 1991 dollars and divided by deflated total assets. The statistics consists of variables used in the cross-sectional regression for the year 1984.

Variable	Mean	Median	Min.	Max.
Cum. Abnormal Return	0.003	-0.008	-0.042	0.061
Asset Size (\$billions)	\$10.747	\$6.209	\$0.181	\$1.0E8
Provision for Loan Loss	0.005	0.004	0.001	0.029
Provision for Charge offs	0.005	0.003	0.001	0.031
Real Estate	0.177	0.166	0.003	0.550
Comm. & Ind.	0.199	0.193	0.047	0.365
Foreign Loans	0.003	0.001	0.000	0.034
Capital	0.296	0.002	0.000	0.092
Deposits	0.774	0.795	0.378	0.915
Agriculture	0.007	0.003	0.000	0.057
Negotiable CDs	0.119	0.097	0.022	0.445
Bank Loans	0.009	0.004	0.000	0.776
Letters of Credit	0.005	0.003	0.000	0.035
Consumer	0.130	0.130	0.004	0.355

Table-2**Ten Day Abnormal Prediction Errors: TBTF Announcement**

Abnormal Prediction Errors (APEs) surrounding the announcement of the TBTF doctrine on September 19, 1984. The market's reaction to the security price for a 177 publicly traded BHCs starting 5 days prior (-5) to 5 days following (+5) the TBTF announcement.

Days	%APE	Z-stat.	% positive	Binomial t-stat.
-5	0.372***	3.377	46.89	-0.83
-4	0.698***	7.066	58.19**	2.18
-3	0.478***	5.564	55.37*	1.43
-2	0.166**	2.102	64.41***	3.83
-1	-0.035	-0.355	46.89	-0.83
0	0.048	0.964	44.63*	-1.43
+1	0.048	0.964	45.76	-1.13
+2	-0.115	-0.480	55.93*	1.58
+3	-0.105	-0.676	57.06**	1.88
+4	0.029	-0.321	39.55***	-2.78
+5	0.154*	1.547	42.37**	-2.03

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-3**Cumulative Abnormal Prediction Errors: TBTF Announcement**

Cumulative Abnormal prediction errors (CAPES) surrounding the announcement of the TBTF doctrine on September 19, 1984. The market's reaction to the security price for a 177 publicly traded BHCs for the following periods surrounding the TBTF announcement: 10 days before to the day of (-10,0), 5 days before to the day of (-5,0), the day before and the day of (-1,0), 1 day following to 6 days following (+1,+6), and 1 day following to 11 days following (+1,+11).

Interval	CAPE	Z-stat.
Whole Sample		
-10,0	2.861***	9.088
-5,0	1.927***	8.268
-1,0	0.215*	1.517
+1,+6	-0.085	0.626
+1,+11	-0.196	0.767
O'Hara and Shaw's TBTF Sample		
-10,0	10.064***	6.176
-5,0	5.239***	4.261
-1,0	1.121*	1.405
+1,+6	-2.085**	-1.827
+1,+11	-7.510***	-4.632
Non-TBTF Sample		
-10,0	2.430***	7.846
-5,0	1.729***	7.470
-1,0	0.161	1.218
+1,+6	0.035	1.092
+1,+11	0.242**	1.923
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level		

Table-4**TBTF Announcement Regression: Whole Sample**

Results from the cross-sectional regression for all BHCs. The two-day standardized abnormal returns are used to determine if the market perceived asset size and/or riskiness of the BHC's asset portfolio is the determining factor to the Comptroller's announcement regarding who will receive TBTF protection. Binary variables (D1, D2 and D3) are used to represent asset size quartiles. All variables are deflated into 1991 dollars and divided by total assets.

$$SAR_{-1,0} = \beta_0 + \beta_1 RE + \beta_2 CI + \beta_3 FL + \beta_4 CAP + \beta_5 NCD \\ + \beta_6 DEP + \beta_7 AG + \beta_8 NSTA + \beta_9 BL + \beta_{10} LET + \beta_{11} C \\ + \beta_{12} OFF + \beta_{13} LOSS + \beta_{14} MBHC + \beta_{15} D1 + \beta_{16} D2 + \beta_{17} D3 + \epsilon$$

Variable	Parameter estimates	t-statistics
Real Estate	95.009	0.607
Comm. & Indus.	-100.550	-0.538
Foreign Loans	-1012.323	-0.497
Capital	792.140	1.284
Negotiable CDs	-27.239	-0.159
Deposits	102.188	0.649
Agriculture	-133.859	-0.132
Total Assets	0.001	0.544
Bank Loans	540.495	0.788
Letters of Credit	-1988.310	-0.964
Consumer	-136.970	-0.582
Charge Offs	4602.714	1.004
Provision for Loan Loss	-3320.219	-0.616
MBHC	20.921	-0.691
D1	47.268	1.015
D2	19.141	0.442
D3	66.254*	1.774
Intercept	-117.410	-0.998
R2	.0976	
Number of Observations	103	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-5**TBTF Announcement Regression: Largest Asset Quartile**

Results from the cross-sectional regression for BHCs with asset size greater than \$9.537 billion. The two-day standardized abnormal returns are used to determine if the market perceived asset size and/or riskiness of the BHC's asset portfolio is the determining factor to the Comptroller's announcement regarding who will receive TBTF protection. All variables are deflated into 1991 dollars and divided by total assets.

$$\begin{aligned} SAR_{1,0} = & \beta_0 + \beta_1 RE + \beta_2 CI + \beta_3 FL + \beta_4 CAP + \beta_5 NCD \\ & + \beta_6 DEP + \beta_7 AG + \beta_8 NSTA + \beta_9 BL + \beta_{10} LET + \beta_{11} C \\ & + \beta_{12} OFF + \beta_{13} LOSS + \beta_{14} MBHC + \varepsilon \end{aligned}$$

Variable	Parameter estimates	t-statistics
Real Estate	81.947	0.167
Comm. & Indus.	-478.808	-1.125
Foreign Loans	-2499.671	-0.742
Capital	-133.778	-0.053
Negotiable CDs	-1.831	-0.005
Deposits	-36.478	-0.098
Agriculture	-1599.994	-0.849
Total Assets	-1.9E8	-0.015
Bank Loans	429.669	0.338
Letters of Credit	5654.620	0.782
Consumer	-177.311	-0.296
Charge Offs	20319.000	1.529
Provision for Loan Loss	-19004.000	-1.557
MBHC	-83.818	-0.826
Intercept	240.903	1.176
R2	.3513	
Number of Observations	25	

- * Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-6**TBTF Announcement Regression: Second Asset Quartile**

Results from the cross-sectional regression for BHCs with asset size between \$9.537 billion and \$5.831 billion. The two-day standardized abnormal returns are used to determine if the market perceived asset size and/or riskiness of the BHC's asset portfolio is the determining factor to the Comptroller's announcement regarding who will receive TBTF protection. All variables are deflated into 1991 dollars and divided by total assets.

$$\begin{aligned} SAR_{-1,0} = & \beta_0 + \beta_1 RE + \beta_2 CI + \beta_3 FL + \beta_4 CAP + \beta_5 NCD \\ & + \beta_6 DEP + \beta_7 AG + \beta_8 NSTA + \beta_9 BL + \beta_{10} LET + \beta_{11} C \\ & + \beta_{12} OFF + \beta_{13} LOSS + \beta_{14} MBHC + \varepsilon \end{aligned}$$

Variable	Parameter estimates	t-statistics
Real Estate	465.846	0.647
Comm. & Indus.	338.398	0.377
Foreign Loans	-3311.642	-0.672
Capital	3912.094	1.258
Negotiable CDs	-211.859	-0.199
Deposits	-345.359	-0.506
Agriculture	-5592.299	-1.165
Total Assets	-0.001	-0.198
Bank Loans	1338.212	0.223
Letters of Credit	-8956.605	-0.989
Consumer	11.114	0.010
Charge Offs	22786.000	0.358
Provision for Loan Loss	2768.312	0.040
MBHC	31.781	0.179
Intercept	93.589	0.147
R2	.3318	
Number of Observations	25	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-7**TBTF Announcement Regression: Third Asset Quartile**

Results from the cross-sectional regression for BHCs with asset size between \$5.831 billion and \$2.447 billion. The two-day standardized abnormal returns are used to determine if the market perceived asset size and/or riskiness of the BHC's asset portfolio is the determining factor to the Comptroller's announcement regarding who will receive TBTF protection. All variables are deflated into 1991 dollars and divided by total assets.

$$\begin{aligned} SAR_{-1,0} = & \beta_0 + \beta_1 RE + \beta_2 CI + \beta_3 FL + \beta_4 CAP + \beta_5 NCD \\ & + \beta_6 DEP + \beta_7 AG + \beta_8 NSTA + \beta_9 BL + \beta_{10} LET + \beta_{11} C \\ & + \beta_{12} OFF + \beta_{13} LOSS + \beta_{14} MBHC + \varepsilon \end{aligned}$$

Variable	Parameter estimates	t-statistics
Real Estate	191.231	0.268
Comm. & Indus.	-3135.171	-0.137
Foreign Loans	-5328.690	-0.235
Capital	512.455	0.237
Negotiable CDs	-567.996	-0.831
Deposits	178.132	0.317
Agriculture	8635.505*	2.178
Total Assets	-0.001	-0.097
Bank Loans	1177.601	0.465
Letters of Credit	-2935.521	-0.462
Consumer	-421.504	-0.490
Charge Offs	18483.000	0.382
Provision for Loan Loss	-3088.587	-0.094
MBHC	133.282	1.129
Intercept	-189.624	-0.441
R2	.4333	
Number of Observations	26	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-8**TBTF Announcement Regression: Smallest Asset Quartile**

Results from the cross-sectional regression for BHCs with asset size less than \$2.447 billion. The two-day standardized abnormal returns are used to determine if the market perceived asset size and/or riskiness of the BHC's asset portfolio is the determining factor to the Comptroller's announcement regarding who will receive TBTF protection. All variables are deflated into 1991 dollars and divided by total assets.

$$\begin{aligned} SAR_{-1,0} = & \beta_0 + \beta_1 RE + \beta_2 CI + \beta_3 FL + \beta_4 CAP + \beta_5 NCD \\ & + \beta_6 DEP + \beta_7 AG + \beta_8 NSTA + \beta_9 BL + \beta_{10} LET + \beta_{11} C \\ & + \beta_{12} OFF + \beta_{13} LOSS + \beta_{14} MBHC + \varepsilon \end{aligned}$$

Variable	Parameter estimates	t-statistics
Real Estate	76.173	0.298
Comm. & Indus.	163.668	0.455
Foreign Loans	93992.000	0.934
Capital	839.228	0.697
Negotiable CDs	17.880	0.059
Deposits	429.191	0.678
Agriculture	-1893.667	-0.899
Total Assets	0.001	0.550
Bank Loans	923.301	0.766
Letters of Credit	-21829.154	-0.434
Consumer	-324.298	-0.615
Charge Offs	-1526.656	-0.205
Provision for Loan Loss	11038.000	0.721
MBHC	35.581	0.681
Intercept	-488.347	-0.875
R2	.2563	
Number of Observations	27	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-9**Descriptive Statistics: Dividend Cut and Omissions**

Descriptive statistics for the sample of non-TBTF BHCs that experienced dividend cuts or omissions for the period 1974-1991. Total assets are adjusted for inflation, the number of institutional investors, and the relative shareholdings of institutional investors are reflected for the entire sample and then separately for those BHCs with announcements of dividend cuts or omissions prior to the TBTF doctrine and those with announcements after the TBTF doctrine. Mean difference tests are conducted on the pre-TBTF and post-TBTF groups.

Variable	N	Mean	Med.	Min.	Max.
Total Assets (\$Mil)	59	15,638.17	7,118.46	904.79	146,990.00
Pre-TBTF	26	8,670.80	4,171.95	904.79	51,539.93
Post-TBTF	33	17,147.22	13,330.59	1,230.33	146,990.00
t-statistic ($\mu_{pre}-\mu_{post}$)		-2.46***			
No. Of Inst. holders	70	84.81	50.5	1	328
Pre-TBTF	29	47.93	27	1	328
Post-TBTF	41	110.92	100	7	276
t-statistic ($\mu_{pre}-\mu_{post}$)		-3.51***			
Shares Held by Inst.	70	30.93%	31.08%	0.01%	79.57%
Pre-TBTF	29	19.94%	12.68%	0.01%	79.57%
Post-TBTF	41	38.70%	37.16%	0.677%	78.89%
t-statistic ($\mu_{pre}-\mu_{post}$)		-4.01***			
*** significant at the 1% level					

Table-10**Average Prediction Errors: Dividend Cuts and omissions**

Abnormal prediction errors (APEs) for the entire sample of BHCs announcing dividend cuts or omissions from 1974-1991. Subsamples are constructed based on TBTF doctrine, median firm size, the median number of institutional investors, and the median percent of shares held by institutional investors. Mean difference tests are conducted on the APEs between groups

Sample	N	%APE _{-1,0}	Z-stat.	% Positive	Binomial t-stat.
Entire Sample	94	-1.129***	-4.925	47.872	-0.413
Pre-TBTF	38	-2.497***	-6.955	44.737	-0.649
Post-TBTF	56	-0.200	-0.652	50.000	0.000
t statistic ($\mu_{pre} - \mu_{post}$)			1.70*		
Pre-TBTF					
TA > \$4,171.95 Mil.	13	-5.366***	-10.498	30.769	-1.387
TA ≤ \$4,171.95 Mil.	13	-0.965	-0.707	53.846	0.277
t statistic ($\mu_{>\$4,171.95} - \mu_{\leq \$4,171.95}$)			-1.32		
Post-TBTF**					
TA > \$13,330.59 Mil.	17	-0.230	0.495	56.941	0.243
TA ≤ \$13,330.59 Mil.	16	1.113	0.632	56.250	0.500
t statistic ($\mu_{>\$13,330} - \mu_{\leq \$13,330}$)			-0.75		
Pre-TBTF					
Inst. Inv. > 27	14	-2.735***	-4.324	35.714	-1.069
Inst. Inv. ≤ 27	15	-3.747***	-7.474	46.667	-0.258
t statistic ($\mu_{>27} - \mu_{\leq 27}$)			0.33		
Post-TBTF					
Inst. Inv. > 100	20	0.344	1.222	50.000	0.000
Inst. Inv. ≤ 100	21	0.695	0.234	52.381	0.218
t statistic ($\mu_{>100} - \mu_{\leq 100}$)			-0.24		
Pre-TBTF					
Inst. hold > 12.68%	15	-1.202	-1.689	33.333	-1.291
Inst. hold ≤ 12.68%	14	-5.463***	-10.245	50.000	0.000
t statistic ($\mu_{>12.68\%} - \mu_{\leq 12.68\%}$)			1.37		
Post-TBTF					
Inst. hold > 37.16%	21	-0.311	0.277	47.619	-0.218
Inst. hold ≤ 37.16%	20	1.400	1.178	55.000	0.447
t statistic ($\mu_{>37.16\%} - \mu_{\leq 37.16\%}$)			-1.15		

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-11**Cumulative Abnormal Prediction Errors: Non-Banks and Non-TBTF Banks**

Cumulative Abnormal prediction errors (CAPEs) surrounding the announcement of the TBTF doctrine on September 19, 1984 for non-financial institutions. The sample consists of the market's reaction to the security price of a 60 publicly traded firms that have dividend cuts and omissions for the following periods surrounding the TBTF announcement: 10 days before to the day of (-10,0), 5 days before to the day of (-5,0), the day before and the day of (-1,0), 1 day following to 6 days following (+1,+6) and 1 day following to 11 days following (+1,+11).

Interval	Non-Banks		Non-TBTF Banks	
	CAPE	Z-stat.	CAPE	Z-stat
Pre-TBTF				
-10,0	-4.621***	-7.065	-2.463***	-2.386
-5,0	-6.661***	-6.070	-3.324***	-4.908
-1,0	-6.244***	-9.125	-2.497***	-6.955
+1,+6	-0.102	0.018	-1.858**	-1.905
+1,+11	-1.271	-0.529	-1.580	-1.035
Post-TBTF				
-10,0	-3.833***	-2.778	-1.176	-0.952
-5,0	-2.924***	-2.680	-0.997*	-1.512
-1,0	-2.723***	-3.712	-0.200	-0.652
+1,+6	1.495	1.500	0.753	0.322
+1,+11	0.330	0.363	1.468	0.201
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level				

Table-12**Descriptive Statistics: Asset Composition**

Descriptive statistics for BHCs surrounding the announcement of the TBTF doctrine on September 19, 1984. All variables are from the year 1984 and deflated into 1991 dollars and divided by deflated total assets. The statistics consists of variables used in the time-series cross-sectional regression for the year 1984.

Variable	Mean	Median
Asset Size (\$Millions)	\$450.680	\$54.996
Real Estate	0.174	0.166
Comm. & Ind.	0.146	0.126
Foreign Loans	0.002	0.000
Capital	0.080	0.078
Deposits	0.871	0.893
Agriculture	0.087	0.029
Negotiable CDs	0.104	0.079
Bank Loans	0.002	0.000
Letters of Credit	0.005	0.001
Consumer	0.114	0.100

Table-13**Asset Composition Regression: Whole Sample**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \\ & \beta_{14} \text{TBTF*RE} + \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} \\ & + \beta_{19} \text{TBTF*DEP} + \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \\ & \beta_{23} \text{TBTF*BL} + \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
Real Estate (RE)	0.427**	2.322
Comm. & Ind. (CI)	0.769***	4.018
Foreign Loans (FL)	7.000*	1.885
Capital (CAP)	-3.591***	-12.821
Negotiable CDs (NCD)	0.025	0.140
Deposits (DEP)	-3.939***	-15.504
Agriculture (AG)	-2.936***	-18.952
Foreign Exchange Contracts Purchased (FXPUR)	14.797***	3.592
Foreign Exchange Contracts Sold (FXSALE)	-8.413***	-3.190
Bank Loans (BL)	15.541***	13.229
Letters of Credit (LET)	26.698***	19.708
Consumer (C)	-0.330	-1.465
TBTF	-1.375***	-5.599
TBTF*RE	-0.239	-1.118
TBTF*CI	0.930***	4.201
TBTF*FL	-10.019***	-2.679
TBTF*CAP	-5.574***	-15.498

Table 13: (cont.)

Variable	Parameter Estimate	t-statistic
TBTF*NCD	-0.027	-0.127
TBTF*DEP	2.114***	7.735
TBTF*AG	-0.444**	-2.324
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-12.692***	-9.828
TBTF*LET	-26.697***	-19.705
TBTF*C	0.158	0.603
MBHC	1.575***	67.811
Intercept	14.609***	63.954
R ²	.5115	
Number of Observations	16861	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-13A**Asset Composition Regression: Whole Sample**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample using a reduced form equation. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} \\ + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \\ \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-1.286***	-5.300
TBTF*RE	-0.368*	-1.925
TBTF*CI	0.879***	4.240
TBTF*FL		
TBTF*CAP	-5.585***	-15.068
TBTF*NCD		
TBTF*DEP	1.987***	7.370
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-30.838***	-22.812
TBTF*C	0.213	0.845
MBHC	1.649***	68.014
Intercept	14.462***	62.708
R ²	.4628	
Number of Observations	16861	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-13B**Asset Composition Regression: Whole Sample**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample using a reduced form equation. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \\ & \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \\ & \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \\ & \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.636***	11.026
TBTF*RE		
TBTF*CI		
TBTF*FL	-13.047***	-3.473
TBTF*CAP	-5.769***	-16.068
TBTF*NCD	0.385*	1.902
TBTF*DEP		
TBTF*AG	-0.786***	-4.843
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-10.074***	-7.783
TBTF*LET	-33.585***	-26.463
TBTF*C	-0.034	-0.130
MBHC	1.675***	71.582
Intercept	11.462***	234.218
R ²	.4892	
Number of Observations	16861	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-14**Asset Composition Regression: Largest Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs with asset size over \$.116 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.817***	-8.050
TBTF*RE	-0.255	-0.609
TBTF*CI	0.386	0.918
TBTF*FL	-13.237***	-3.574
TBTF*CAP	-15.763***	-14.288
TBTF*NCD	-0.029	-0.082
TBTF*DEP	4.569***	11.350
TBTF*AG	0.705	0.985
TBTF*FXPUR	-40.821	-0.259
TBTF*SALE	23.753	0.150
TBTF*BL	-7.056***	-4.928
TBTF*LET	-16.166***	-9.143
TBTF*C	0.172	0.314
MBHC	0.913***	30.639
Intercept	17.034***	51.429
R ²	.4993	
Number of Observations	4319	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-14A**Asset Composition Regression: Largest Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size over \$.116 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} \\ + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \\ \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-3.480***	-10.170
TBTF*RE	-0.333	-0.083
TBTF*CI	0.665*	1.667
TBTF*FL		
TBTF*CAP	-15.336***	-13.772
TBTF*NCD		
TBTF*DEP	5.099***	12.714
TBTF*AG		
TBTF*FXPUR	-15.892**	-2.519
TBTF*SALE		
TBTF*BL		
TBTF*LET	-18.207***	-10.484
TBTF*C	0.533	1.010
MBHC	0.918***	30.365
Intercept	17.212***	52.088
R ²	.4773	
Number of Observations	4319	

- * Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-14B**Asset Composition Regression: Largest Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size over \$.116 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{FL} + \beta_2\text{CAP} + \beta_3\text{NCD} + \beta_4\text{AG} + \beta_5\text{FXSALE} + \beta_6\text{BL} + \beta_7\text{LET} + \beta_8\text{C} + \beta_9\text{TBTF} + \beta_{10}\text{TBTF*FL} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*NCD} + \beta_{13}\text{TBTF*AG} + \beta_{14}\text{TBTF*FXSALE} + \beta_{15}\text{TBTF*BL} + \beta_{16}\text{TBTF*LET} + \beta_{17}\text{TBTF*C} + \beta_{18}\text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	1.233***	9.771
TBTF*RE		
TBTF*CI		
TBTF*FL	-19.704***	-5.284
TBTF*CAP	-17.533***	-15.954
TBTF*NCD	0.405	1.199
TBTF*DEP		
TBTF*AG	0.736	1.059
TBTF*FXPUR		
TBTF*SALE	-13.219**	-2.084
TBTF*BL	-7.417***	-5.163
TBTF*LET	-25.523***	-16.082
TBTF*C	0.606	1.113
MBHC	0.951***	31.394
Intercept	12.745***	115.036
R ²	.4725	
Number of Observations	4319	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-15**Asset Composition: Regression for the Second Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs with asset size between \$.116 billion and \$.51 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.238	-1.251
TBTF*RE	-0.163*	-1.646
TBTF*CI	-0.124	-1.230
TBTF*FL		
TBTF*CAP	0.232	0.508
TBTF*NCD	-0.063	-0.671
TBTF*DEP	0.321*	1.678
TBTF*AG	-0.246**	-2.315
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-1.334*	-1.708
TBTF*LET	-0.866	-0.878
TBTF*C	0.036	0.306
MBHC	0.098***	8.385
Intercept	11.621***	63.642
R ²	.0410	
Number of Observations	4457	
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level		

Table-15A**Asset Composition: Regression for the Second Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size between \$.116 billion and \$.51 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{RE} + \beta_2\text{CI} + \beta_3\text{CAP} + \beta_4\text{DEP} + \beta_5\text{FXPUR} + \beta_6\text{LET} + \beta_7\text{C} \\ + \beta_8\text{TBTF} + \beta_9\text{TBTF*RE} + \beta_{10}\text{TBTF*CI} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*DEP} + \\ \beta_{13}\text{TBTF*FXPUR} + \beta_{14}\text{TBTF*LET} + \beta_{15}\text{TBTF*C} + \beta_{16}\text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.249	-1.333
TBTF*RE	-0.077	-0.879
TBTF*CI	-0.095	-1.025
TBTF*FL		
TBTF*CAP	0.230	0.504
TBTF*NCD		
TBTF*DEP	0.277	1.459
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-1.199	-1.227
TBTF*C	0.124	1.137
MBHC	0.089***	7.692
Intercept	11.588***	63.787
R ²	.0284	
Number of Observations	4457	

- * Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-15B**Asset Composition: Regression for the Second Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size between \$.116 billion and \$.51 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \\ & \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \\ & \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \\ & \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.019	0.489
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	0.046	-0.110
TBTF*NCD	-0.091	-1.025
TBTF*DEP		
TBTF*AG	-0.167*	-1.801
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-0.879	-1.157
TBTF*LET	-1.402	-1.503
TBTF*C	0.606	0.564
MBHC	0.099***	8.489
Intercept	11.237***	316.013
R ²	.0373	
Number of Observations	4457	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-16**Asset Composition Regression: Third Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs with asset size between \$.51 billion and \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.147	1.536
TBTF*RE	-0.044	-0.543
TBTF*CI	-0.011	-0.131
TBTF*FL		
TBTF*CAP	-0.231	-1.391
TBTF*NCD	0.062	0.679
TBTF*DEP	-0.134	-1.280
TBTF*AG	-0.075	-1.040
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	1.063	0.709
TBTF*LET	0.264	0.294
TBTF*C	-0.002	-0.028
MBHC	0.052***	3.443
Intercept	10.482***	133.165
R ²	.0351	
Number of Observations	3999	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-16A**Asset Composition Regression: Third Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size between \$.51 billion and \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF} * \text{RE} + \beta_{10} \text{TBTF} * \text{CI} + \beta_{11} \text{TBTF} * \text{CAP} + \beta_{12} \text{TBTF} * \text{DEP} + \beta_{13} \text{TBTF} * \text{FXPUR} + \beta_{14} \text{TBTF} * \text{LET} + \beta_{15} \text{TBTF} * \text{C} + \beta_{16} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.180**	2.079
TBTF*RE	-0.023	-0.332
TBTF*CI	0.028	0.348
TBTF*FL		
TBTF*CAP	-0.240	-1.465
TBTF*NCD		
TBTF*DEP	-0.183	-1.894
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	0.198	0.221
TBTF*C	0.014	0.153
MBHC	0.053***	3.503
Intercept	10.434***	144.082
R ²	.0192	
Number of Observations	3999	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-16B**Asset Composition Regression: Third Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size between \$.51 billion and \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{FL} + \beta_2\text{CAP} + \beta_3\text{NCD} + \beta_4\text{AG} + \beta_5\text{FXSALE} + \beta_6\text{BL} + \beta_7\text{LET} + \beta_8\text{C} + \beta_9\text{TBTF} + \beta_{10}\text{TBTF*FL} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*NCD} + \beta_{13}\text{TBTF*AG} + \beta_{14}\text{TBTF*FXSALE} + \beta_{15}\text{TBTF*BL} + \beta_{16}\text{TBTF*LET} + \beta_{17}\text{TBTF*C} + \beta_{18}\text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.016	0.692
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	-0.201	-1.237
TBTF*NCD	0.061	0.703
TBTF*DEP		
TBTF*AG	-0.059	-0.972
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	1.390	0.945
TBTF*LET	0.347	0.401
TBTF*C	-0.015	-0.159
MBHC	0.053***	3.490
Intercept	10.558***	656.456
R ²	.0344	
Number of Observations	3999	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-17**Asset Composition Regression: Smallest Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs with asset size less than \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.610***	-4.984
TBTF*RE	0.140	0.740
TBTF*CI	0.008	0.037
TBTF*FL		
TBTF*CAP	2.281***	3.763
TBTF*NCD	-0.005	-0.028
TBTF*DEP	2.631***	4.916
TBTF*AG	0.130	0.986
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	23.678***	2.683
TBTF*LET	-6.503***	-2.873
TBTF*C	0.357	1.590
MBHC	0.215***	2.900
Intercept	11.492***	22.582
R ²	.1269	
Number of Observations	4083	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-17A**Asset Composition Regression: Smallest Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size less than \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{RE} + \beta_2\text{CI} + \beta_3\text{CAP} + \beta_4\text{DEP} + \beta_5\text{FXPUR} + \beta_6\text{LET} + \beta_7\text{C} \\ + \beta_8\text{TBTF} + \beta_9\text{TBTF*RE} + \beta_{10}\text{TBTF*CI} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*DEP} + \\ \beta_{13}\text{TBTF*FXPUR} + \beta_{14}\text{TBTF*LET} + \beta_{15}\text{TBTF*C} + \beta_{16}\text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.209***	-4.233
TBTF*RE	-0.017	-0.101
TBTF*CI	-0.053	-0.276
TBTF*FL		
TBTF*CAP	1.792***	2.975
TBTF*NCD		
TBTF*DEP	2.299***	4.295
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-6.416***	-2.824
TBTF*C	0.261	1.263
MBHC	0.227***	3.039
Intercept	11.257***	22.094
R ²	.1140	
Number of Observations	4083	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-17B**Asset Composition Regression: Smallest Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with an asset size less than \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{FL} + \beta_2\text{CAP} + \beta_3\text{NCD} + \beta_4\text{AG} + \beta_5\text{FXSALE} + \beta_6\text{BL} + \beta_7\text{LET} + \beta_8\text{C} + \beta_9\text{TBTF} + \beta_{10}\text{TBTF*FL} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*NCD} + \beta_{13}\text{TBTF*AG} + \beta_{14}\text{TBTF*FXSALE} + \beta_{15}\text{TBTF*BL} + \beta_{16}\text{TBTF*LET} + \beta_{17}\text{TBTF*C} + \beta_{18}\text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.047	-0.836
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	-0.213	-0.610
TBTF*NCD	-0.010	-0.055
TBTF*DEP		
TBTF*AG	0.144	1.256
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	4.412	0.514
TBTF*LET	-7.632***	-3.424
TBTF*C	0.549**	2.439
MBHC	0.226***	3.013
Intercept	9.940***	202.783
R ²	.1071	
Number of Observations	4083	

- * Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-18**Asset Composition Regression: Non-Publicly Traded**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHC without publicly traded equity. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \\ & \beta_{14} \text{TBTF*RE} + \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} \\ & + \beta_{19} \text{TBTF*DEP} + \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \\ & \beta_{23} \text{TBTF*BL} + \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
Real Estate (RE)	0.443**	2.531
Comm. & Ind. (CI)	0.703***	3.847
Foreign Loans (FL)	7.271*	1.847
Capital (CAP)	-3.215***	-12.136
Negotiable CDs (NCD)	0.089	0.512
Deposits (DEP)	-3.284***	-13.233
Agriculture (AG)	-2.839***	-19.355
Foreign Exchange Contracts Purchased (FXPUR)	1389.592	-0.925
Foreign Exchange Contracts Sold (FXSALE)	1402.302	0.929
Bank Loans (BL)	14.932***	13.250
Letters of Credit (LET)	27.683***	18.060
Consumer (C)	-0.511**	-2.390
TBTF	-1.354***	-5.617
TBTF*RE	-0.207	-1.018
TBTF*CI	0.790***	3.747
TBTF*FL	9.119**	-2.304
TBTF*CAP	-4.449***	-12.983

Table 18: (cont.)

Variable	Parameter Estimate	t-statistic
TBTF*NCD	0.058	0.286
TBTF*DEP	2.003***	7.504
TBTF*AG	-0.490***	-2.711
TBTF*FXPUR	1305.300	0.865
TBTF*SALE	-1314.502	-0.867
TBTF*BL	-10.742***	-8.680
TBTF*LET	-27.684***	-18.059
TBTF*C	0.136	0.545
MBHC	1.346***	59.106
Intercept	13.993***	62.500
R ²	.4564	
Number of Observations	16513	
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level		

Table-18A**Asset Composition Regression: Non-Publicly Traded**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHC in reduced form without publicly traded equity. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{RE} + \beta_2\text{CI} + \beta_3\text{CAP} + \beta_4\text{DEP} + \beta_5\text{FXPUR} + \beta_6\text{LET} + \beta_7\text{C} \\ + \beta_8\text{TBTF} + \beta_9\text{TBTF*RE} + \beta_{10}\text{TBTF*CI} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*DEP} + \\ \beta_{13}\text{TBTF*FXPUR} + \beta_{14}\text{TBTF*LET} + \beta_{15}\text{TBTF*C} + \beta_{16}\text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-1.150***	-4.706
TBTF*RE	-0.303*	-1.659
TBTF*CI	0.827***	4.133
TBTF*FL		
TBTF*CAP	-4.742***	-13.394
TBTF*NCD		
TBTF*DEP	1.764***	6.512
TBTF*AG		
TBTF*FXPUR	24.996	0.945
TBTF*SALE		
TBTF*BL		
TBTF*LET	-32.355***	-20.584
TBTF*C	0.210	0.870
MBHC	1.412***	59.034
Intercept	13.936***	59.904
R ²	.3965	
Number of Observations	16513	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-18B**Asset Composition Regression: Non-Publicly Traded**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHC in reduced form without publicly traded equity. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \\ & \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF} * \text{FL} + \beta_{11} \text{TBTF} * \text{CAP} + \beta_{12} \text{TBTF} * \text{NCD} + \\ & \beta_{13} \text{TBTF} * \text{AG} + \beta_{14} \text{TBTF} * \text{FXSALE} + \beta_{15} \text{TBTF} * \text{BL} + \beta_{16} \text{TBTF} * \text{LET} + \\ & \beta_{17} \text{TBTF} * \text{C} + \beta_{18} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.531***	9.752
TBTF*RE		
TBTF*CI		
TBTF*FL	-10.231**	-2.562
TBTF*CAP	-4.701***	-13.892
TBTF*NCD	0.391**	2.017
TBTF*DEP		
TBTF*AG	-0.736***	-4.811
TBTF*FXPUR		
TBTF*SALE	-14.759	-0.572
TBTF*BL	-9.199***	-7.469
TBTF*LET	-32.731***	-22.296
TBTF*C	0.034	0.135
MBHC	1.407***	61.396
Intercept	11.251***	247.571
R ²	.4391	
Number of Observations	16513	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-19**Asset Composition Regression: Largest Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with asset size over \$.116 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.571***	-7.765
TBTF*RE	-0.359	-0.950
TBTF*CI	0.384	1.017
TBTF*FL	-11.976***	-3.312
TBTF*CAP	-10.821***	-10.703
TBTF*NCD	0.184	0.572
TBTF*DEP	3.938***	10.490
TBTF*AG	0.278	0.453
TBTF*FXPUR	1212.876	0.914
TBTF*SALE	-1247.716	-0.936
TBTF*BL	-5.383***	-4.201
TBTF*LET	-17.497***	-8.600
TBTF*C	0.109	0.222
MBHC	0.686***	25.180
Intercept	16.290***	51.901
R ²	.3932	
Number of Observations	4127	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-19A**Asset Composition Regression: Largest Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with asset size over \$.116 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{RE} + \beta_2\text{CI} + \beta_3\text{CAP} + \beta_4\text{DEP} + \beta_5\text{FXPUR} + \beta_6\text{LET} + \beta_7\text{C} + \beta_8\text{TBTF} + \beta_9\text{TBTF*RE} + \beta_{10}\text{TBTF*CI} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*DEP} + \beta_{13}\text{TBTF*FXPUR} + \beta_{14}\text{TBTF*LET} + \beta_{15}\text{TBTF*C} + \beta_{16}\text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.959***	-9.111
TBTF*RE	-0.180	-0.499
TBTF*CI	0.678*	1.874
TBTF*FL		
TBTF*CAP	-10.826***	-10.639
TBTF*NCD		
TBTF*DEP	4.237***	11.265
TBTF*AG		
TBTF*FXPUR	-27.542	-1.173
TBTF*SALE		
TBTF*BL		
TBTF*LET	-19.160***	-9.458
TBTF*C	0.364	0.767
MBHC	0.682***	24.616
Intercept	16.414***	52.193
R ²	.3645	
Number of Observations	4127	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-19B**Asset Composition Regression: Largest Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with asset size over \$.116 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.925***	8.071
TBTF*RE		
TBTF*CI		
TBTF*FL	-16.241***	-4.450
TBTF*CAP	-12.384***	-12.318
TBTF*NCD	0.494	1.599
TBTF*DEP		
TBTF*AG	0.331	0.560
TBTF*FXPUR		
TBTF*SALE	-40.426*	-1.703
TBTF*BL	-5.761***	-4.508
TBTF*LET	-24.364***	-12.978
TBTF*C	0.395	0.812
MBHC	0.707***	25.560
Intercept	12.602***	126.891
R ²	.3658	
Number of Observations	4127	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-20**Asset Composition Regression: Second Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs without publicly traded equity and with asset size between \$.116 billion and \$.52 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.256	-1.428
TBTF*RE	-0.142	-1.504
TBTF*CI	-0.064	-0.662
TBTF*FL		
TBTF*CAP	0.362	0.828
TBTF*NCD	-0.067	-0.740
TBTF*DEP	0.310*	1.718
TBTF*AG	-0.196*	-1.933
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-0.951	-1.272
TBTF*LET	-1.046	-1.093
TBTF*C	0.061	0.542
MBHC	0.075***	6.681
Intercept	11.651***	67.660
R ²	.0340	
Number of Observations	4127	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-20A**Asset Composition Regression: Second Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with asset size between \$.116 billion and \$.52 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.288	-1.643
TBTF*RE	-0.078	-0.937
TBTF*CI	-0.046	-0.519
TBTF*FL		
TBTF*CAP	0.392	0.896
TBTF*NCD		
TBTF*DEP	0.299*	1.669
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-1.414	-1.493
TBTF*C	0.129	1.240
MBHC	0.068***	5.993
Intercept	11.610***	67.863
R ²	.0218	
Number of Observations	4127	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-20B**Asset Composition Regression: Second Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with asset size between \$.116 billion and \$.52 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.004	0.097
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	0.087	0.218
TBTF*NCD	-0.077	-0.907
TBTF*DEP		
TBTF*AG	-0.135	-1.526
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-5.761***	-0.737
TBTF*LET	-1.323	-1.463
TBTF*C	0.078	0.707
MBHC	0.076***	6.775
Intercept	11.261***	330.081
R ²	.0301	
Number of Observations	4127	
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level		

Table-21**Asset Composition Regression: Third Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs without publicly traded equity and with asset size between \$.52 billion and \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.147	1.516
TBTF*RE	-0.008	-0.098
TBTF*CI	-0.039	-0.441
TBTF*FL		
TBTF*CAP	-0.249	-1.480
TBTF*NCD	0.061	0.651
TBTF*DEP	-0.154	-1.444
TBTF*AG	-0.020	-0.269
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	1.354	0.881
TBTF*LET	0.229	0.253
TBTF*C	0.105	1.051
MBHC	0.051***	3.344
Intercept	10.497***	129.339
R ²	.0377	
Number of Observations	4128	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-21A**Asset Composition Regression: Third Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with an asset size between \$.52 billion and \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{RE} + \beta_2\text{CI} + \beta_3\text{CAP} + \beta_4\text{DEP} + \beta_5\text{FXPUR} + \beta_6\text{LET} + \beta_7\text{C} + \beta_8\text{TBTF} + \beta_9\text{TBTF*RE} + \beta_{10}\text{TBTF*CI} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*DEP} + \beta_{13}\text{TBTF*FXPUR} + \beta_{14}\text{TBTF*LET} + \beta_{15}\text{TBTF*C} + \beta_{16}\text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.201	2.156
TBTF*RE	-0.023	-0.336
TBTF*CI	-0.017	-0.212
TBTF*FL		
TBTF*CAP	-0.249	-1.494
TBTF*NCD		
TBTF*DEP	-0.205**	-1.975
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	0.113	0.125
TBTF*C	0.087	0.955
MBHC	0.052***	3.388
Intercept	10.425***	129.800
R ²	.0209	
Number of Observations	4128	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-21B**Asset Composition Regression: Third Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with an asset size between \$.52 billion and \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.005	0.216
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	-0.229	-1.384
TBTF*NCD	0.049	0.553
TBTF*DEP		
TBTF*AG	-0.016	-0.260
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	1.647	1.089
TBTF*LET	0.231	0.264
TBTF*C	0.092	0.926
MBHC	0.052***	3.413
Intercept	10.590***	651.375
R ²	.0369	
Number of Observations	4128	
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level		

Table-22**Asset Composition Regression: Smallest Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs without publicly traded equity and with asset size less than \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.669***	-5.111
TBTF*RE	0.142	0.756
TBTF*CI	-0.028	-0.141
TBTF*FL		
TBTF*CAP	2.271***	3.745
TBTF*NCD	0.010	0.051
TBTF*DEP	2.687***	5.034
TBTF*AG	0.163	1.241
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	23.681***	2.675
TBTF*LET	-6.363***	-2.820
TBTF*C	0.420*	1.878
MBHC	0.226***	3.123
Intercept	11.557***	22.775
R ²	.1262	
Number of Observations	4128	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-22A**Asset Composition Regression: Smallest Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with an asset size less than \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF} * \text{RE} + \beta_{10} \text{TBTF} * \text{CI} + \beta_{11} \text{TBTF} * \text{CAP} + \beta_{12} \text{TBTF} * \text{DEP} + \beta_{13} \text{TBTF} * \text{FXPUR} + \beta_{14} \text{TBTF} * \text{LET} + \beta_{15} \text{TBTF} * \text{C} + \beta_{16} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-2.264***	-4.349
TBTF*RE	-0.034	-0.210
TBTF*CI	-0.101	-0.530
TBTF*FL		
TBTF*CAP	1.760***	2.924
TBTF*NCD		
TBTF*DEP	2.366***	4.434
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-6.305***	-2.783
TBTF*C	0.307	1.486
MBHC	0.052***	3.388
Intercept	11.318***	22.274
R ²	.1135	
Number of Observations	4128	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-22B**Asset Composition Regression: Smallest Non-Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and with an asset size less than \$.26 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{FL} + \beta_2\text{CAP} + \beta_3\text{NCD} + \beta_4\text{AG} + \beta_5\text{FXSALE} + \beta_6\text{BL} + \beta_7\text{LET} + \beta_8\text{C} + \beta_9\text{TBTF} + \beta_{10}\text{TBTF*FL} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*NCD} + \beta_{13}\text{TBTF*AG} + \beta_{14}\text{TBTF*FXSALE} + \beta_{15}\text{TBTF*BL} + \beta_{16}\text{TBTF*LET} + \beta_{17}\text{TBTF*C} + \beta_{18}\text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.055	-0.992
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	-0.279	-0.806
TBTF*NCD	-0.006	-0.030
TBTF*DEP		
TBTF*AG	0.181	1.583
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	4.522	0.525
TBTF*LET	-7.546***	-3.397
TBTF*C	0.618***	2.748
MBHC	0.237***	3.250
Intercept	9.949***	203.803
R ²	.1067	
Number of Observations	4128	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-23**Asset Composition Regression: Publicly Traded**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs with publicly traded equity. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \\ & \beta_{14} \text{TBTF*RE} + \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} \\ & + \beta_{19} \text{TBTF*DEP} + \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \\ & \beta_{23} \text{TBTF*BL} + \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
Real Estate (RE)	1.085	0.910
Comm. & Ind. (CI)	0.374	0.269
Foreign Loans (FL)	3.110	0.418
Capital (CAP)	-4.780	- 0.914
Negotiable CDs (NCD)	0.463	0.464
Deposits (DEP)	-5.301***	-4.801
Agriculture (AG)	11.729*	1.728
Foreign Exchange Contracts Purchased (FXPUR)	22.491***	4.118
Foreign Exchange Contracts Sold (FXSALE)	-15.473***	-4.148
Bank Loans (BL)	4.040	0.661
Letters of Credit (LET)	8.175***	3.049
Consumer (C)	4.299**	2.489
TBTF	0.076	0.074
TBTF*RE	0.886	0.619
TBTF*CI	0.967	0.585
TBTF*FL	11.320	0.871
TBTF*CAP	-17.217***	-2.946

Table 23: (cont.)

Variable	Parameter Estimate	t-statistic
TBTF*NCD	0.227	0.183
TBTF*DEP	-0.090	-0.069
TBTF*AG	9.554	1.140
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-3.539	-0.507
TBTF*LET	16.239*	1.760
TBTF*C	1.059	0.521
MBHC	1.167***	10.957
Intercept	17.626***	18.865
R ²	.7011	
Number of Observations	347	
* Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level		

Table-23A**Asset Composition Regression: Publicly Traded**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with publicly traded equity. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1\text{RE} + \beta_2\text{CI} + \beta_3\text{CAP} + \beta_4\text{DEP} + \beta_5\text{FXPUR} + \beta_6\text{LET} + \beta_7\text{C} \\ + \beta_8\text{TBTF} + \beta_9\text{TBTF*RE} + \beta_{10}\text{TBTF*CI} + \beta_{11}\text{TBTF*CAP} + \beta_{12}\text{TBTF*DEP} + \\ \beta_{13}\text{TBTF*FXPUR} + \beta_{14}\text{TBTF*LET} + \beta_{15}\text{TBTF*C} + \beta_{16}\text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.661	0.644
TBTF*RE	1.944	1.350
TBTF*CI	1.203	0.727
TBTF*FL		
TBTF*CAP	-4.565	-0.934
TBTF*NCD		
TBTF*DEP	-2.033*	-1.720
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	9.323	0.975
TBTF*C	1.900	1.024
MBHC	1.275***	11.621
Intercept	16.736***	22.274
R ²	.6403	
Number of Observations	347	

- * Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-23B**Asset Composition Regression: Publicly Traded**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for the whole sample of BHCs in reduced form with publicly traded equity. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \\ & \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \\ & \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \\ & \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.490	0.918
TBTF*RE		
TBTF*CI		
TBTF*FL	0.214	0.016
TBTF*CAP	-18.708	-3.702
TBTF*NCD	0.607	0.476
TBTF*DEP		
TBTF*AG	5.008	0.557
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-3.972	-0.516
TBTF*LET	16.702*	1.715
TBTF*C	0.159	0.079
MBHC	1.352***	11.637
Intercept	14.389***	29.184
R ²	.6170	
Number of Observations	347	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-24**Asset Composition Regression: Largest Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs with publicly traded equity and with asset size over \$12.067 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	6.319***	3.150
TBTF*RE	-6.009	-1.568
TBTF*CI	-3.383	-1.047
TBTF*FL	-15.339	-1.073
TBTF*CAP	-55.905***	-4.294
TBTF*NCD	0.313	0.183
TBTF*DEP	-2.809	-1.089
TBTF*AG	3.583	0.328
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-43.263*	-1.826
TBTF*LET	84.733***	4.346
TBTF*C	-5.223	-1.032
MBHC	0.867*	1.834
Intercept	10.862***	5.411
R ²	.5519	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-24A**Asset Composition Regression: Largest Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form with publicly traded equity and with an asset size over \$12.067 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	3.194**	2.288
TBTF*RE	-3.522	-0.994
TBTF*CI	-0.518	-0.197
TBTF*FL		
TBTF*CAP	-47.114***	-4.061
TBTF*NCD		
TBTF*DEP	-1.314	-0.595
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	86.402***	4.644
TBTF*C	-3.046	-0.630
MBHC	0.694	1.53
Intercept	13.858***	9.908
R ²	.4829	
Number of Observations	86	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-24B**Asset Composition Regression: Largest Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form with publicly traded equity and with an asset size over \$12.067 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	1.707**	2.096
TBTF*RE		
TBTF*CI		
TBTF*FL	-7.260	-0.532
TBTF*CAP	-40.800***	-4.178
TBTF*NCD	-1.297	-0.831
TBTF*DEP		
TBTF*AG	-3.389	-0.342
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-10.822	-0.631
TBTF*LET	87.665***	4.424
TBTF*C	-4.787	-1.216
MBHC	0.915*	1.901
Intercept	14.794***	16.080
R ²	.4758	
Number of Observations	86	
* Significant at the 10% level		
** Significant at the 5% level		
*** Significant at the 1% level		

Table-25**Asset Composition Regression: Second Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs with publicly traded equity and with asset size between \$12.067 billion and \$6.274 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	0.034	0.061
TBTF*RE	-0.753	-0.601
TBTF*CI	0.443	0.314
TBTF*FL	4.442	0.558
TBTF*CAP	-0.045	-0.011
TBTF*NCD	-0.361	-0.334
TBTF*DEP	-0.105	-0.127
TBTF*AG	2.931	0.468
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	1.207	0.271
TBTF*LET	-0.455	-0.063
TBTF*C	0.681	0.494
MBHC	-0.079	-0.785
Intercept	16.071***	32.205
R ²	.1626	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-25A**Asset Composition Regression: Second Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form with publicly traded equity and with an asset size between \$12.067 billion and \$6.274 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \varepsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.035	0.073
TBTF*RE	-0.908	-0.791
TBTF*CI	0.457	0.434
TBTF*FL		
TBTF*CAP	0.130	0.038
TBTF*NCD		
TBTF*DEP	0.001	0.002
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-2.348	-0.365
TBTF*C	-0.550	0.478
MBHC	-0.080	-0.925
Intercept	15.974***	37.874
R ²	.0987	
Number of Observations	86	

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table-25B**Asset Composition Regression: Second Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form with publicly traded equity and with an asset size between \$12.067 billion and \$6.274 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.091	-0.307
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	0.613	0.197
TBTF*NCD	-0.313	-0.370
TBTF*DEP		
TBTF*AG	3.325	0.661
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	1.474	0.360
TBTF*LET	0.596	0.093
TBTF*C	0.203	0.200
MBHC	-0.103	-1.152
Intercept	16.072***	55.605
R ²	.4758	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-26**Asset Composition Regression: Third Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs with publicly traded equity and with asset size between \$6.274 billion and \$2.519 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \epsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.956	-1.087
TBTF*RE	-0.788	-0.747
TBTF*CI	-1.151	-0.746
TBTF*FL	23.881	1.362
TBTF*CAP	-1.836	-0.322
TBTF*NCD	0.549	0.522
TBTF*DEP	1.015	1.021
TBTF*AG	2.497	0.374
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	2.201	0.433
TBTF*LET	14.158*	1.845
TBTF*C	1.226	0.867
MBHC	0.224**	2.355
Intercept	16.725***	21.673
R ²	.3768	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-26A**Asset Composition Regression: Third Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form with publicly traded equity and with an asset size between \$6.274 billion and \$2.519 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-1.120	-1.401
TBTF*RE	-0.674	-0.674
TBTF*CI	-0.600	-0.464
TBTF*FL		
TBTF*CAP	-2.701	-0.527
TBTF*NCD		
TBTF*DEP	1.361	1.537
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	12.426*	1.712
TBTF*C	0.927	0.815
MBHC	0.199**	2.428
Intercept	16.927***	24.773
R ²	.3289	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-26B**Asset Composition Regression: Third Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form with publicly traded equity and with an asset size between \$6.274 billion and \$2.519 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.757*	-1.790
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	0.739	0.138
TBTF*NCD	0.518	0.551
TBTF*DEP		
TBTF*AG	3.428	0.515
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	5.101	1.061
TBTF*LET	16.134**	2.221
TBTF*C	1.782	1.288
MBHC	0.258**	2.636
Intercept	15.723***	40.545
R ²	.2377	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-27**Asset Composition Regression: Smallest Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs without publicly traded equity and with asset size less than \$2.519 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\begin{aligned} \text{SIZE} = & \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{FL} + \beta_4 \text{CAP} + \beta_5 \text{NCD} + \beta_6 \text{DEP} + \beta_7 \text{AG} + \\ & \beta_8 \text{FXPUR} + \beta_9 \text{FXSALE} + \beta_{10} \text{BL} + \beta_{11} \text{LET} + \beta_{12} \text{C} + \beta_{13} \text{TBTF} + \beta_{14} \text{TBTF*RE} + \\ & \beta_{15} \text{TBTF*CI} + \beta_{16} \text{TBTF*FL} + \beta_{17} \text{TBTF*CAP} + \beta_{18} \text{TBTF*NCD} + \beta_{19} \text{TBTF*DEP} + \\ & \beta_{20} \text{TBTF*AG} + \beta_{21} \text{TBTF*FXPUR} + \beta_{22} \text{TBTF*FXSALE} + \beta_{23} \text{TBTF*BL} + \\ & \beta_{24} \text{TBTF*LET} + \beta_{25} \text{TBTF*C} + \beta_{26} \text{MBHC} + \varepsilon \end{aligned}$$

Variable	Parameter Estimate	t-statistic
TBTF	-1.735	-0.546
TBTF*RE	1.769	0.935
TBTF*CI	1.959	0.796
TBTF*FL	393.603	0.678
TBTF*CAP	-12.498	-0.979
TBTF*NCD	-1.077	-0.575
TBTF*DEP	2.750	0.676
TBTF*AG	9.793	0.641
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-1.888	-0.160
TBTF*LET	-41.070*	-1.690
TBTF*C	-0.567	-0.151
MBHC	0.623***	4.210
Intercept	16.709***	6.775
R ²	.5826	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-27A**Asset Composition Regression: Smallest Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and an with asset size less than \$2.519 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{RE} + \beta_2 \text{CI} + \beta_3 \text{CAP} + \beta_4 \text{DEP} + \beta_5 \text{FXPUR} + \beta_6 \text{LET} + \beta_7 \text{C} + \beta_8 \text{TBTF} + \beta_9 \text{TBTF*RE} + \beta_{10} \text{TBTF*CI} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*DEP} + \beta_{13} \text{TBTF*FXPUR} + \beta_{14} \text{TBTF*LET} + \beta_{15} \text{TBTF*C} + \beta_{16} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	0.419	0.156
TBTF*RE	1.482	0.856
TBTF*CI	1.579	0.694
TBTF*FL		
TBTF*CAP	4.196	0.468
TBTF*NCD		
TBTF*DEP	-1.555	-0.517
TBTF*AG		
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL		
TBTF*LET	-23.870	-1.068
TBTF*C	1.915	0.715
MBHC	0.708***	4.934
Intercept	13.834***	7.037
R ²	.5006	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-27B**Asset Composition Regression: Smallest Public Asset Quartile**

Results from the cross-sectional time-series regression distinguishing between asset and periphery growth strategies for BHCs in reduced form without publicly traded equity and an with asset size less than \$2.519 billion. All variables are deflated into 1991 dollars and divided by the BHCs total assets. The dependent variable is the log of total assets.

$$\text{SIZE} = \beta_0 + \beta_1 \text{FL} + \beta_2 \text{CAP} + \beta_3 \text{NCD} + \beta_4 \text{AG} + \beta_5 \text{FXSALE} + \beta_6 \text{BL} + \beta_7 \text{LET} + \beta_8 \text{C} + \beta_9 \text{TBTF} + \beta_{10} \text{TBTF*FL} + \beta_{11} \text{TBTF*CAP} + \beta_{12} \text{TBTF*NCD} + \beta_{13} \text{TBTF*AG} + \beta_{14} \text{TBTF*FXSALE} + \beta_{15} \text{TBTF*BL} + \beta_{16} \text{TBTF*LET} + \beta_{17} \text{TBTF*C} + \beta_{18} \text{MBHC} + \epsilon$$

Variable	Parameter Estimate	t-statistic
TBTF	-0.032	-0.038
TBTF*RE		
TBTF*CI		
TBTF*FL		
TBTF*CAP	2.619	0.405
TBTF*NCD	-0.741	-0.427
TBTF*DEP		
TBTF*AG	6.587	0.476
TBTF*FXPUR		
TBTF*SALE		
TBTF*BL	-4.774	-0.408
TBTF*LET	-22.653	-1.073
TBTF*C	0.521	0.176
MBHC	0.703	4.783
Intercept	13.917***	19.297
R ²	.4796	
Number of Observations	86	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-28**Descriptive Statistics: Efficiency**

Descriptive statistics (means) for the variables used in the multi-product quadratic cost function for the years 1983 to 1985 in \$millions.

Variable	1983	1984	1985
Total Cost (TC)	\$27.203	\$59.152	\$55.262
Comm. & Ind. (CI)	73.709	70.836	70.405
Real Estate (RE)	54.649	57.363	62.641
Consumer (C)	36.060	39.736	44.043
Agriculture (AG)	5.568	5.292	4.651
(CI) ²	3.7E11	3.0E11	2.8E11
(RE) ²	1.8E11	1.9E11	2.2E11
(C) ²	5.9E10	8.8E10	1.2E11
(AG) ²	1.5E9	1.3E9	8.7E8
CI*RE	2.1E11	2.0E11	2.1E11
CI*C	1.2E11	1.3E11	1.5E11
CI*AG	1.4E10	1.1E10	8.8E9
RE*C	9.2E10	1.2E11	1.5E11
RE*AG	1.4E10	1.2E10	1.0E10
C*AG	6.5E9	6.6E9	6.3E9
Loanable Funds (CF)	0.674	0.085	0.075
Cost of Wages (W)	20.924	22.021	22.955
Cost of Physical Capital (CP)	0.005	0.003	0.003

Table-29**Multi-Product Quadratic Cost Function: Whole Sample**

Results for the multi-product quadratic cost function for all BHCs for the year 1983:

$$TC = \beta_0 + \beta_1 RE + \beta_2 AG + \beta_3 CI + \beta_4 C + \beta_5 (RE)^2 + \beta_6 (AG)^2 + \beta_7 (CI)^2 + \beta_8 (C)^2 + \beta_9 RE*AG + \beta_{10} RE*CI + \beta_{11} RE*C + \beta_{12} AG*CI + \beta_{13} AG*C + \beta_{14} CI*C + \beta_{15} CF + \beta_{16} W + \beta_{17} PC + \beta_{18} MBHC + \varepsilon$$

Variable Name	Parameter Estimate	t-statistics
Real Estate (RE)	0.076***	16.265
Agriculture (AG)	0.098***	3.375
Comm. & Ind. (CI)	0.269***	107.428
Consumer (C)	0.047***	8.228
(RE) ²	8.0E-8***	3.572
(AG) ²	0.001***	18.951
(CI) ²	1.16E-9***	4.886
(C) ²	-5.6E-8***	-15.182
(RE)*(AG)	6.1E-8***	3.454
(RE)*(CI)	-6.3E-8***	-46.095
(RE)*(C)	0.001***	20.956
(AG)*(CI)	0.001***	17.179
(AG)*(C)	-0.001***	-25.762
(CI)*(C)	2.9E-8***	25.113
Cost of Funds (CF)	13399**	2.038
Cost of Wages (W)	33.836	0.572
Cost of Physical Capital (PC)	-103822	-1.440
MBHC	7406.116***	5.683
Intercept	-61.882	-0.036
R ²	.9904	
Number of Observations	5024	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-30**Multi-Product Quadratic Cost Function: Most Efficient BHCs**

Results for the multi-product quadratic cost function for the best set or most efficient set of BHCs for the year 1983:

$$TC = \beta_0 + \beta_1 RE + \beta_2 AG + \beta_3 CI + \beta_4 C + \beta_5 (RE)^2 + \beta_6 (AG)^2 + \beta_7 (CI)^2 + \beta_8 (C)^2 + \beta_9 RE*AG + \beta_{10} RE*CI + \beta_{11} RE*C + \beta_{12} AG*CI + \beta_{13} AG*C + \beta_{14} CI*C + \beta_{15} CF + \beta_{16} W + \beta_{17} PC + \beta_{18} MBHC + \epsilon$$

Variable Name	Parameter Estimate	t-statistics
Real Estate (RE)	0.083***	10.120
Agriculture (AG)	0.339***	11.872
Comm. & Ind. (CI)	0.216***	103.964
Consumer (C)	0.060***	6.266
(RE) ²	2.4E-8***	4.261
(AG) ²	-0.001***	-7.424
(CI) ²	5.0-9***	22.315
(C) ²	-8.7E-8***	-25.858
(RE)*(AG)	-0.001***	-2.446
(RE)*(CI)	-8.0E-8***	-39.792
(RE)*(C)	0.001***	21.890
(AG)*(CI)	0.001***	15.267
(AG)*(C)	-0.001***	-5.721
(CI)*(C)	4.0E-8***	34.703
Cost of Funds (CF)	4434.825	0.901
Cost of Wages (W)	40.036	0.750
Cost of Physical Capital (PC)	-42895	-0.765
MBHC	2786.570***	2.993
Intercept	-3549.911**	-2.001
R ²	.9974	
Number of Observations	1256	

* Significant at the 10% level
 ** Significant at the 5% level
 *** Significant at the 1% level

Table-31**Measures of Inefficiency**

Measures of Inefficiency from the multi-product quadratic cost function for each year, for publicly traded and non-publicly traded BHCs, along with their asset quartile groups (\$billions). The parameters for the most efficient set are used in the multi-product quadratic cost function and subtracted against total costs (TC). The residuals are used as follows:

$$\text{Inefficiency} = \varepsilon(\text{error}) / \text{TA (total assets)}$$

Sample	1983	1984	1985
Total	6.579%	13.939%	13.231%

Publicly Traded	1.417	9.485	7.531
TA > \$12.06	1.394	11.139	7.850
\$12.06 > TA > \$6.27	1.114	8.359	6.769
\$6.27 > TA > \$2.52	1.398	9.060	7.321
TA < \$2.52	1.757	9.545	8.023

Non-Publicly Traded	6.704	14.034	13.338
TA < \$.111	1.987	9.374	8.059
\$.111 > TA > \$.052	3.471	11.085	10.339
\$.052 > TA > \$.026	5.635	13.081	12.646
TA < \$.026	15.270	22.532	22.659

VITA

Breck Ledo Robinson was born in Baltimore, Maryland on August 28, 1964. He attended elementary and secondary school in Baltimore County and graduated from Milford Mill High School in June 1982. The following September he entered University of Maryland Baltimore County, and in May 1986 received a double major with a degree of Bachelor of Arts in Political Science and Economics. He continued his education at the University of Delaware in September 1986, and in December 1988 received a Master of Arts degree in Economics.

From June 1988 to June 1989, he worked as a Research Assistant at the Federal Reserve Bank of Philadelphia in the Department of Economic Research. In August 1989 he came to the University of Tennessee, Knoxville and received a Master of Business Administration degree in Finance in August 1994. Later in that same year, Breck received a Doctor of Philosophy degree in Business Administration with a major in Finance and a minor in Macroeconomics/Macroeconomics in December 1994.

He will join the finance department as a faculty member at his Alma Mater, The University of Delaware in September 1994.