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Post Merger Bank Performance Associated with Regulatory Evaluation Factors

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POST MERGER BANK PERFORMANCE ASSOCIATED WITH REGULATORY EVALUATION FACTORS

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TABLE OF CONTENTS

ABSTRACT

The U.S. banking industry has seen an unprecedented wave of merger activity over the past decade. This study provides an investigation into performance effects of bank mergers on post merger performance from both the banking industry's and bank regulators' perspectives. Using FDIC call report data from 1992 until 2004, I assembled a data set that included 3500 mergers over this time period and found that significant overall improvements in financial performance is difficult to achieve, in agreement with past research. Specific variables showed improvement, while others did not.

INTRODUCTION

The past decade has seen dramatic changes within the US banking industry. In the ten years since the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (codified at various sections of 12 U.S.C.) (IBBEA), there has been an unprecedented wave of consolidation of industry assets through mergers and acquisitions. The period from 1994 to 2003 saw 3,517 mergers occur (Pilloff 2004), as broken down by year in Figure 1. This shows that as the number of mergers has been decreasing over the period, the number of banking organizations decreased from 16,000 in 1980 to 8,000 in 2003 (Pilloff 2004). This reduction in the number of banks has led to an increased concentration of total assets within the industry. As the merger wave continued, the industry assets held by the ten largest institutions increased from 22 percent to 46 percent (Pilloff).

In addition to this consolidation there has been a wealth of research into the underlying reasons for and the performance effects of these mergers. Most of this research can be divided into two main categories. The first category is of event studies that track of stock price changes and abnormal returns in the wake of merger announcements. These studies attempt to determine how company valuation is affected by mergers. The other main category of merger studies looks at operating performance. Most of these studies have focused on post merger effects, controlling for variables such as size or profitability (Focarelli, Panetta, and Salleo 2002). The focus of this study is to investigate the effects and relationships of banks' pre-merger conditions on post-merger performance within the context of factors that regulators use in bank evaluation. While

many similar studies compare merged banks' results with a control group of banks that did not merge, the aim of this study is to determine what factors prove most significant in obtaining favorable post merger results.

This study will evaluate bank merger effects on financial performance by assessing factors related to CAMELS rating as a proxy. The CAMELS system is used during investigations by the regulators who evaluate the financial position of banks. The time period included in this study will span from the early 1990's recession and recovery, through the unprecedented economic expansion of the late 1990's, and back again to the recession and recovery of the early 21st century. Aggregate industry-wide data will be assembled by combining pre merger banks' financial statements into single pro forma entities which will then be compared to the financial data of the post merger surviving bank. The results are intended to provide more information on bank mergers as to whether they achieve the goals set in providing the justification for merging, both from the regulators' and the banking industry's perspectives. This topic is important as it contributes to the discussion of whether banks see success in the areas they aim to improve through engaging in mergers and acquisitions and whether the regulator approval of these mergers and acquisitions is in line with the goal of ensuring safety and soundness of the country's banking industry. The results of this paper can be used to further justify or discredit the appropriateness of bank mergers to occur. It will also contribute the banks' ability to find ideal conditions in which to engage in mergers to achieve the highest benefits and also contribute to the regulators' responsibility of assessing merger proposals.

Preliminary results tend to agree with the literature in that performance increases resulting from engaging in bank mergers are difficult to achieve. Studies of mergers' effects on operating performance have become increasingly common and reflect a heightened interest in cost cutting and the improvement of efficiency within the banking industry (Rhoades 1994). Rhoades found two conclusions most prevalent within the operating performance studies. Most of the studies summarized showed no improvements in both efficiency and profitability in cases where both are studied concurrently. The studies that do show improvement in either efficiency or profitability provide inconclusive results in determining whether efficiency and profitability gains are related.

This paper begins by first introducing several hypotheses that are complimentary to the investigation of factors used by regulators in assessing and approving bank mergers. Accompanying these hypotheses will be a review of previous related studies. It will then present a review of the relevant literature pertaining to this topic. This section shall consist of first a general background on corporate mergers, and move on to look at the interests' regulators have in reviewing bank merger applications. Included here will be an overall history of bank merger legislation in the United States and of how the Federal Reserve has been given authority over bank mergers, with more attention given to events that have higher impact during recent times since this paper uses data from the 1990's and into the 2000's. The section then moves on to discuss the components of the CAMELS factors that federal regulators use in assessing a banks performance and condition. The CAMELS acronym stands for Capital, Assets, Management, Earnings, Liquidity, and Sensitivity and is detailed further in this section.

The banking industry has its own reasons for engaging in mergers and acquisitions and will next be discussed. The more commonly stated reasons given by banks for engaging in mergers are to achieve performance improvements through synergy and cost efficiency. Many research studies of performance, including this one, tend to show actual results otherwise in that the use of mergers to improve performance is not justified in the post merger data (Rhoades 1994).

The data and methodology used for this research shall be defined, followed by presentation and discussion of the analytical results. The results section will provide an analysis of the CAMELS related factors, address the hypotheses mentioned in the introduction, and present the results of a linear regression performed in order to form a model that predicts post merger performance based on the CAMELS factors. The paper will conclude with a summary of the results as well as topics for further research. This paper will provide further direction for research in the field of bank mergers that will allow us to further describe what happens to banks as they merge and to define what pre-merger conditions influence merger success.

HYPOTHESES

The first hypothesis is that no acquiring banks pay a price for a target bank that is below the current market price. Many studies have addressed this question using stock market prices. This study however also incorporates non-publicly traded firms. Because of the difficulty in assessing the market values of these privately held institutions, this paper will use premium levels as a proxy for market value. These premiums are the purchase price paid by the acquirer that is in excess of the book value of the target. As

banks engage in mergers and acquisitions, premiums paid for targets are booked on balance sheets as goodwill. Several merger studies have investigated factors that influence bank merger premiums. Palia (1993) studied managerial, regulatory, and financial determinants of bank merger premiums and determined that premiums are related to characteristics of both targets and acquirers, as well as their regulatory environments. His significant findings indicated that strongly performing smaller targets commanded higher premiums, and that the larger acquirers tended to pay higher premiums. Deregulation allows for higher levels of competition for these better performing targets and thus further acts to increase premium levels. Considering the passage of the IBBEA since Palia's work, premium levels can be expected to have risen over the period included in this study. Brewer, et al., (2000) examined whether premiums offered to targets have been increasing over time. In his work, Brewer demonstrated that premiums were higher in the post IBBEA period, as demand for target banks rose due to the removal of the regulation-induced limits on bank mergers and acquisitions.

A period of rising premiums will be evidenced by higher levels of goodwill on the balance sheets post merger. In order to address this hypothesis, the changing levels of goodwill to assets from pre merger to post merger will be analyzed. Premiums could be more directly studied by comparing the values of target banks' equities, but as explained above, this study includes non-publicly traded firms whose equity levels aren't easily determined. This will help to determine whether the industry on average is seeing higher premiums. It is expected that results will agree with the literature in that premiums have been rising over the proposed period of study.

The second hypothesis is that if there are no improvements in efficiency through cost reduction, then mergers will not take place. While efficiency through cost reduction is often cited as a motivating factor for bank mergers to occur, many studies have demonstrated that improvements in unit cost efficiency are very difficult to achieve through merger activity (Rhoades 1994). This would mean that efficiency improvements alone are not significant enough to be the sole motivation for a merger to take place. Rhoades (1994) summarized the results of thirty-nine studies published from 1980 to 1993 that investigated bank merger and acquisition performance. Studies of mergers' effects on operating performance have become increasingly common and reflect a heightened interest in cost cutting and the improvement of efficiency within the banking industry. Rhoades found two conclusions most prevalent within the operating performance studies. First, most of the studies summarized showed no improvements in both efficiency and profitability in cases where both are studied concurrently. Some of the studies did show improvement in either efficiency or profitability, yet provided inconclusive results in determining whether efficiency and profitability gains are related.

Akhavein, Berger, and Humphrey (1997) examined merger effects on profit efficiency amongst the largest of banking organizations and found significant improvements in efficiency for merged banks over for those who did not engage in merger activities. They concluded that most gains in profit efficiency came through working to increase revenues, rather than direct cost control. Also, banks who showed the lowest performance in efficiency improved the greatest after merging.

Berger and Mester (1999) studied the changes in cost and profit performance in banks from 1984 to 1997. Their main finding was that the banking industry overall showed improvement in profit performance. Their measurements of cost efficiency proved inconclusive, however, as improvements in this figure would be minimal relative to overall profitability improvement or barely at all. They noted also that merging institutions influenced this statistic more so than their non merging counterparts. Their explanation for these findings is that studying cost efficiency alone doesn't entirely reveal the success in attempts to improve overall performance. Banks that focus on revenue growth, while at the same time minimizing cost increases seen through variable unit costs, may see success in improving overall profitability that is clouded by lesser improvements in cost efficiency. DeYoung (1997) made similar conclusions in that studies of cost efficiency must also include analysis of revenues.

The efficiency ratio is determined by dividing the total non-interest expense by the sum of the interest and non-interest incomes, or total revenue. This ratio is a measure of how well the costs contribute to revenues. This hypothesis will be addressed by investigating the pre and post merger efficiencies of banks. Merger effects on non-interest expense and efficiency ratios will be analyzed here. It is expected that this stand-alone look at the efficiency ratios will agree with the literature in that post merger improvements in efficiency will be minimal. The presence of minimal to nil gains in efficiency within dataset of merged banks' performance will disprove the hypothesis.

The third hypothesis is that mergers do not result in significant performance increases. Some of the previously mentioned literature has shown that performance

increases resulting from mergers are very difficult to achieve. Rhoades' (1994) summary of nineteen different operating performance studies found that most showed a lack of improvement in profitability as a result of mergers. One study in Rhoades summary in particular showed mixed results in terms of efficiency and profitability measures and utilizes a very similar methodology as in this paper. Cornett and Tehranian (1992) studied changes in bank corporate performance that occur post acquisition. This study looked at thirty large bank mergers that occurred from 1982 to 1987 and compared their post merger performance to industry averages. Their results indicated that merged banks as a whole see greater improvements in performance. Results are mixed when individual measures are examined. Return on equity for the merged banks improved relative to the industry while return on assets did not. The similarities and differences in the two approaches will he highlighted below as the methodology is described.

Performance changes will be measured by changes return on equity, as well as the three components of the DuPont equation: profit margin, total asset turnover, and the equity multiplier. The Dupont Equation has been chosen because it provides a simple means of determining where performance changes are derived from. These pre and post mergers will be compared to look for evidence of profitability improvements and will lead into the last analysis of the paper. Following the results of the hypothesis testing will be a multiple linear regression that incorporates the selected pre merger CAMELS variables in order to build a predictive model for post merger performance based on pre-merger conditions.

BACKGROUND AND LITERATURE REVIEW

This section begins by generalizing the reasons for corporations to engage in mergers and acquisitions. The differing pathways managers can implement towards achieving merger success will be outlined here. Next, the industry regulators' role will be examined by providing a historical background that describes how the current regulatory environment has developed over time. Incorporated here is a brief discussion of important issues that regulators must consider in approving mergers, as well as a brief review of the literature that has investigated bank mergers' effects on their external environment. Following this will be an examination into why banks themselves choose to engage in M&A activity. Included here is a review of the literature that concerns itself with how mergers have affected the financial performance of banks. The section will conclude by describing the CAMELS system and introducing the variables to be studied that fall within the context of performance measures.

REASONS FOR ENGAGING IN CORPORATE MERGERS AND ACQUISITIONS

Corporate mergers and acquisitions are justified through many different strategies and see various levels of success. The main purpose of engaging in this activity, however, is the increase firm value. When analyzing any new project, managers must determine whether the project will add this value. One method of project analysis is the net present value method (NPV). The NPV method discounts all net future cash flows expected to be received through the project in question to their present value. On a stand alone basis, the project is then accepted or rejected, depending on whether the NPV is

positive or negative. In the context of mergers and acquisitions, management can look at the three components of the NPV equation to determine their strategy for pursuing M&A: top-line gains, or revenue; bottom-line gains, or income; and the discount rate, or risk (Walter 2004).

Increasing market share and market extension is a common reason for engaging in mergers and acquisitions. Revenue levels can be increased by gaining new customers in areas that a firm currently lags in either in terms of product offerings or where the firm physically conducts its business. Economies of scope can be achieved when an institution offers a wider product mix and allows existing customers to turn to them for more of their needs. Geographic expansion allows the institution to compete in new areas and gain new customers.

Profit margins can be widened through increases in economies of scale and cost efficiency. Economies of scale mean that high fixed costs can be spread over a larger revenue base that accompanies a firm's growth. Literature indicates that size, however, has less to do with improving cost efficiency as does management and the way a firm is run (Walter 2004).

Both the expansion of product mix and geographic expansion work to improve the firm's risk level as well. Geographic diversification has long been cited to reduce the volatility of a firm's revenue and income by diversifying away the effects of local economic shocks and diversified product mixes help to protect against downturns in product cycles.

M&A activity tends to occur in waves triggered by changes in either the competitive or regulatory environment that encourages and enables mergers and acquisitions. Major waves have occurred in the 1890's, 1920's, 1960's, 1980's and the 1990's (Katz 1997). Often times these waves can be limited to just a few industries or can involve several industries as during the conglomerate mergers of the 1960's. The recent banking industry merger wave of the 1990's is the time period of this study, with the main catalyst for this wave stemming from the continued governmental deregulation of the industry. The following section discusses the history of bank industry regulation.

REGULATORS' ROLE IN BANK MERGERS AND ACQUISITIONS

The regulation of the banking industry has existed in this country as long as the industry itself has. Recent history has shown that the nation's economy can depend on occurrences and developments within the banking industry and, hence, falls under great scrutiny. The government over the years has attempted to regulate this industry through several congressional acts that set up the organizations that oversee these regulations and the industry as a whole. While several agencies govern the different types of institutions within the banking industry, the Federal Reserve Board (Fed) has the final say in whether or not a bank merger will be approved. This section will describe the history of some of the major legislation passed in attempting to regulate the banking industry. It will focus on the reasons the Fed has been given authority over bank mergers and major issues the regulators must take into consideration in evaluating a merger proposal. It will conclude with a description of the CAMELS system and how it is used in this paper to analyze bank merger performance.

The Federal Reserve Board's main purpose in approving merger applications is to make sure that the public interest is served (Broaddus 1998), in addition to considering the competitive effects and the financial health of the surviving institution (Hoenig 1999). The Federal Reserve was created when Federal Reserve Act of 1913 (dispersed throughout 12 USC; ch. 6, 38 Stat. 251) was passed in 1913 in order to "...establish a more effective supervision of banking in the United States..." (Federal Reserve Website). One of the Fed's four general duties is "supervising and regulating banking institutions to ensure the safety and soundness of the nation's banking and financial system and to protect the credit rights of consumers (Federal Reserve Website)." Hence, the Fed is given the authority and responsibility to assess bank mergers and acquisitions. These statements direct the Fed in evaluating bank mergers. While this Act established the Fed, the changing banking industry created the need for additional and more defined powers. Additional legislation since the passing of the Federal Reserve Act has further defined and expanded the Fed's role in approving bank merger applications in order to keep pace with the changing environment.

Many issues pertaining to bank mergers and acquisitions have surfaced over the years. Perhaps the most visible issue in reviewing a merger is how the overall level of competition will be affected by a merger. The 1950's saw a rise on the formation of large bank holding companies (BHC's) as a method for banks to expand outside of their legislatively restrictive borders and outside of the banking industry. Merger numbers increased as a result of this action. The high level of merger activity drove fears of impaired competition levels and of a few very large institutions rising to create a monopolistic environment. As a result, the Bank Holding Company Act of 1956 (12

USC 1841), along with later amendments, assigned the primary responsibility for supervising and regulating the activities of BHCs to the Fed. The Fed was granted this authority for two main reasons: to avoid the creation of banking monopolies which may stifle competition as stated above and to keep banking and commerce separate in instances where non bank holding companies were attempting to acquire banks.

The Bank Merger Act of 1960 (12 USC 1828) addressed concerns that the continuation of the 1950's trend of mergers occurring within the same metropolitan areas would lead to excessive concentrations of financial power and greatly reduced levels of competition. Recent studies have shown that mergers do not significantly stifle local competition as the reduction in singular banking organizations often encourages new entry (Berger 1997). This Act requires that mergers receive prior approval from the surviving bank's regulator, which may be one of several agencies which is primarily the Fed; although the FDIC, the OCC, and various state banking authorities also contribute to the review process.

The Bank Holding Company Act of 1956 and the Bank Merger Act of 1960 provided the Fed with the power to approve or disapprove any mergers between banks that fall under its jurisdiction. In looking at a merger, the Fed must weigh the possible anti-competitive effects against how the convenience and needs of the community are being served, in addition the financial and managerial positions of the existing and proposed banks. Competitive effects are generally assessed within the local market or metropolitan area in which a proposed merger will take place. In assessing the financial effects of a merger on a surviving bank, regulators look at the future prospects for the

bank as the banks tend to claim improvements in earnings and better risk diversification by entering new markets.

A second issue pertinent to the regulators' role in bank mergers is community service. Reviewing how banks lend funds back into the communities in which they are located assesses this. When reviewing merger proposals, the Fed looks at the merging institutions adherence to the Community Reinvestment Act of 1974 (12 USC 2901) (CRA), in addition to other indicators of how the community's needs will be served by the merger. This Act was passed amid concerns that banks that expand into new regions weren't providing enough loans at the local level. The function of the CRA is to ensure that the credit needs of banks' communities are met (Bostic, et al 2002) by requiring certain amounts of the loan portfolio a bank holds to be within its community. Berger (1997) concluded that bank mergers tend to result in the decrease of small business loans that the merging institution makes, providing justification for the CRA. The level of this decrease depends on the size of the bank and by how it adjusts its level of small business lending after a merger. This deficit, however, is made up for by other banks and non-bank financial institutions who offer the same product. In short, Berger found that when a bank decreases its level of small business lending, other members of the local market will step in to make up the loss. This finding may indicate that a merger's effect on a bank's adherence to the CRA is a lesser priority when being evaluated by regulators.

The period from 1960 to 1970 saw 3,592 mergers take place (Rhoades 1985). The pace of mergers then increased as the deregulation of BHCs passed during the 1970's. This trend began to slow down into the early 1980's, as the industry as was reaching equilibrium with the laws in place at the time. That pace picked up again, however, as

interstate merger and branching limitations were slowly deregulated and 6,157 mergers took place from 1981 to 1994 (Rhoades 1996), culminating in the passage of the IBBEA in 1994. During the 1980's, some states had already loosened their intrastate branching laws and some began to allow interstate acquisitions by bank holding companies. From 1994 until 2003, there has been another 3,517 mergers (Pilloff 2004).

A third issue is the emergence of "too-big-to-fail" institutions. The numerous mergers in recent times have resulted in the formation of very large banking organizations, whose assets constitute significant portions of the entire industry as a whole. Currently, 68 percent of all commercial bank assets are held by the fifty largest firms, up from 55 percent in 1990 (ABA Website). The issue is that the failure of one of these banks could bring significant harm to the nation's economy. Banks are given a safety net in the form of insurance by the government. As a bank begins to run into financial trouble, the presence of this federal safety net allows the bank to commit to riskier types of investments in an attempt to right itself. The bank then needs bailing out when this risky activity does not work and the bank needs to be saved. As institutions grow in size, it may become an immense burden on the government to have to bail out one or more of the larger banking institutions, should they run into trouble (Broaddus 1998). Serious consequences would be felt by the financial industry and even the nation's economy as a whole, should these institutions be allowed to fail or close.

The Fed's tending to the safety and soundness of the banking industry must also include an analysis of the banks to be involved in a merger to determine whether the merger will leave behind a successful surviving institution. All of the aforementioned issues are dealt with by examiners on a case by case basis and at least partly include

performance measures. The next section highlights the CAMELS system that provides the basis for choosing the performance variables studied in this paper.

THE CAMELS SYSTEM

As mentioned above, financial performance plays a significant role in whether or not a merger will be approved. Examiners use a ranking system while evaluating the safety and soundness of a bank that incorporates six different factors; the acronym for this system being CAMELS. CAMELS ratings are a common tool for ranking bank performance, with one being the highest and five the lowest. Banks with ratings of three, four, or five are usually considered to be performing sub par and are not allowed to acquire other banks (Wheelock and Wilson 2002). While actual CAMELS ratings assigned to banks by the examiners are not public information, this study will begin its analysis of bank mergers by using the six factors that make up the CAMELS acronym to select, as a proxy, several performance indicators and compare how they change after two institutions have merged. The factors that make up this acronym are Capital adequacy, Asset quality, Management, Earnings, Liquidity, and Sensitivity.

BANKING INDUSTRY REASONS FOR ENGAGING IN MERGERS

While the regulators' role in bank mergers and acquisitions is to ensure the safety and soundness of the nation's banking system, the banking industry has its own reasons for engaging in mergers and acquisitions. These reasons closely follow the generalized reasons for corporate mergers as highlighted in the beginning of this section. Several of these reasons have been presented in the following literature review along with a review

of related studies in attempt to answer why the banking industry has seen increased merger activity.

The major underlying reason for banks to engage in mergers is to improve firm value. As described above, this can be accomplished through three main strategies: revenue enhancement, margin and income enhancement, and risk reduction. Banks can utilize several methods in order to improve these areas individually or simultaneously. Improvements in some areas may come at an expense in others, as will be highlighted below.

Revenues can be expanded through M&A by achieving economies of scope, by increasing market share, and by and through geographic expansion. Scope of operations can be widened by providing a higher number of products and services within the same institution rather than through several competing institutions. Focarelli, et al., (2002) showed that banks engaging in mergers as a means to diversify their product offerings tend to see their service-based income increase. This increase in income is offset, however, by an increase in personnel costs.

Some banks look to increasing their market share and thus improving their competitive position in order to raise revenues. Increasing market share has long been hypothesized to be a reason for bank mergers occurring, as banks are more able to raise loan rates and lower depository rates in environments where competition is reduced (Piloff and Santomero 1997). Yet while this can be true for the largest banks, the top five of which having doubled their market share since the beginning of the merger wave in the early 1980's, the industry as a whole is still relatively fragmented (Broaddus 1998).

Additionally, regulation prohibits any consolidation that could act to stifle competition as mentioned in a previous section.

Geographic expansion allows a bank to expand into new markets which can act to drive new revenue growth, as well as to reduce risk through geographic diversification. Risk reduction results in smoothing out volatility in earnings. Pilloff (2004), Focarelli (2002), and numerous other studies state that the gradual deregulation of the banks and the easing of geographic restrictions such as those on interstate branching have allowed the wave of consolidation within the US banking industry. As discussed above, the banking industry's desire to engage in mergers and acquisitions has always been present, as evidenced by the regulations that have been passed over the years in attempt to control and inhibit mergers in the interest of maintaining the safety and soundness of the banking industry. As the environment and regulatory opinion on mergers have changed, the regulations have been pulled back. This deregulation, as mentioned above, culminated with the implementation of IBBEA. New waves of merger activity follow each step in the deregulation cycle.

Hughes (1999) found that the financial performance and safety benefits of consolidation are strongest for BHCs engaging in interstate expansion. The strongest gains in Hughes' study came to those involved in this geographic diversification of state-specific macroeconomic risk. Banks minimize the adverse effects felt by regional economic shocks by spreading out over a wider geographic region. Emmons (2001), on the other hand, demonstrates, at least for smaller community banks, that risk can be diversified away through a local merger as much as through a merger with a bank across

the country. Their conclusion is that risk is diversified away by increasing in size rather than through geographic diversification.

While improving revenues are an important first step in improving merger performance, the ability of a firm to improve its overall profitability through gains in efficiency and margins define the second value improvement strategy. A firm who relies solely upon revenue increases as justification for engaging in M&A may ultimately see poor results or a failure to improve at all by ignoring costs that may rise as well. Cost reduction and efficiency improvement thus have long been reasons banks use for engaging in mergers. Consolidation can be used to reduce redundant costs and achieve economies of scale and higher efficiency. There is an abundance of literature that indicates to the contrary in that banks do not realize the expected level of cost reduction after going through a merger (Rhoades 1994). Piloff and Santomero (1997) offer explanation in that the costs of the actual consolidation work to offset any gains achieved as a result of the merger. Also, performance gains may take longer time to appear in accounting data. Analyzing data too far after a merger, however, can include accounting effects not attributable to the merger itself. This study will examine efficiency ratios and non interest expense in order to shed more light on the issue.

Banks of all sizes claim economies of scale in engaging in merger activity. Studies have shown that the best results in this area are obtained by the smaller banks, while the largest of banks may actually realize diseconomies of scale in that the costs of maintaining their immense size outweighs any gains from achieving that size (Berger and Mester 1997). Smaller sized banks may even find themselves in the position where they become too small to compete. Many fixed costs items have added up over the years that,

while practically required by all banks, have become prohibitively expensive for the smaller institutions.

Another factor behind the consolidation within the banking industry has been the vast improvements in telecommunications and information technology (Hoenig 1999). As technology and productivity improves, banks are better equipped to grow to previously unattainable sizes and achieve greater economies of scale. This has allowed great improvements in cost efficiency. Advances in computing capabilities and other data processing technology since the beginning of the merger wave can perhaps be one of the dominant reasons for such activity over the long run. As data processing technology has advanced, banks have become better able to manage information and are able to translate these ongoing advances into cost savings (Broaddus, 1998). These cost savings are likewise seen in economies of scale and are best reaped by the largest of institutions, which are commonly the main category of banks studied that actually realize performance gains from mergers.

Banks also engage in mergers to reduce their exposure to various types of risk, commonly through the diversification of their assets and product offerings or through the expansion over geographic regions. Many studies have been conducted to determine whether these benefits are actually achieved. Focarelli, et al., (2002) showed that banks engaging in mergers as a means to diversify their product offerings tend to see their service-based income increase. This increase in income is offset, however, by an increase in personnel costs. Profitability, as measured by return on equity, also increases, but mainly due to an overall decrease in the combined capital between the merging banks as excess capital is returned to shareholders. An acquiring bank may use some of its

equity capital to purchase another bank. When a premium is paid, the composition of the balance sheets change in that the assets may grow as the premium is recorded as goodwill. Debt may increase and capital may decrease in order to facilitate the merger.

Focarelli, et al., (2002) and Berger (1998) both demonstrate that mergers lead to a decrease in small business lending because the acquired banks move to reduce their bad loans, a significant part of which stems from the loans issued to smaller businesses. Small businesses depend on commercial banks for their credit (Cole, Wolken, and Woodburn 1996), while the amount of small business loans that make up a bank's loan portfolio decreases as the bank's size increases (Berger 1998). Consolidation is a method banks may employ to reduce their loan risk by growing in size and reducing its small business loans.

DATA AND METHODOLOGY

This section will present the methodology used to address the issues previously brought forth. It begins by describing how the data was assembled for use and then moves on to detail how the data was analyzed. Several problems arose in analyzing the large data set used in this study. Mergers that include several banks pose a difficulty in assembling the pre-merger data and an important account change took place in 2001. Both of these problems are addressed and explained in detail here.

Previous research has shown varying results of bank mergers using various approaches. A weighted average of the assets the pre-merger institutions was used to determine the combined pro-forma pre-merger institutions' financial statements from which the selected variables for study are found. Craig and Santos (1997) found that,

although during pre-merger the acquiring institution performs better than the acquired institution, the separate performances of the two banks, post-merger, begin to converge. This convergence is usually toward the larger bank, which is generally the acquirer. The Craig paper found that a weighted average of the pre-merger institutions factored into where this convergence occurred. Their used of this method is the reason for its use in this study.

Pre-merger pro-forma variables were compared to their post-merger values up to the third year using descriptive statistics, along with displaying trend lines of the pre- and post- merger factors' means for each variable along the time period. An important part of this study is determining how much time to allow post merger. In his study on merger effects on loan portfolio structure, Berger (1997) indicated a three year span to be most appropriate when trying to find a balance between using too short and too long a period of time to analyze post merger activity. Berger classified effects on bank performance post merger into categories. Static effects of mergers are those that occur immediately and are reflected in the first statements available post-merger. These effects are simply due to the combination of the two entities. The more dynamic effects of mergers may take several years to become fully measurable. These effects can include the time needed to adapt a banks new loan structure and business strategy as well as for the new bank to reach a new equilibrium within its internal and external environments. In choosing the post-merger time period to study, one must avoid using too brief of a time period in order to allow the effects of the merger to appear on the financial statements. However, on must also avoid using too long of a time period post merger where the effects of the merger become diluted with other new factors such as a changing economy and

additional mergers. Following Berger's approach, three years post merger was thus chosen for this study. The first year post merger was taken as the first year in which the combined banks financial data became available. With mergers occurring anywhere from the beginning to the end of the merger year, the average post merger time period will actually be between two and three years using year end data.

This study relies on the Federal Deposit Insurance Corporation's (FDIC) Statistics on Depository Institutions (SDI) for its data, which is readily available on the FDIC's website. Information on the bank mergers themselves was also available through the FDIC's website in their Institution Directory. The Institution Directory lists every bank that has held FDIC insurance. Several important categories within this list allowed me to construct the list of mergers for this study. The first category, STATUS, is an indication of whether a bank is still active. By sorting the list by whether the institution is active or not, I was able to assemble a list that contained banks that are currently inactive. These banks no longer exist due to acquisition or by means of failure and closing. Also included are change codes, CHANGE, which are used to indicate a status change of an institution such as a restructuring, renaming, or, for the purposes of this study, when the institution engaged in a merger or closed. Change codes of 200 signify that the bank has ceased operations. Banks that have become inactive also have their last change code in the 200's since they have ceased operations. A list of closed banks was assembled by isolating these banks who are inactive and whose change codes from 200 to 299. Within this inactive list I then isolated from this list were those banks who, from their change code, were involved in mergers, absorptions, or consolidation without assistance. For the purposes of this paper, all three will simply be referred to as mergers. It is this final list

that was used in gathering bank data from the SDI list. Figure 1 in the appendix provides a hierarchal illustration of this data filtering method used in assembling the list of acquired banks.

This final list of acquired banks was then used to assemble the list of actual mergers. Coupled with the banks designated as inactive in the institution directory is the category NEWCERT, which shows the new FDIC certificate number that is assigned to an institution once it has ceased operations due to being acquired. ENDFYM, or the last date of structural updates, is the category that shows the date that a bank ceased to exist and is assumed to be the year the merger occurred. ENDFYM was used to separate the banks by the year they engaged in the merger.

FDIC Certificate (CERT) numbers are the main form of unique identification for the institutions. Coupled with each bank in the institution directory was the NEWCERT number resulting from the merger. It was then the old CERT, NEWCERT and ending date of the target institution (ENDFMY) that were used in assembling the merger data. The original CERT number identifies the target of the merger. The NEWCERT is the new certificate number given to the bank. Since only mergers make up the list, the NEWCERT signifies both the acquiring bank's FDIC certificate number as well as the surviving bank's certificate number. This data was then condensed into a new spreadsheet with the banks' financial information retrieved from the SDI (as described below) to assemble the comprehensive merger data file.

Since this study intends to evaluate the pre-merger bank characteristics' effect on post merger performance, year-end data from the year prior to the year of the merger for both the target and the acquirer, were first added into the merger spreadsheet. Since

some post merger variables are to be compared to pre-merger values, pro-forma pre-merger institutions were assembled by combining the target and acquiring institutions data into one institution. Balance sheet and income statement variables were simply combined, while performance measures and ratios that were pre-calculated and available in the SDI were combined by using a weighted average by asset size of the two banks, this following the method of the Craig and Santos (1997) paper. Data from the surviving banks was also collected from one to three years post merger. All data from the year before the merger is assumed to be from Year 0, with year-end data from the year of the merger being Year 1, and so on as defined below:

Y_0 = year end data for the year immediately preceding the merger year

Y_1 = year end data from the year in which the merger occurred, with merger occurring at any time during the year

Y_2 = second year post merger data

Y_3 = third year post merger data

For further clarification, all data that refers to a year included in this study is referring to the actual year in which the merger occurred. For example, 1995 pre-merger variable means that while the merger occurred in 1995, the pre-merger data is actually from 1994, the year before the merger. The Y3 data for the same 1995 merger would refer to the merged bank's data from the year 1997

The FDIC has currently made available SDI data from 1992 through 2004. Since this study needs data from the year before the merger, 1993 is the earliest year studied for merger activity. Additionally, since the performance analysis studied incorporated the third year post merger, 2002 is the last year included for mergers to have taken place as

the latest available data is year end 2004. As per the above explanation, the Y_3 data for mergers occurring in 2002 is 2004.

Excluded from this study are those banks that are themselves merger targets and became inactive before the end of the third year post merger. Since these banks have ceased to exist, there is of course no data to study. Using this method, many banks that still existed during the first and second years post merger were eliminated from the data set when they could have been used in calculations that required only the first year post merger. This study treated the first and second years post merger as a subset of the data that includes the third year post merger and therefore is the justification for not including the rest of the first year data.

Also excluded from this study were mergers that involved more than two banks. During this time of high level merger activity, some banks acquired over a dozen other banks and the consolidation of BHC's involved many more. These mergers were eliminated from the data set due to the difficulty in isolating the influence of so many institutions on the direction of bank merger performance.

Another issue that arose in the study is that in 2001, an accounting change occurred that required the use of the purchase method of accounting for mergers and acquisitions. Banks must now capitalize any premiums paid for other banks as goodwill and need only to test it for impairment annually. Banks previously had a greater choice in their accounting method for mergers before the change. General practice was to use the pooling method where the net asset book values on the balance sheets of the two entities were simply combined or to use the purchase accounting method in which the

non-interest revenues. The use of the common size statements allows for easier comparability among institutions of widely differing sizes.

The banks studied in this paper have been classified into several size categories according to their total assets as shown in Appendix Table 1 in order to see if results vary with size. According to the literature previously reviewed, increases in cost reduction and efficiency should rise as the size of the surviving bank increases. It should be noted that there also may be diminishing returns as banks approach the top tier in the industry. Due to the large number of variables included in this study, only the performance model regression includes these categories as a variable.

After having properly prepared the data for analysis, I ended up with a total of 2219 mergers spanning from 1993 through 2002, 2399 when 2003 is included, and 2601 when 2003 and 2004 are included. Appendix Table 2 shows the number of mergers studied per year.

Camels Variables

Several variables, defined below, will attempt to describe by proxy the CAMELS components. Capital adequacy is an indicator of how well a bank can absorb losses and avoid becoming insolvent in the presence of unexpected negative events. Banks are expected to meet the minimum capital adequacy standards set forth by the various regulating agencies. The ratios of Tier 1 capital to assets ($TIER1_x$) and total equity to assets (EQ_x) are used here. Tier 1, or core capital to assets, which is total equity capital less intangibles such as goodwill, makes up the minimum leverage requirements that are meant to cap the amount of leverage a bank holds against its equity capital. The total equity to assets gives an indication of a firm's ability to absorb losses, promote public

confidence, help restrict excessive asset growth, and provide protection to depositors and insurance funds (FDIC Manual of Examination Policies). The higher these ratios are, the stronger a bank is and the less it is leveraged. Additionally, Tier 1 will be used in addressing the first hypothesis.

Asset quality gives an indication of the quality of loans that an institution makes. This plays an important role in performance since loans overwhelmingly make up most of a bank's assets. Several key ratios will be looked at in this study. The non-current loans to total loans ratio ($NCLNSR_x$) provides an indication of how likely a bank will suffer losses from its loan portfolio. Non-current loans include loans and leases that are ninety days past due and also loans in non-accrual status. The loss allowance to total loans ($LNATRESR_x$) is a general reserve account set up to cover loan losses and is similar to the allowance for doubtful accounts that most businesses use. The provision for loan and lease losses, from income, contributes to the account. The loss allowance provides an indication of how well a bank has planned to absorb its expected losses. This figure should be near that of the non-current loans to total loans, since a bank knows it will more likely have cover the non-current loans. The net charge-offs to loans ($NTLNLSR_x$) shows the actual losses in a banks loan portfolio.

Management quality, although highly influential in determining the success or failure of a bank, is by itself a fairly qualitative factor. Management quality and decisions do highly influence financial results and performance and it can be assumed that management quality is indirectly exhibited through the other factors related to the CAMELS system. The use of Economic Value Added (EVA) could provide a good proxy for measuring management quality. EVA compares the return on investment to the

costs of capital and thus measures how well management makes use of its capital. One possible equation for EVA is:

Operating capital is found by subtracting short term securities held for investment from the total of liabilities and equity capital. ROIC, or return on invested capital, is determined by dividing NOPAT, or net operating profit after taxes, by operating capital:

WACC is the weighted average cost of capital and incorporates the cost of both debt and equity. All variables are readily found or calculated using the selected data source for this study with the exception of the WACC. Determining the cost of equity capital would require a case by case analysis of each firm and is beyond the scope of the study. ROIC will then be used as a proxy for gauging management quality.

Earnings are a banks first defense towards absorbing losses and also contribute to capital growth. Several components of income have been isolated for this study, revolving around interest and non-interest income and expense as percents of earning assets. Non-interest income to average earning assets ($NONIIY_x$) measures how much income a bank derives from services and fees. Non-interest expense to average earning assets ($NONIXY_x$) provides an indication of how well a bank manages its overhead and includes such items as payroll and fixed asset expenses. This paper will use NONIIY and NONIXY to prove the second and third hypotheses. Operating income to assets ($NOIJY_x$) is also included in the analysis. Earnings quality provides for an understanding of the success of a bank's core business activities (FDIC website), which are reflected in operating income. Return on assets is included since it includes results from all of a

bank's activities. Comparing ROA to operating income can show if banks are showing more non-recurring income on top of income from operations. Earnings measures will by utilized in addressing the fourth hypothesis.

ROIC will serve as a proxy for the measurement of management quality. ROIC is important as it shows how efficient management is in using is operating capital. The higher levels of ROIC indicate that management is making better use with its available capital.

Liquidity is used to measure how well short-term obligations can be met as they come due. It also allows banks to counteract fluctuations in longer term assets and liabilities. Although several ratios exist that can be used to measure liquidity and liquidity management, the ratio of short term securities to assets ($TRES_x$) are investigated here. When studied in the context of mergers, a marked change in a banks liquidity position may provide an indication of how a well merger was planed for and funded. A drop in current liquid assets may indicate that they were needed to assist in the purchase of another bank or to compensate for both expected and unexpected costs associated with the merger. As time moves on past the merger, liquidity may change as the restructuring effects of the merger are felt.

Sensitivity to market risk measures how well an institution protects itself from changes in prices and rates. These changes can have adverse effects on a bank's financial position, by reducing earnings or reducing capital and asset quality. Interest rate risk is the major factor here for most banks (FDIC). One approach to minimizing this risk is to rely less on interest income and more on non-interest sources of income. This study will investigate whether or not banks have been deriving more revenue through non-interest

means of fee-based services as opposed to interest income as a way of diversifying away their exposure to interest rate risk.

The Hypotheses

Using the information previously explained and the appendix data this paper will attempt to test three hypotheses. *Hypothesis I*: No acquiring banks pay a price for a target bank that is below the current market price. *Hypothesis II:* Mergers do not result in improvements in efficiency through cost reduction. *Hypothesis III*: mergers do not result in performance increases.

The Performance Prediction Model:

The first step taken in forming the model to allow us to test the hypotheses was to choosing which variables to include. So far, this paper has presented many variables related to the CAMELS system. The correlations of each variable to performance were tested for both high positive and high negative correlation. They were then entered into a multiple linear regression model.

The analysis begins by describing how the aforementioned CAMELS variables change over the three-year period after a merger. Following this will be the results of the hypothesis tests and finally the regression model.

RESULTS AND DISCUSSION

Merger Effects on CAMELS Factors:

The first step taken in this study in analyzing the merger data is to assess each chosen factor related to CAMELS and describe how they change from the year before the merger, until the third year post merger. This section addresses each variable separately as outlined in the earlier discussion of the CAMELS factors. Appendix Tables 3 through 7 divides the CAMELS variables by each letter of the acronym: capital, assets, earnings, management quality, liquidity, and sensitivity. Shown on these tables are the annual means for the CAMELS-related variables used in this study. Both the combined pre-merger variables are shown as X_0 and three years post merger as X_3. Three years post merger, as stated previously, is used for these factors to allow sufficient time for their effects to show. Since this analysis compares the year immediately preceding the merger to the third year post merger, only merger years 1993 through 2002 are included as year three has not occurred for 2003 mergers and years two and three have not occurred yet for those mergers that took place in 2004. Included with the CAMELS results are charts that illustrate trends in the chosen variables. Each chart plots the average value of the selected variable for all mergers against the year of merger. Two sets of data are depicted on each chart: the first, X_0, is average data for the year prior to the merger and the second, X_3, being the average data three years post merger. The purpose of this setup allows for direct comparison pre and post merger data by year and additionally, through the use of regression lines, for the comparison of trends in the pre and post mergers data over the time period in the study. The independent variable describes the year in which the merger takes place. Included in the appendix for reference are Tables 3 through 7. These tables contain descriptive statistics for all CAMELS variables studied. These

tables are broken down by each section: capital, assets, earnings, management quality, liquidity, and sensitivity, respectively.

Capital

A look at the capital ratios shows that total equity capital to assets remains virtually unchanged from pre to post merger as shown by the closely aligning regression lines in Figure 2. Another observation with the capital is that the amount of equity as a percent of total assets as been trending upward over the time period, indicating that banks are relying less on debt.

Tier 1 capital as a percentage of total assets tends to be lower three years post merger, indicated by the gap between the two trend lines in Figure 3. This difference in the Tier 1 capital to assets ratios from pre and post merger banks may be an indication that post merger banks' intangibles such as goodwill are making up a larger portion of total equity. This observation, coupled with the growing gap in the pre and post merger means over time, may be a signal that premiums banks are paying for acquisitions are rising. Another possibility is that capital adequacy may be reduced after a bank engages in a merger and is a possible indication that equity is being used in the acquisition.

Asset Quality

Several loan ratios were used in studying asset quality. Non-current loans as a percent of total loans, which are loans that are more than ninety days past due , had been trending downward for the pre-merger banks, indicating that pre merger banks have been improving the quality of their loans to levels normally observed after a bank engages in a

merger. The third year post merger figure tended to remain around a level of 1% of total loans as shown in Figure 4. This trend would confirm Berger's (1997) find that banks restructure their loan portfolio post merger away from poor performing loans. The gap between pre and post merger levels of non-current loans does close towards the end of the period studied, however, indicating that this improvement through mergers may not be as significant as it once was.

The allowance for loan losses to assets has trended lower over time for both pre and post merger institutions. Banks in their third year post merger tended to hold lower reserves than they had held pre-merger as shown in Figure 5. This figure shows that banks are lowering their loss reserves as they reduce their non-current loans. The improvement from pre to post merger declines over the period to the point where little gain is shown towards the end of the period.

Figure 6 compares the pre to post merger changes in both non current loans and in the allowance. While both are declining as discussed above, the allowance is declining at a lesser rate than that of the non-current loans. This may be an indication that banks are reluctant to reduce their allowance.

Average annual net loans and leases to assets have trended downward over time for the pre-merger institutions, but had leveled off to around 33% after three years post merger as shown in Figure 7. This indicates that banks are attempting to diversify their loan risk by shifting their asset portfolio to a lower weighting of loans.

All three factors studied that relate to asset quality show fairly consistent results. Pre-merger banks have been improving their loan quality over the time period studied. Once they engage in a merger, their performance improves to a level that does not change

much over this period. Regression lines that intersect towards the end of the period indicate diminishing returns in asset quality improvements through merger activity.

Earnings

Several factors that influence earnings quality were included in the study. Non-interest income has been steadily rising over the period as shown in Figure 8. Pre to post merger shows is generally higher. This indicates that banks are diversifying their income streams away from interest income both over the time period and as a result of engaging in mergers.

Non-interest expense to earning assets had been decreasing for the pre-merger banks and slightly increasing for them three years later. Overall, however, there is little difference from pre to post merger as shown in Figure 9. The regression lines show a low goodness of fit as there is a significant amount of deviation from it in several years.

While net operating income to revenue in Figure 10 had been rising over time before merger, three years post merger their NOI ratios were trending slightly downward. This indicates results similar to those of the assets quality in that pre merger banks had lower operating income relative to post merger and post merger results show an improvement to a steady level. Mergers early on in the study had been resulting in gains in net operating income to assets, but the industry may now be unable to continue these gains through mergers due to diminishing returns.

ROA in Figure 11 for both pre and post merger institutions trends upward slightly over the time line. Like net operating income to assets, these results indicate marginal returns over time for improvement in ROA through mergers.

Liquidity

Securities as a measure of liquidity show that firms have significantly reduced their liquidity by the third year after merger. Over time, the ratio of securities to assets has been declining for both pre and post merger institutions as shown in Figure 12. The decline from pre to post merger securities, as shown by the post merger regression line lying lower than the pre merger line, may indicate that banks are using short term assets in going through mergers. Over time, banks' reduction in securities may indicate an overall decrease in liquidity. This may be due to unforeseen costs of consolidation that must be covered with short term assets.

Sensitivity

Risk sensitivity was looked at in terms of how banks have been handling their exposure to interest rate changes. I looked at both non-interest revenue and interest revenue to determine if banks have been diversifying their income streams away from the risks associated with interest rate changes as shown in Figures 13 and 14. Figure 13 show interest income to total revenue. While pre-merger bank data slopes upward over time, results post merger show that once banks engage in merger activity, they rely less on interest income.

Results shown in Figure 14 agree as non-interest income increases post merger. These results indicate that bank that merge attempt to diversity their income away from interest revenue in order to reduce their sensitivity to interest rate risk.

Hypothesis Testing

Hypothesis 1

The first hypothesis tested stated that banks have been paying higher premiums for acquisitions. The first step in this analysis is to again look at the Tier 1 capital to assets ratio. Returning to Figure 3, we see that the Tier 1 capital as a percentage of assets, while overall has been rising over the period studied, has been falling from pre to post merger. This observation, coupled with the fact that total equity capital to assets changes little from pre to post merger, indicates that a higher level of intangibles are being recorded on the balance sheets. Figure 15 illustrates the main factor investigated for this hypothesis: the ratio of goodwill to total assets. Unlike the CAMELS variables, Goodwill is one of the variables analyzed that uses the very first year post-merger data since the balance sheet effect on goodwill is immediate and would only be diluted over time by amortization and new acquisitions. Figure 15 shows that post-merger goodwill on average is higher each merger year than for pre-merger. Figure 15, however, goes on to graph the actual change between pre and post merger levels of goodwill to assets and shows little change until the last few years of the study. The rising regression line here demonstrates that goodwill as a percentage of assets has been increasing over the period studied. The results here provide evidence in favor of the hypothesis; however there exists one drawback of what may at first be the strongest piece of evidence. The change is accounting for goodwill may disrupt the feasibility of relying on this data, since two different methods of have been in use. Studying this variable, however, helps determine if there is any bias introduced to the data stemming from the change in accounting for mergers and acquisitions and how the premiums paid for targets are treated. There is no

solid indication, however, of a change in goodwill levels after the accounting change occurred since a look at the frequencies (not included) shows that 44.6% of pre-merger institutions had no goodwill on their books and only 27.1 percent post merger showed no goodwill. It should be noted, however, that post merger goodwill has begun to increase more significantly during the last two years studied (2003 and 2004), which may be indicative of a delayed effect of the accounting change. Firms not amortizing goodwill are beginning to build up acquisition-related goodwill. Without a more thorough investigate of the effects of the accounting change on financial data, the first hypothesis can only be said to be true with a possible bias.

Hypothesis 2

The second hypothesis tested was whether synergy through cost reductions is achieved after a merger. To test this, I compared several cost ratios. First, I looked at pre- and post-merger non-interest expense to total revenue to determine how bank overhead changes after a merger.

The pre-merger proforma ratio of non-interest expense to total revenue averaged 40.19% with a standard deviation of 10.68% over the entire period. Post merger results indicate an average non-interest expense to revenue ratio of 40.65%. Figure 16 is an illustration with regression lines for combined pre-merger (nonix0) and three years post (nonix3) non-interest expense to total revenue. These results show that for the first few years of the study the mergers result in the improvement of non-interest expense. For the end of the study, however, pre-merger non-interest expense has been decreasing over time as post-merger non-interest expense to revenue has been increasing. These results

agree with the studies previously mentioned that indicate no improvement in cost savings is achieved through mergers as is widely claimed by management.

Another variable tested is whether merged banks have lower personnel expenses. While personnel expense could not be singled out from the income statement data of the SDI database, the number of earning assets per employee is provided. Cost efficiency hypothesis indicates this level should increase post merger, as banks consolidate and eliminate redundant personnel. Figure 17 shows how this variable changes as banks move three years post merger. Assets per employee for both pre (astemp0) and post (astemp3) merger banks run nearly parallel on a rising trend. The separation of the two lines, with the third year data sitting higher than pre-merger, would indicate that banks do see an improvement three years after the merger over the pro-forma pre-merger bank. These lines are converging, indicating that banks may start are operating at a high level of employee productivity and may be starting to experience diminishing returns from mergers in the area of improving personnel costs.

The efficiency ratio is non-interest expense, less the amortization expense of intangible assets, as a percent of the sum of net interest income and non-interest income (FDIC). It is a measurement of the overhead costs for a bank. Figure 18 indicates that the efficiency of the pre-merger banks has been declining from a 1993 merger year average of 67% to a 2002 merger year average of 62%. This indicates that lesser performing banks have been engaging in merger activity, a result of bank managements' citing cost improvement for engaging in mergers. While post merger efficiency has indeed been increasing over this period, it has still proved to be an overall reduction from

pre (eff0) to post (eff3) merger. Once again, diminishing returns are evident towards the end of the period as the two trend lines intersect.

The overall results of this analysis of non-interest expense, assets per employee, and efficiency agree with the literature in that mergers do not yield significant increases in cost efficiency.

Hypothesis 3

The third hypothesis stated that mergers do not result in significant increases in overall performance. In order to address this question, I compared the pre and post merger values of return on equity and return on assets. Return on assets for both pre and post merger banks had been increasing over the period studied. When comparing pre merger to post merger values, it is evident as shown previously in Figure 11 that, while there is improvement during the early years of the study, banks actually see a decline in ROA from pre to post merger towards the end of the study. A look at ROE in Figure 19 shows very similar results in favor of the hypothesis. The data presented here shows that mergers indeed do not result in significant increases in performance.

Performance Prediction/Regression based on CAMELS Factors:

The purpose of analyzing these evaluative variables is to arrive at an equation for the prediction of post merger bank performance using them. I tested two different models that included all of the CAMELS variables mentioned previously. Also included in the regression was the assets size categories mentioned previously. These are included here to determine any effect they have on merger performance. Return on assets was the

first model. After removing all variables that showed minimal significance with a t-statistic less than |2.00|, I arrived at the following regression:

$$Y = 0.05093X_1 + 3.015X_2 + 3.309X_3 + 0.166X_4 - 2.131X_5$$

where Y = ROA three years post merger as a percentage,

X_1 = pre-merger net operating income to assets, expressed in decimal form,

X_2 = net interest income to total revenue as a percent,

X_3 = total non-interest income to revenue,

X_4 = net loans and leases to assets, and

X5 = non-interest expense to revenue.

This first model shows that the most important pre-merger variables that influence post merger return on assets are mostly income measures. A possible explanation for this is that banks that are performing well tend to continue to do so after engaging in mergers. The banking industry's use of performance increases as justification for mergers would be correct, had these variables been negative in the model. The only non-income factor that showed any signifigance was the net loans and leases to assets. The presence of this variable indicates that higher levels of pre merger loans to assets lead to increased post merger profitability. Returning to Figure X, loans to assets are reduced from pre to post merger. This is in agreement with Berger's finding that mergers do tend to reduce small business lending as banks try to reduce their bad loans.

Return on equity was the second model. This was performed identically to that ROA model in that all CAMELS variables are included, along with the size categories.

After removing all variables that showed minimal significance, I arrived at the following regression:

$$Y = 0.564X_1 - 52.029X_2 + 45.585X_3 + 49.101X_4 - 43.482X_5 + 0.09139X_6$$

where Y = ROE three years post merger as a percentage,

X_1 = scaled asset category,

X_2 = pro-forma equity to assets,

X_3 = net interest income to revenues,

X_4 = non-interest income to revenue, and

X_5 = efficiency ratio

In this analysis, bank size does influence post merger return on equity. Equity to assets, interest income, and efficiency all directly affect post merger ROE, which is similar to the ROA results. Non-interest income shows an inverse relationship with post merger ROE. This is due to banks diversifying their income streams into more non-interest areas.

As mentioned previously in this paper, in relation to the literature that concludes there does not exist the high level of cost reduction post-merger that managers use as a reason for merging, it is difficult to arrive at a model with a high level of fit to the actual data. The ROA equation gives an R^2 level of 81% and the ROE equation give an R^2 level of 75.1%.

CONCLUSIONS AND ISSUES REQUIRING FURTHER STUDY

The purpose of this study was to examine bank merger performance from both the regulators' and from the banking industry's perspectives. Within this context I analyzed

several selected variables related to the CAMELS ratings system that is used by the regulators in assessing the financial performance of banks. These variables were separately investigated to determine how they change as banks engage in merger activity. The pre merger variables were then used in developing predictive models for the post merger performance indicators, return on assets and return on equity, along with addressing four main hypotheses that were presented in the introduction.

The hypotheses presented addressed specific trends related to bank mergers. The first hypothesis shows that banks had been paying higher premiums for acquisition targets over the period studied.

The second hypothesis proved less clear, however. The main factors studied addressed in determining whether banks see significant cost improvements showed rising post merger non-interest expenses over the period studied, along with diminishing improvements in the efficiency ratio, both of which indicate that banks do not improve their cost structure through mergers. The assets per employee ratio, however, showed steady improvement over the period for both pre and post merger banks. Yet the improvement here from pre to post merger also showed diminishing returns.

The third hypothesis stated that banks do not see the performance increases as a result of engaging in merger activity. The analysis of return on assets and return on equity prove this to be true as both measures show declines from pre to post merger banks.

Producing an accurate performance prediction model proved a difficult task in that most of the variables studied were not significant enough to include in the models for

both ROA and ROE. The few variables that were used in the final models do little more than to show that pre merger income influences post merger income performance.

While banks commonly cite increases in performance as a major reason for engaging in mergers, the reviewed literature and previous research showed that bank mergers do not result in significant gains in performance. The results of this study tend to agree with the literature.

Several areas of concern arose during this study that may be best left for future research. A large question that arose in this study is the treatment of goodwill for mergers and acquisitions. As stated previously, banks could, until the 2001 accounting change, use differing methods in the treatment of goodwill. The use of pooling accounting could be indicated by the lack of goodwill post merger. This was the case in about 27% of the mergers studied here. About 45% of the pre-merger banks, however, showed no goodwill. This decrease in the number of banks that report goodwill could be attributed to the increasing use of purchase accounting. As pointed out earlier, does rise towards the end of the time period, indicating a possible time delay in the effect of the accounting change. Better results in performance studies could be achieved if these banks financial information could be recast and standardized to one method of accounting for mergers and acquisitions. It can be inferred from above that banks that use of pooling and purchase accounting can be differentiated by whether or not they show goodwill on their balance sheets. A new problem arose when banks actually changed between the accounting methods, whether it was when it became a requirement that banks capitalize goodwill and only test it annually for impairment or if they had changed at an earlier time. Coupled with this is whether banks had amortized goodwill or tested it for

impairment. These questions may only be answered by performing a case by case investigation into how each bank handled its goodwill before the accounting change.

Further research can be made into the present issues in this paper by further breaking down the data into more size groups, as there now exists a vast range of bank sizes, from the smallest single branch community banks to those top tier institutions that hold the vast majority of the nation's assets. For this study, only the multiple regression models took into account the size of the institution. A more appropriate method would be use maintain the time series data as previously presented, and also divide each years' data by bank size. Additionally left out of this paper is what kind of core business the banks cater to. Credit card banks will hold a far different loan structure than a bank that specializes in agricultural lending and will tend to show different financial results. A problem with combining all data into one set as was done in this study is that the variables studied are reflective of the average figures of the entire set as a whole. Another possible factor that may influence bank merger performance not addressed in this study was whether the merger was a regulatory induced merger. When a merger is induced, the target bank is assumed to be in trouble and in need of assistance at the time of the merger. This study simply combined all forms of mergers and acquisitions together into the data set. Future research can focus on any one of the subgroups just outlined.

Some of these questions that have risen may be best answered using a different approach to the research. While this paper tries to include as many mergers as possible to gain a wide picture of industry behavior in terms of post merger performance, the last

issues brought up may be best dealt with using a case by case investigation with a smaller amount of data.

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Appendix

Table 1: Size of Banks Included in Study		
Total Assets (in millions)	Number of Banks	Percent
99 and below	368	14.15
100 to 999	1470	56.52
1,000 to 9,999	599	23.03
10,000 to 999,999	151	5.81
100,000 and up	13	0.50
Total	2601	100

Table 2: Mergers per Year in Study		
	Frequency	Percent
1993	285	10.96
1994	267	10.27
1995	245	9.42
1996	212	8.15
1997	218	8.38
1998	203	7.80
1999	214	8.23
2000	194	7.46
2001	201	7.73
2002	181	6.96
2003	179	6.88
2004	202	7.77
Total	2601	100

Table 3: Capital Adequacy Descriptive Statistics			
	N	Mean	Std. Deviation
Merger number	2601	1301	750.9883488
year merger occured	2601	6.064	3.514
date of merger	2601	na	na
dummy: merger took place within state	2601	0.865	0.341
aquirer percent of total premerger assets	2601	0.751	0.192
scale asset size	2601	2.220	0.775
proforma tier1	2601	0.088	0.039
yr 1 survivor tier 1	2601	0.083	0.041
T1SURV2	2399	0.083	0.038
T1SURV3	2220	0.082	0.033
T1SRVCHG	2601	0.084	0.041
T1AVGCHG	2601	-0.026	0.238
EQPROF	2601	0.094	0.040
EQSURV1	2601	0.094	0.044
EQSURV2	2399	0.094	0.041
EQSURV3	2220	0.093	0.038
EQAVGSRV	2601	0.095	0.044
EQAVGCHG	2601	0.034	0.254

Table 4: Assets
Descriptive Statistics

	N	Mean	Std. Deviation
Merger number	2601	1301	750.9883488
aquirer percent of total premerger assets	2601	0.751	0.192
scale asset size	2601	2.220	0.775
NCLNSPRO	2601	1.145	1.550
NCLNSSV1	2601	1.022	1.343
NCLNSRV2	2399	0.947	0.910
NCLNSRV3	2220	0.942	0.939
NCLNAVG	2601	0.958	0.876
LOSSRES0	2601	1.603	0.979
LOSSRES1	2601	1.511	0.899
LOSSRES2	2399	1.462	0.781
LOSSRES3	2220	1.438	0.808
AVLOSSRV	2601	1.464	0.828
NETLN0	2601	0.385	0.830
NETLN1	2601	0.343	0.863
NETLN2	2399	0.323	0.710
NETLN3	2220	0.334	0.664
AVGNETLN	2601	0.334	0.728

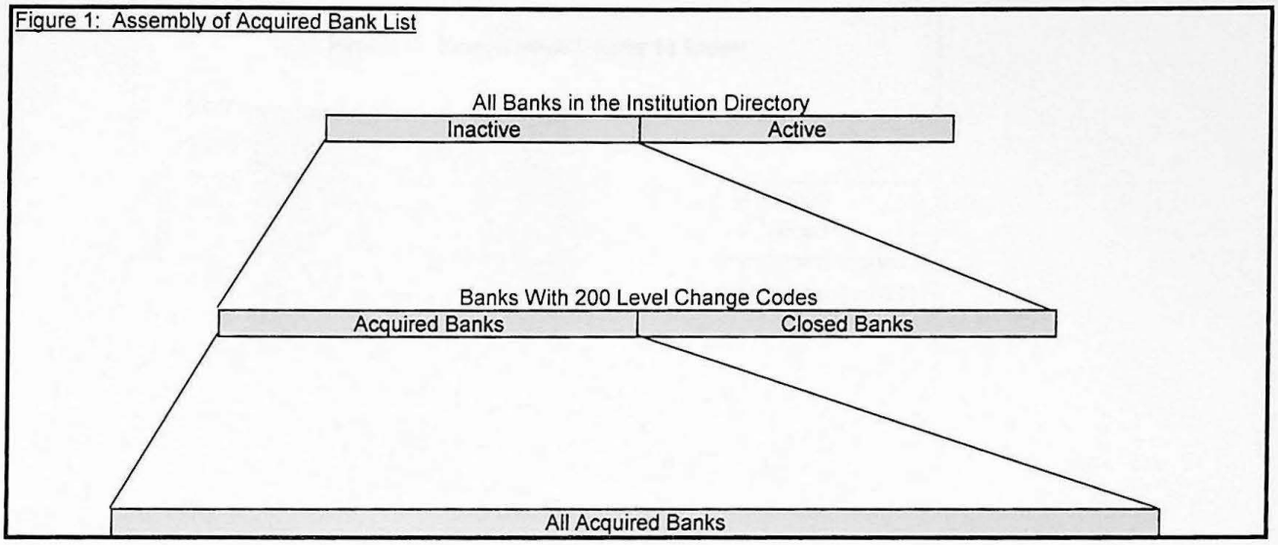
Table 5: Earnings
Descriptive Statistics

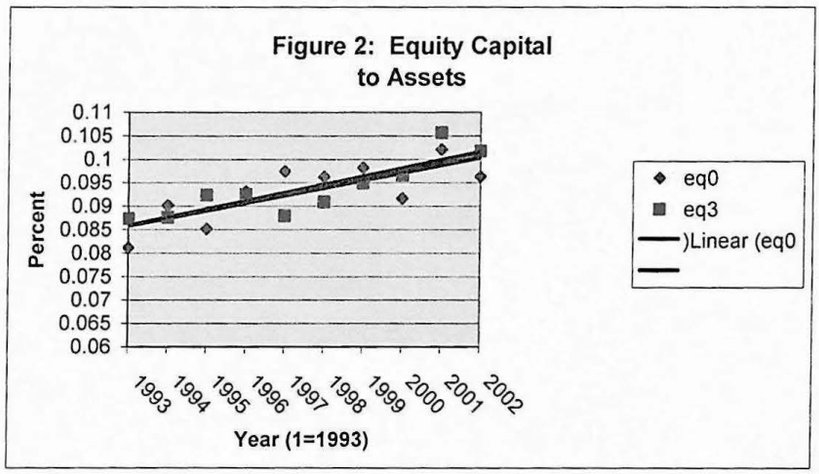
	N	Mean	Std. Deviation
Merger number	2601	1301	750.9883488
aquirer percent of total premerger assets	2601	0.751	0.192
scale asset size	2601	2.220	0.775
NONIIY0	2601	1.769	16.286
NONIIY1	2601	1.639	10.793
NONIIY2	2399	1.778	13.338
NONIIY3	2220	1.447	4.700
NONIIYAV	2601	1.669	11.090
NONIXY0	2601	3.915	7.248
NONIXY1	2601	3.847	5.360
NONIXY2	2399	3.935	10.033
NONIXY3	2220	3.651	4.107
NONIXYAV	2601	3.818	6.539
NOIJY0	2601	1.131	3.876
NOIJY1	2601	1.168	2.668
NOIJY2	2399	1.188	2.606
NOIJY3	2220	1.127	0.668
NOIJYAVG	2601	1.178	2.546
ROA0	2601	1.173	3.873
ROA1	2601	1.201	2.671
ROA2	2399	1.220	2.646
ROA3	2220	1.159	0.651
ROAAVG	2601	1.210	2.551
ROE0	2601	12.198	16.207
ROE1	2601	12.755	8.624
ROE2	2399	12.984	9.201
ROE3	2220	13.018	8.269
ROEAVG	2601	12.830	7.356

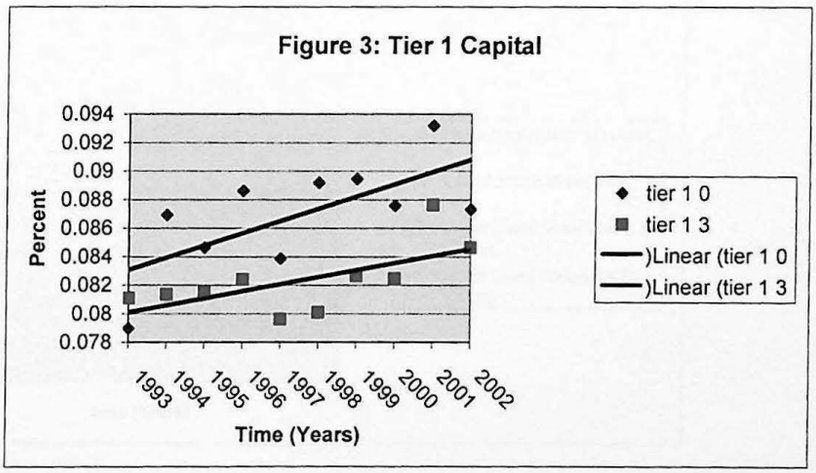
Table 6: Liquidity Descriptive Statistics			
	N	Mean	Std. Deviation
Merger number	2601	1301	750.9883488
aquirer percent of total premerger assets	2601	0.751	0.192
scale asset size	2601	2.220	0.775
TRES0	2601	0.046	0.064
TRES1	2601	0.037	0.059
TRES2	2399	0.031	0.053
TRES3	2220	0.025	0.047
TRESAVG	2601	0.030	0.049

Table 7: Sensitivity Descriptive Statistics			
	N	Mean	Std. Deviation
Merger number	2601	1301	750.9883488
aquirer percent of total premerger assets	2601	0.751	0.192
scale asset size	2601	2.220	0.775
NIM0	2601	0.491	0.087
NIM1	2601	0.502	0.096
NIM2	2399	0.497	0.097
NIM3	2220	0.493	0.097
NIMAVG	2601	0.505	0.094
NONII0	2601	0.125	0.092
NONII1	2601	0.131	0.097
NONII2	2399	0.133	0.097
NONII3	2220	0.134	0.094
NONIIAVG	2601	0.135	0.093
NETLN0	2601	0.608	0.126
NETLN1	2601	0.623	0.132
NETLN2	2399	0.629	0.129
NETLN3	2220	0.635	0.129
NETLNAVG	2601	0.631	0.124
LNLSALL0	2596	0.016	0.009
LNLSALL1	2595	0.015	0.009
LNLSALL2	2396	0.015	0.008
LNLSALL3	2218	0.014	0.008
LNLSALAV	2595	0.015	0.008

Figure 1: Assembly of Acquired Bank List







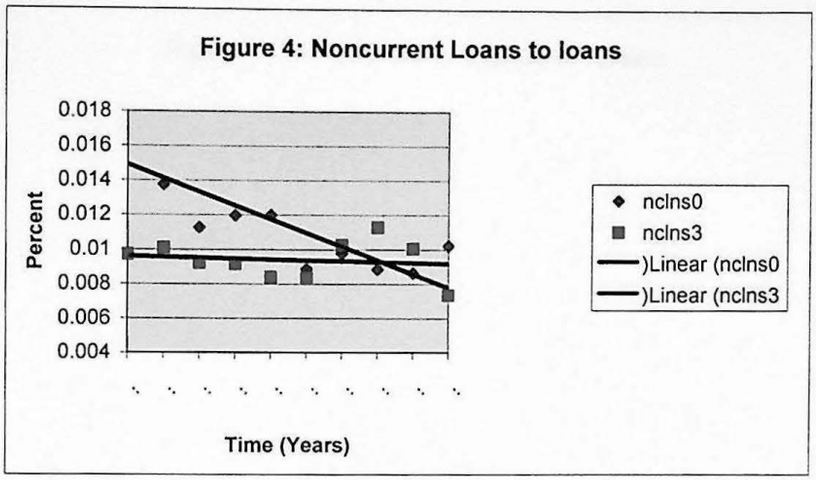


Figure 4: Noncurrent Loans to loans
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
Percent
Time (Years)
nclns0
nclns3
)Linear (nclns0
)Linear (nclns3

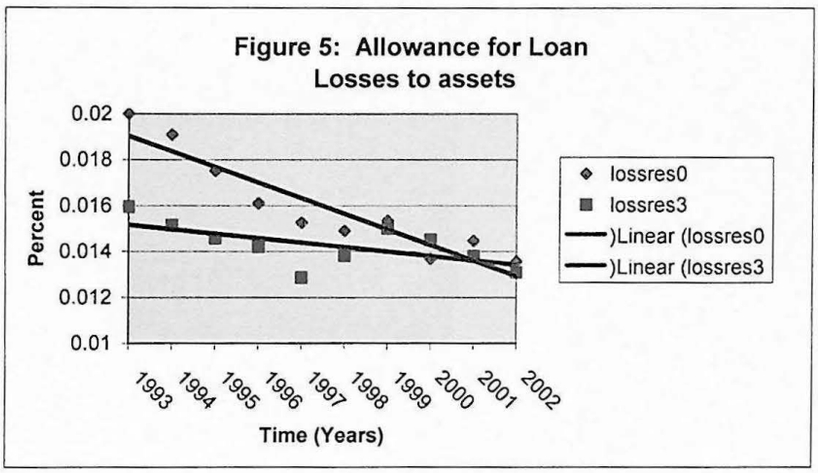


Figure 5: Allowance for Loan Losses to assets
0.02
0.018
0.016
0.014
0.012
0.01
Percent
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Time (Years)
lossres0
lossres3
)Linear (lossres0
)Linear (lossres3

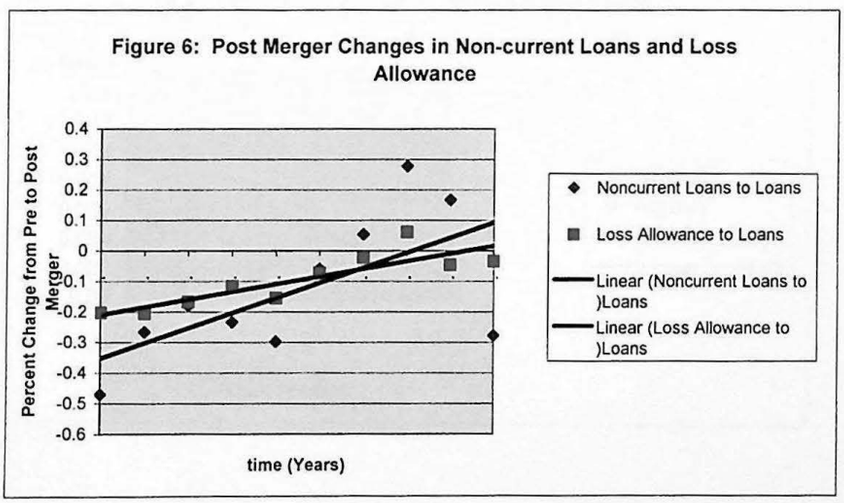


Figure 6: Post Merger Changes in Non-current Loans and Loss Allowance
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
Percent Change from Pre to Post Merger
time (Years)
Noncurrent Loans to Loans
Loss Allowance to Loans
Linear (Noncurrent Loans to)Loans
Linear (Loss Allowance to)Loans

Figure 7: Net Loans and Leases to Assets

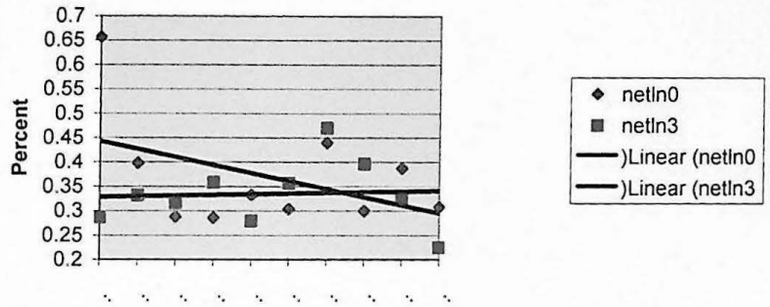


Figure 8: Noninterest income to Earning Assets

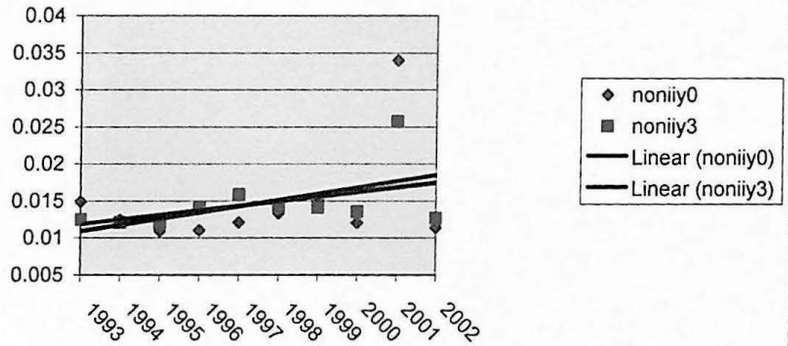


Figure 9: Noninterest Expense to Assets

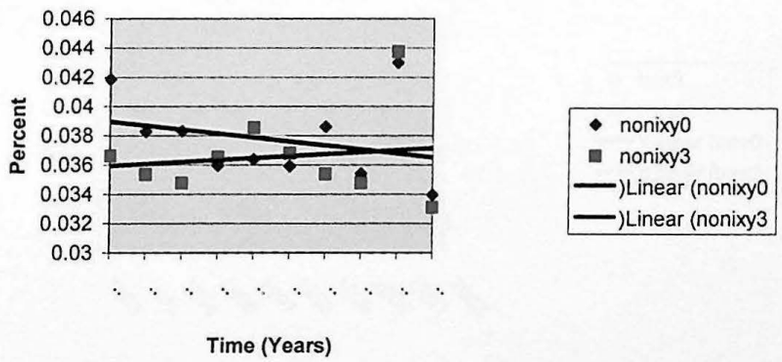


Figure 10: Net Operating Income to Assets

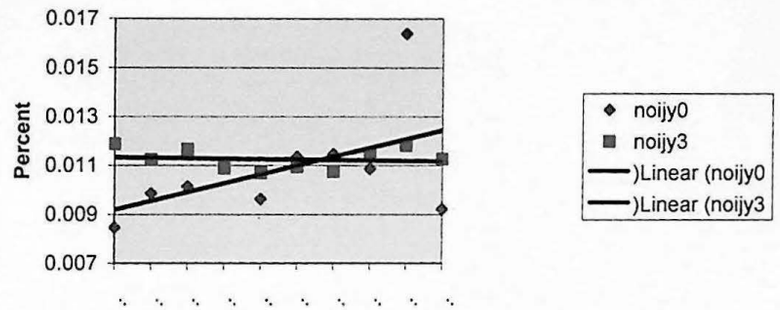


Figure 11: Return On Assets

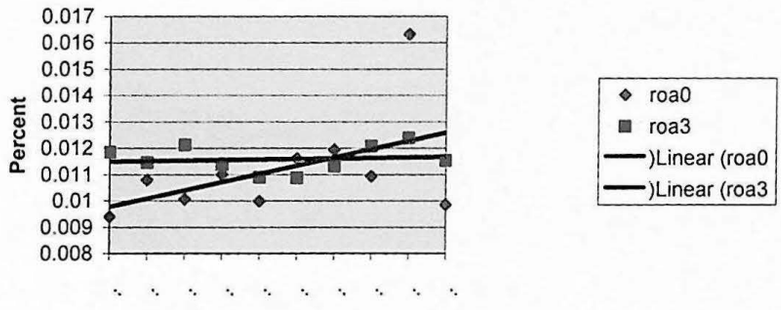


Figure 12: Securities to Assets

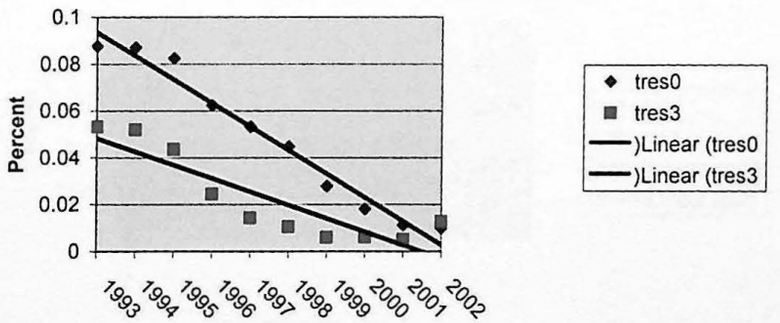


Figure 13: Interest Income to Revenue

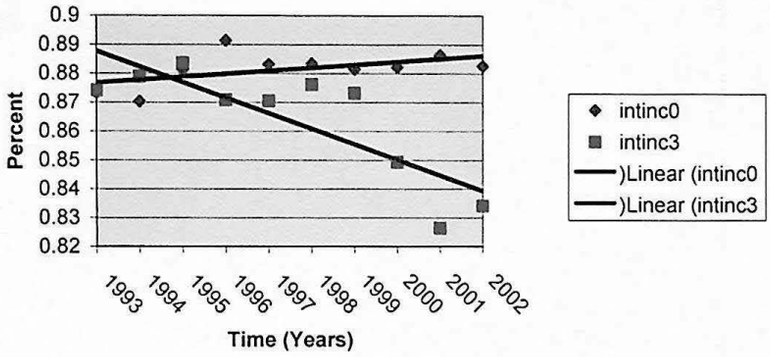


Figure 14: Noninterest Income to Revenue

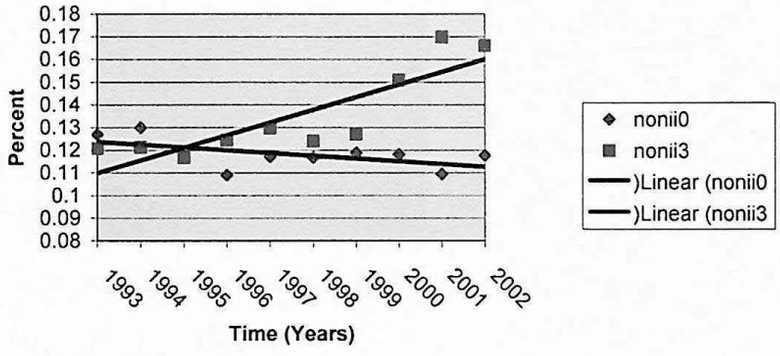


Figure 15: Goodwill to Assets

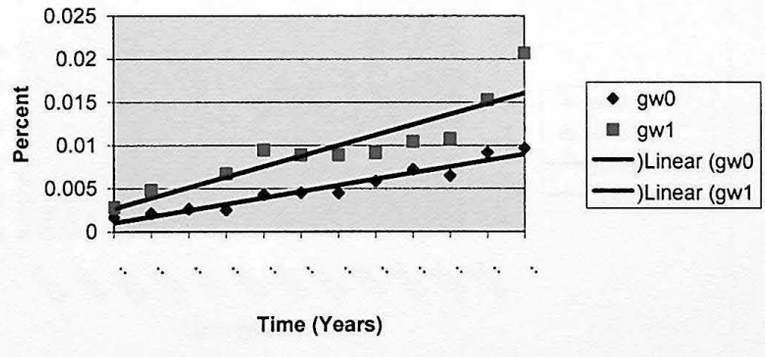


Figure 16: Noninterest expense to Total Revenue

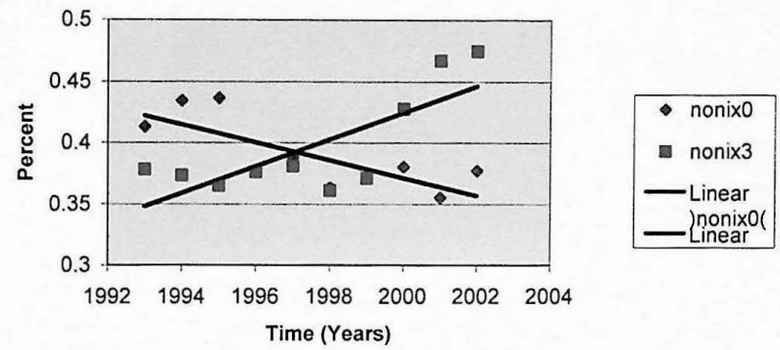


Figure 17: Assets per Employee

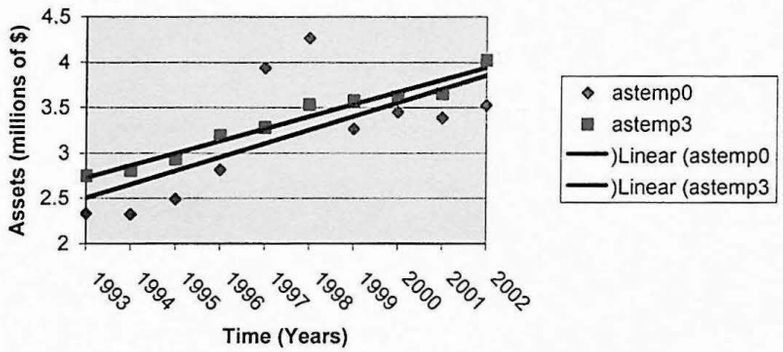


Figure 18: Efficiency Ratio

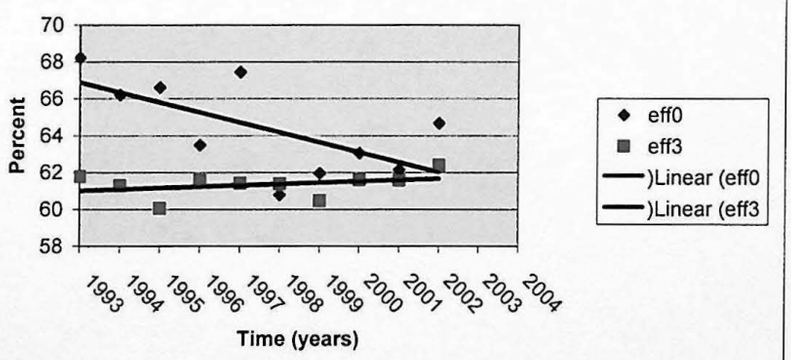


Figure 19: Return on Equity