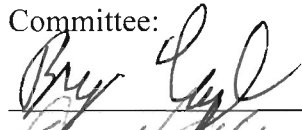


THE ROLE OF "TOO BIG TO FAIL" STATUS IN BANK MERGER ACTIVITY

by

Parker M. Normann
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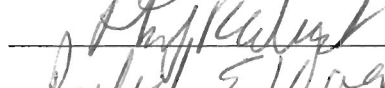
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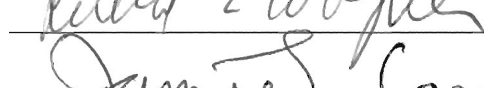
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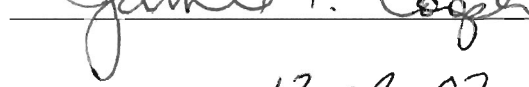




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A dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy at George Mason University

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DEDICATION

Dedicated in loving memory to my father, Conrad Neil Normann Sr., the first and best economist in the family.

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ABSTRACT

THE ROLE OF "TOO BIG TO FAIL" STATUS IN BANK MERGER ACTIVITY

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George Mason University, 2007

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This dissertation examines a linchpin of federal banking policy, the Federal Deposit Insurance Corporation (FDIC). The main function of the FDIC is to provide absolute guarantees on insured deposits up to a set limit. This amounts to a federal subsidy for banks, and the greater risks banks assume, the greater the amount of the subsidy. Attempts by policy makers to undue the undesirable aspects of the subsidy have succeeded in limiting the extent of coverage to small banks but have codified into law that the largest banking institutions are considered “too big to fail” (TBTF). This special status granted to TBTF banks confers upon them a funding advantage not available to their smaller competitors. This imbalance creates an incentive for banks to merge in order to create a bank considered TBTF, or for existing TBTF banks to purchase smaller

banks; in either event the purpose is to capture the gains from the too big to fail status. This potential cause of bank mergers has only recently begun to enter the banking literature and has yet to be formerly tested. The purpose of this dissertation is to both layout the economic theory and to test empirically the role of too big to fail status in bank merger activity.

I. CHAPTER-1

A. Overview

1. Introduction

Part of the 1991 FDIC Improvement Act created explicit protections to prevent the failure of megabanks if their collapse would undermine the stability of the overall economy. As a result some consider that all deposits held in megabanks to have government backing, not just those covered by the standard FDIC limit of \$100,000. This grants to banks considered too-big-to-fail (TBTF) a funding advantage in the market for deposits, which their smaller counterparts can not exploit. This creates an incentive whereby banks may desire to become larger, not for scale-economies, but to capture the benefits for capital funding subsidies through a legal construct. Because these benefits can be captured through merger activity, the 1991 act may have inadvertently contributed to the recent increase in bank consolidations. Banks in an effort to achieve TBTF status may combine with another large bank to reach the required threshold, or banks that are already TBTF may extend that benefit by acquiring smaller banks below the threshold. If true, this environment may result in a higher acquisition price, or a merger premium, for the target bank if the combined entities, or the acquiring bank, are considered TBTF.

I extend the existing merger premium analysis by testing to see if TBTF status accounts for a higher premium (ratio of the acquisition price versus the bank's book value) all else equal. The merger premium is understood as a value above a given ratio, generally the price paid relative to the bank's book value. Theoretically, certain measurable variables such as income growth or local market conditions will influence the size of the ratio. There is a significant amount of prior research that has tested for factors affecting the merger premium (Palia 1993, Rhoades 1987, Cheng, Gup, and Wall 1989, Benston, Hunter, and Wall 1995, Fraser and Kolari 1987, Esty, Narasimhan, and Tufano 1999, Beatty, Santomero, and Smirlock 1987) but none have controlled for potential TBTF effects. Work by Shull and Hanweck (2001) and Berger *et al* (1999) do specifically discuss the potential impact from TBTF but neither paper fully develops the theory or empirically test for a TBTF effect.

Kane (2000) lays out the discussion for the effects from TBTF status but fails to test it empirically due to the limited number of observations involving large banks. Kane tests separately the stock return on each acquisition controlling for several factors, and to then compare the reactions across banks of a similar size by grouping the coefficients according to asset class. But because of the small number of mega-mergers he is left with no useful statistics on this class size.

Instead of using an event study an alternative is to incorporate a TBTF variable in the merger-premium models. The inclusion of the variable removes the data limitation imposed by Kane's methodology because the TBTF effect should occur in all mergers/acquisitions where at least one of the parties (or post-merger, the combined

parties) exceeds the threshold. By including all acquisitions the number of potential observations is greatly increased because it includes not just so called megamergers, but also all of the purchase activity by TBTF banks. So for example, if an existing TBTF bank purchases a small rival, this is an extension of the implied guarantee to the deposits of the small bank. Therefore, in a competitive banking market, all else equal, a TBTF bank will be willing to pay more for a target than a non-TBTF entity.¹

Apart from the merger premium model I also look for evidence of TBTF benefits by investigating the outcome of the bailout of Long Term Capital Management. Long Term was a massive hedgefund that collapsed under the weight of poor investment decisions amidst an uncertain economic environment. The impending collapse of the fund sent ripples of concern throughout the investment community. The concern was evidently great enough that the Federal Reserve Bank of New York rather than let the fund fail, chose to get involved and help orchestrate a bailout. The reasons given to the rescue were largely due to the funds size and the potential impact on the community as a result of its collapse. In effect the Fed was saying that the fund was too large to let fail. This rescue of a non-bank based on its size and potential impact on the markets would likely solidify in the minds of investors that certain entities are in fact too large to let fail. I look to see if the stock prices for the nations 10 largest banks are favorably impacted by the Feds involvement in the securing of Long Term Capital. If the largest banks (those considered under the potential TBTF umbrella) saw their relative stock prices rise, this is

¹ The assumption of a competitive bidding market implies that the rents from the extension or creation of the TBTF guarantee are applied to the target firm.

evidence that the market saw the Long Term bailout as further confirmation of a federal TBTF policy.

The results from the two models are generally reassuring; while the event study shows scant evidence that the ten largest banks appear to have benefited from the Long Term bailout, the benefit of a TBTF policy does not show up in the merger premium model. In general, the results of the model are consistent with a competitive and efficient bank merger market where strong growth, quality management, risk diversification, and product market extension result in higher merger premiums. Meanwhile the results reject effects such as TBTF or bandwagon effects where banks overpay during times of heavy merger activity. These results are reassuring in that it offers evidence that the massive U.S. banking industry with thousands of participants and hundreds of annual mergers is dynamic and competitively efficient.

2. Background

Congressional response to the banking crises caused by the Great Depression resulted in a nation wide safety net that guaranteed deposits with the full faith and credit of the U.S. government. It soon became apparent however, that the government safety net removed the oversight role of the market in assessing the risk of banking institutions. The moral hazard created by the safety net enables banks to increase the risk of their investments without having to increase the rates they pay for deposit liabilities. Because depositors know with absolute confidence that their money is safe up to the insured limit they do not require a risk tradeoff based on the financial health of the bank. Other market

factors are not necessarily sufficient to constrain bank risk taking. Shareholders want the banks to maximize risk in order to gain the largest possible return, and themselves are not as concerned with risk as they can sufficiently diversify through a balanced portfolio.² One might then argue that uninsured deposits would force banks to make risk return tradeoffs, as uninsured depositors would demand higher interest payments to compensate for their greater risk of loss. But observed behavior of the FDIC has demonstrated to investors that the government does not just protect up to the insured limit, but in fact essentially guarantees deposits regardless of size.

The protection beyond the insured limit, while not stated in fact, came to be believed implicitly as a result of the actions by the Federal Deposit Insurance Corporation (FDIC), the main regulatory body responsible for overseeing banks. The FDIC has largely used purchase and assumption transactions as a means of dealing with a failed bank or thrift. A purchase and assumption, or P&A, is a process whereby a healthy bank acquires the failed bank's assets and takes on all of the failed bank's liabilities.³ But the FDIC, in order to encourage the transaction absorbs the losses of the failed bank rather than having the acquiring bank pay for them. The acquiring bank then takes on all of the liabilities, including large uninsured deposits. In this manner the protected status of

² Investors can diversify against the risk of the bankruptcy of any given bank by owning a portfolio of bank assets. This enables them to diversify against the specific risk of a single bank, while still capturing the overall above market returns from a subsidized banking sector.

³ A purchase and assumption transaction is a process "whereby an insured bank purchased certain assets of the failing bank and assumed all deposits, insured and uninsured, with the FDIC providing financial assistance to fill the gap between liabilities and assets." Testimony of Treasury Under Secretary For Domestic Finance John D. Hawke, Jr. before the House Banking and Financial Services Committee, April 1998.

deposits has been extended well beyond the explicit limit set by law because they are just transferred to the new owner rather than used to pay off the failed banks losses. The FDIC was therefore not insuring just small depositors, but virtually all of the deposits for all domestic banks.

For example, from 1986-1991, coverage of uninsured deposits ranged from 80 to 90 percent for every year except 1987 where the rate dropped to about 70 percent.⁴ Further, from 1979-89, 99.7 percent of all deposits at commercial banks were fully covered.⁵ That the FDIC had created an environment where all deposits at virtually all banks were fully covered is exemplified by William Seidman, who writing in the WSJ in 1991 said;

“[The myth is] [i]n most small-bank failures, depositors with accounts over \$100,000 end up losing part of their deposits... Some people mistakenly believe that small-bank failures usually are resolved through a payout of insured deposits—a liquidation, where uninsured depositors and creditors suffer some loss. The reality is that, currently, about nine out of 10 small bank failures are resolved through purchase and assumption transactions. In a P&A, all the deposits (including those over the \$100,000 insurance limit) generally are assumed by a healthy bank.”⁶

This effectively created a banking system that was nearly devoid of depositor oversight and had only limited stock holder monitoring. Left with simply inefficient

⁴ Feldman, Ron J., Rolnick, Arthur J. 1998. Fixing FDICIA: A Plan to Address the Too-Big-To-Fail Problem. Federal Reserve Bank of Minneapolis.

⁵ Feldman and Rolnick (1998).

⁶ Seidman (1991).

regulators as the only safeguard, the adverse effects of such a scheme culminated in the massive failures in the late 1980s, now well known as the S&L crises.

In an effort to correct the documented failures of the system Congress passed the 1991 FDIC Improvement Act. There were two important aspects to the new legislation regarding the current paper; one was that the reforms specifically addressed the issue of too big to fail status for banks, and secondly the act set out to eliminate the use of the P&A resolution as a means for dealing with failed banks and thrifts. The essential element of these reforms was to curtail severely the protection of uninsured deposits at banks and thrifts.

First, the 1991 FDIC improvement act attempted to reign in universal coverage by stating that a 'systematic' risk exemption was possible only where the failure of the bank would undermine the financial stability of the economy. Only then would the FDIC be entitled to protect all the liabilities of the bank against loss. Further, enacting the so-called "to big too fail" exemption requires agreement from the Fed, FDIC, the Secretary of the Treasury and the President. Additionally, FDICIA mandated a least cost resolution (LCR) for a failed bank's assets. This restricts the ability of the FDIC to use purchase and assumption transactions by a healthy bank of the failed bank's assets and liabilities. In effect, this is designed to limit the cost and risk to the FDIC and prevent complete coverage of bank liabilities.

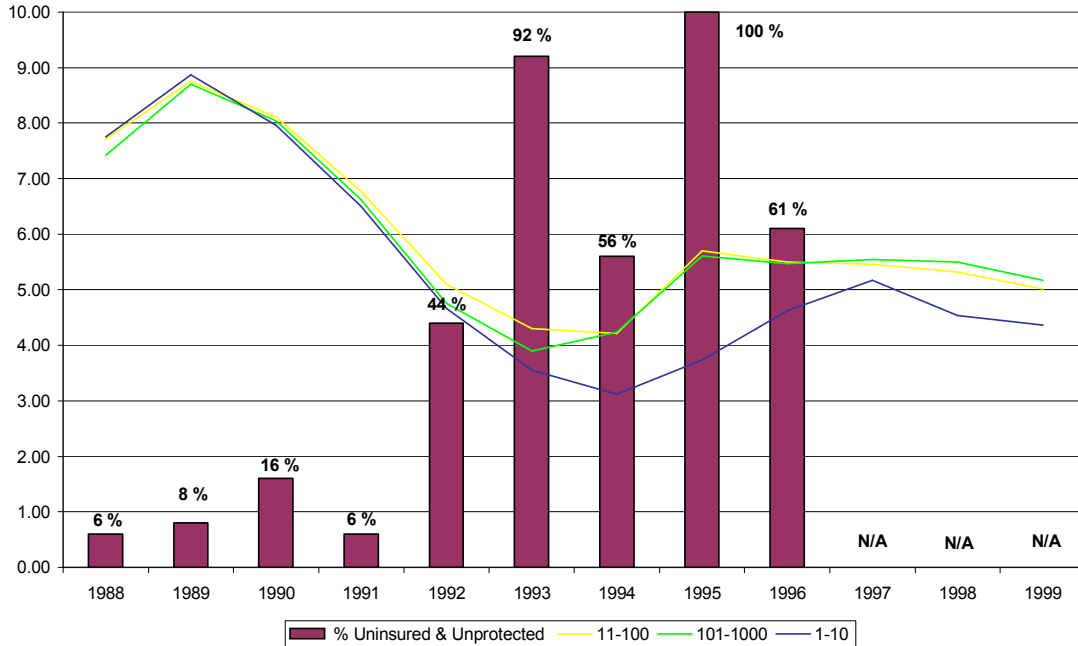
The intent of these reforms was to change the perception that the FDIC would cover all of the failed bank's liabilities. To a large extent this appears to have worked as the FDIC allowed depositor losses at failed banks. Starting in 1992 just over 50% of

uninsured deposits were covered down from 94% in 1991. By 1993 the new policy was fully in place as the FDIC covered a mere 8 percent of uninsured deposits.⁷ But the success of the reforms may have merely undermined depositor confidence in small banks thereby creating a competitive advantage for those banks considered too big to fail. The chart below shows the average interest rate paid on large denomination time deposits by bank size. Since large deposits exceed the \$100,000 FDIC insurance limit the rates may more fully incorporate the risk to the investor under a world absent the government safety net. Notice that from 1988 to 1991, when there was the de-facto assumption of complete coverage for all uninsured deposits there was no rate differential based on bank size. But as the FDIC's new policy became clear in 1992 and 1993 the ten largest banks began, and continue, to enjoy a sizeable rate differential compared to their smaller counterparts. For the period from 1993-99 the ten largest banks paid an average of 91 points less for large deposits than did banks 11-1000. Such a large rate advantage indicates that those banks considered TBTF receive a substantial funding subsidy from their implicit FDIC protection.⁸

⁷ Feldman and Rolnick (1998).

⁸ Additionally, claims that the rate difference results from market power are not sustainable as the rate differential for small deposits has an opposite trend. From 1988-1994 the ten largest banks generally paid substantially lower rates on insured deposits than the smaller banks indicating market power. In 1994 however, the gap began to narrow dramatically, to the point where for the last three years (1997-99) there has been almost no difference.

**Interest Rates Paid by U.S. Banks
Large Denomination Time Deposits
1988 - 1999**



Source: Federal Reserve Bulletin, June 1997 & June 1998; Feldman and Rolnick, 1997 Annual Report, Federal Reserve Bank of Minneapolis.

Figure 1 Interest Rates Paid by U.S. Banks

Hanweck and Shull (1999) found similar rate differentials between large and small banks that they also attributed to the implied protection stemming from TBTF. Additionally, they found that the ten largest banks operate with lower capitalization rates than their smaller counterparts. For 1997 the ten largest banks had average equity-to-asset ratios of 7.39 percent compared to 10.3 percent for the smallest banks. Further they argue that the Fed's recent behavior to form a loan syndicate to save Long-Term Capital

Management has re-enforced the position that certain institutions are beyond failure due to their position within the financial community.⁹

A non-TBTF bank can achieve TBTF status only through a merger/acquisition or by internal growth. Additionally, a TBTF bank can gain additional benefits by acquiring a small bank thereby transferring their preferred deposit rates onto the newly acquired small bank's existing and future deposits. In an effort to either capture TBTF status, or further extend that status, we would expect to see banks engaging in more merger activity than they otherwise would. Indeed, the past decade has seen a tremendous wave of consolidation and scores of megamergers involving banks with more than \$10 billion in assets.

It is important to study factors affecting merger activity because over the last decade there has been considerable consolidation and a growing number of mergers between the largest banks. During the decade of the 90s there was more than 30 completed or proposed megamergers involving organizations with over \$10 billion in assets.¹⁰ From 2000-2003 there were more than 1,000 mergers of commercial banks¹¹, of which nearly 50 involved banks that each had assets of greater than \$1 billion¹². The creation of a greater number of large banks expands the scope of TBTF coverage to a larger amount of assets and potentially increases the number of banks that receive a funding subsidy. As of 1997 Feldman and Rolnick identified 21 banks, up from 11 in

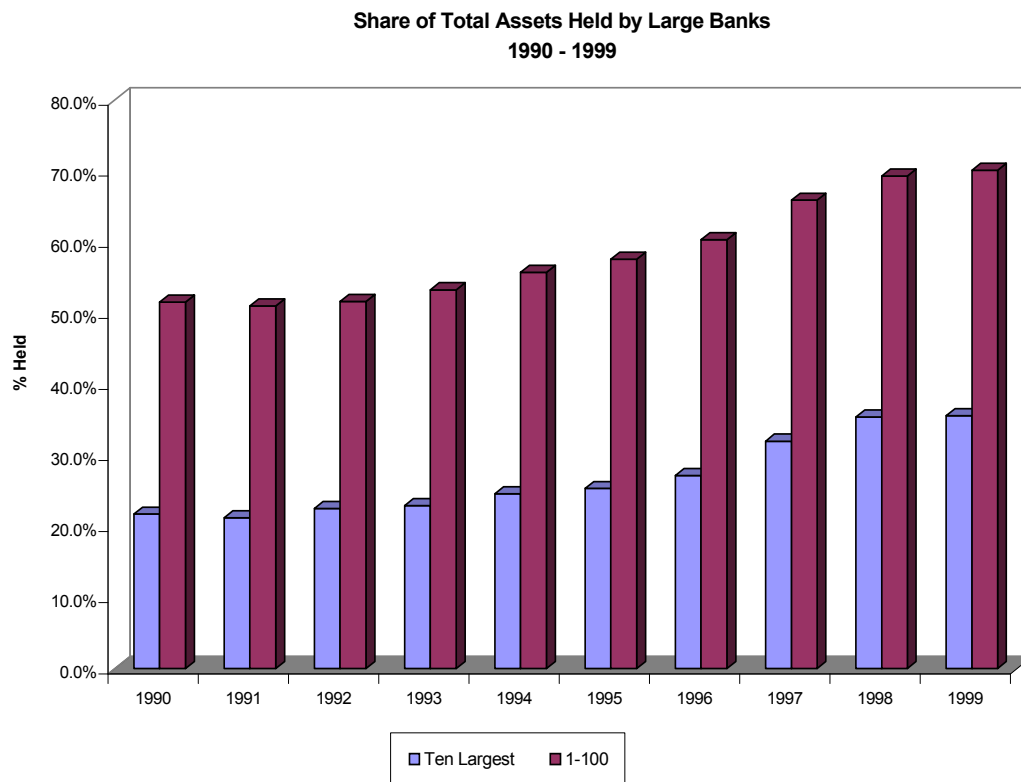
⁹ Hanweck and Shull (1999),16.

¹⁰ Hanweck and Shull (1999).

¹¹ FDIC Statistics at a glance, June 2006.

¹² Jones and Critchfield 2005.

1984, that they now consider TBTF, and that combined control 38 percent of all uninsured deposits.¹³ The chart below shows that the trend towards greater concentration has not abetted since 1997. Indeed, as of 1999 the ten largest banks controlled 36 percent of all bank assets, while the top 100 controlled over 70 percent. Making a conservative estimate from these figures suggests the consolidation trend has extended TBTF protection to 40-50 percent of all bank assets.



Source: Federal Reserve Bulletin, June 1997 & June 1998; Feldman and Rolnick, 1997 Annual Report, Federal Reserve Bank of Minneapolis.

Figure 2 Share of Total Assets Held by Banks

¹³ Feldman and Rolnick (1998).

Despite the newness of the rapid consolidation in the industry the topic has spurned significant amounts of research and study to determine the causes and consequences. An issue not yet formerly studied is the potential impact on merger activity from the 1991 FDICIA reforms that have lowered the funding costs for banks considered too big to fail. There are two reasons that the TBTF funding advantage may increase merger activity. First, two banks that individually do not fall under TBTF protection, but combined do, have a strong incentive to merge. This additional funding advantage is outside of other scale efficiencies; it results strictly from the benefit accruing from the government. This suggests that much of the research that finds gains from scale in bank mergers might actually be capturing the TBTF benefit and not the actual efficiencies created by the merged firms. To the extent this may be true this has strong implications for the social welfare function as the merger decision is made less on efficiency improvements and is instead motivated by regulatory incentives.

The second type of merger is a large bank purchasing a smaller one. In cases where the large bank is already TBTF, the small bank post-merger, will now receive the same cost of funding benefits. This benefit only accrues to banks that are either TBTF or would be put over the TBTF threshold by the acquisition. Thus, these banks will be willing to pay a premium to acquire these smaller banks that, all else equal, a bank that is not in a TBTF position could not match. If the market among large banks is competitive the purchase price of the small bank should reflect the TBTF premium.

The 1990s merger wave has been studied in some depth and a variety of explanations have been offered. But one issue that has received only limited attention and not been formerly tested, is that banks through merger/acquisition can either achieve TBTF status or leverage that existing status to additional deposits (Shull and Hanweek 2001, Kane 2000, Berger et al. 1999). If this is a factor in bank merger activity then it implies that the recent wave of consolidation is fueled at least in part by a legal construct and not by efforts to enhance efficiency. Further, studies that indicate that banks are achieving economies of scale may be misidentifying the association, as the scale economies may result from their implied government status and not from actual efficiencies resulting from greater size.

B. Explanation/Theory for wanting TBTF Status

1. Moral Hazard and deposit insurance

Largely due to their highly leveraged position and the fractional reserve system banks have long been considered more fragile and susceptible to failure than other institutions.¹⁴ Banks, unlike most other enterprises have little physical capital and, as such, maintain a highly leveraged position with low capital-to-asset ratios. In the event of a bank failure there are few salvageable assets that can be used to pay off the debt holders, exposing them to significant losses. A second unique feature of banks that raises

concern is the fractional reserve system. Banks have only a small fraction of their total deposit liabilities on hand in the form of cash to meet withdrawal demands from customers. Under normal circumstances when the bank is solvent this setup works well and in fact is a primary vehicle for credit and wealth creation in the economy. But under periods of duress when the bank's stability is brought into question, fractional reserves make the bank particularly susceptible to severe cash shortages in the event of a run on the institution. Thus, a seemingly solid bank could be thrown into disarray if the financial markets in general are thought to be on the verge of collapse.

Because of the unique financial position of banks and the corresponding risk to customer deposits various approaches to establishing deposit insurance date back as far as 1829.¹⁵ The early attempts at the state level failed for a variety of reasons. Not until the great depression, with the failure of 9,000 banks and widespread losses suffered by depositors, was there sufficient momentum to create a federal safety net for bank deposits. The Glass-Steagall act of 1933 and additional legislation in 1935 created the FDIC as the guarantor of deposits in domestic banks.¹⁶ A safety net supported by the full faith and credit of the federal government assured depositors that their money was safe, thus eliminating the risk of destabilizing bank runs.¹⁷ But in removing the risk faced by

¹⁴ See Kroszner, Richard, "Bank Regulation; Will Regulators Catch Up with the Market?" *Cato Institute Briefing Paper* No. 45, March 1999.

¹⁵ Petri, Tom and Bert Ely, "Better Banking For America: The 100 Percent Cross-Guarantee Solution," *Common Sense*, Fall 1995.

¹⁶ FDIC, Important Banking Legislation, <http://www.fdic.gov/bank/historical/brief/index.html>.

¹⁷ Besides the well-known benefits of deposit insurance there are two other features of the current system that are considered to provide a subsidy. One is the guarantee of inter-bank payments through the Fed's payment network. This is typically considered to provide a subsidy as a result of the guarantee that would

depositors, it also relieved them of their oversight role to make sure that the financial institutions that kept their money were financially sound. Banks no longer faced with the prospect of losing depositors or having to pay them higher rates to compensate for greater risk created the opportunity for moral hazard.

Moral hazard in the context of banking occurs because FDIC insured banks are able to take on risk without having to pay higher finance costs or premiums corresponding to that level of risk.¹⁸ This results from two factors: 1) customers do not face any additional risk because the full faith and credit of the US government back their insured deposits, and 2) despite recent reforms the FDIC does not price insurance according to risk. Therefore, despite the underlying risk of the bank's investments the deposits they accept are priced at a risk free rate that is not offset by an efficient insurance pricing mechanism. To the extent that banks derive a subsidy from the safety net it materializes in reduced interest rate payments required to attract depositors. The total benefit from the subsidy is the difference between that rate and the rate they would be required to pay if they had to compensate depositors fully for the true level of risk.

The actual size of the subsidy is difficult to measure because it depends on the characteristics of each bank as well as conditions within the overall economy. Banks that are near insolvency derive substantial benefits from deposit insurance, but institutions that are well capitalized with high franchise values or risk-sensitive managers interested

come at a substantial cost in the private market (see Ely (1999) and Testimony by Alan Greenspan, March 19, 1997). The second is access to the Fed discount window that grants banks immediate access to liquid funds. Both of these features provide substantial benefits to the banking industry, but the largest single cause of the subsidy is deposit insurance.

in preserving their reputation and future job opportunities may make little use of the safety net.¹⁹ Conditions outside of the bank can also affect the size of the subsidy. During periods of economic prosperity for example, there is little chance of default on most of the bank's revenue generating assets so the benefit derived from deposit insurance is minimal. But when economic conditions deteriorate and the likelihood of defaults begin to rise, the benefits accruing to banks from guaranteed deposits rise as well.²⁰

The actual size of the government guarantee therefore is a function of the macroeconomy and the health of the individual bank. This is separate however from the premium a TBTF bank would pay when acquiring another bank and extending the guarantee. The premium in this instance is a function of the assets, or total size, of the target bank and does not depend on the health of the target itself. This means that even though the total size of the government subsidy is larger for a troubled bank, the acquiring firm would not be willing to pay more for the target. In fact, all else equal the acquiring bank would prefer a healthy bank with solid earnings or a healthy loan portfolio. The TBTF premium is then limited to the funding premium that the acquiring bank can extend to the target bank's deposits and other liabilities.

¹⁸ Hanc, George, "Deposit Insurance Reform: State of the Debate", FDIC, (2000): 3.

¹⁹ See Hanc (2000), Keeley (1990), and Demsetz, Saldenber, and Strahan (1997): 278-83.

²⁰ For example, see Kwast and Passmore (1997).

2. Is the Safety Net a Benefit to Banks

Despite the reduced borrowing costs derived from the safety net there is considerable controversy over whether the total subsidy is positive or negative. For example, in a recent paper Ely (1999) argues that not only is there no subsidy benefiting the banks, but the subsidy actually runs the other direction: from the banks to the taxpayers. His conclusion is based on the premise that various reforms have effectively eliminated the risk facing the taxpayer from bank failures. As a result, Ely argues the reserve fund kept by the FDIC is excessive and represents a forced loan from banks to the government. The interest income the FDIC earns from their portfolio of treasury securities purchased with the reserve fund is what constitutes the subsidy from the banking industry to the FDIC.

In addition to the Ely study there is a body of research that uses the Black-Scholes option-pricing model to measure empirically the size of the safety net subsidy. By treating deposit insurance as a put option with an expiration date at the time of regulatory review they can estimate fair insurance premiums and compare them to the premium charged by the FDIC. Marcus and Shaked (1984) find fair insurance premiums that were less than the actual rate charged by the FDIC.²¹ However, they limited their analysis to forty of the largest banks. Additionally, they make the assumption that the FDIC after the regulatory review process is able to force under-capitalized banks to adjust completely their capital ratios so that the FDIC's net liability returns to zero. Pennacchi (1987) shows

²¹ Also see Ronn and Verma (1986), and Kuester and O'Brien (1991).

that when this assumption is dropped the fair insurance premium is actually far greater than the rate charged by the FDIC.

Whalen (1997) applies the option-pricing model and includes regulatory costs. He concludes that member banks of the FDIC do not receive a net subsidy, but rather they actually bear a net cost. Before accounting for regulatory costs he first calculates 'fair' insurance premiums that range from 1 to 30 basis points.²² Then, by including cost estimates from a 1992 Federal Financial Institutions Examination Council report he determined that on net, the cost of regulation outweighed the 1 to 30 basis point funding advantage derived from the safety net. Whalen's results however should be treated cautiously as they are not representative of the banking industry as a whole over all ranges of the business cycle. Despite the findings of Whalen and others that the gross subsidy may be negative however, this will not alter the marginal behavior of banks. This point is made in Kwast and Passmore (1997).

In an effort to show the effect the safety net has on banks' cost of funds Kwast and Passmore (1997) construct an analytical model that makes an important distinction between the fixed and marginal costs of banking. Absent the government safety net, banks face a marginal cost of funds that rises as their total assets increase. Kwast and Passmore attribute the upward slope to banks raising funds from the least risk-averse customers first. On the other side, the marginal benefit from these funds is derived from how the bank uses them in such ends as corporate or home mortgage loans. The bank

²² FDIC insurance premiums are currently from 0-27 basis points. Over 90 percent of all banks currently make no insurance payments.

invests in the most profitable ventures first so the marginal benefit of funds decreases as assets increase. Banks maximize profits at the point where the marginal cost of raising funds equals the marginal benefit from using those funds. Deposit insurance affects the analysis by shifting the marginal cost curve down, and making it flat up to the point where deposit liabilities are completely covered by the FDIC. As a result the marginal benefit and cost curves intersect further to the right meaning that banks raise more funds and take on more investments than they otherwise would. Banks therefore benefit directly from the government safety net by paying a lower cost for funds.

The most salient feature of this relatively straightforward analysis is the irrelevance of fixed costs on the behavior of banks. Therefore, in terms of its effect on bank behavior the only concern regarding the safety net is its impact on marginal cost and not whether it grants a net subsidy to the banking industry. This means that studies, such as those done by Ely and Whalen that conclude the total subsidy is negative, are not germane to the behavioral adjustments of banks. Recall from above that Whalen finds that the safety net does in fact lower the marginal cost of funding for banks even though the net burden may be negative post-regulatory costs. But we know that the majority of regulatory costs are fixed in nature and as such do not affect the short-run output decisions made by banks.²³ Whalen's results therefore, support, rather than rebut the notion that banks have a lower marginal cost of raising funds from the safety net. This

²³ This is supported by the "Study on Regulatory Burden" (1992) that finds broad consensus among cost studies that "average compliance costs for regulations are substantially greater for banks at low levels of output than at moderate or high levels of output". Such a result implies that regulatory costs are largely incurred up front.

marginal benefit is further expanded as banks expand their asset base through internal expansion or expansion through acquisitions.

Further, recent reforms to the FDIC insurance premium do not offset the funding advantage of the safety net as speculated by writers such as Ely. Up until the 1991 FDIC Improvement Act (FDICIA) the method of pricing deposit insurance acted to offset some of the reduction in marginal borrowing costs resulting from the safety net. Deposit insurance prior to the reforms had been set at a flat rate of 8.3 cents per-hundred dollars of insured deposits. Such a pricing scheme affects the marginal cost curve by moving it upward in a one-time shift. But the 1991 reforms, designed to reduce the adverse affects of the safety net, have actually eliminated even this offsetting factor and further exacerbated the problem.

The current policy for pricing deposit insurance stems from the design of the 1991 FDICIA reforms to replace the fixed rate system and further protect the taxpayer from potential losses. Part of the effort to further insulate taxpayers called for the FDIC to maintain a reserve fund of 1.25 percent of all insured deposits.²⁴ The Act granted the FDIC broad assessment powers to ensure that the fund reached, and could be maintained, at this target level. FDICIA also demanded the enactment of a risk-based insurance pricing mechanism to replace the old flat rate system. The failure under the old system to base premiums corresponding to the level of risk is widely believed to have been a major contributing factor in the collapse of the thrift industry. When the risk-based system was

²⁴ The reserve funds are actually kept separately by the arms of the FDIC, the BIF and SAIF. For our purposes there is no need to draw a distinction between them.

first introduced in 1993 the premium rates were set at 23-31 cents per-\$100 of insured deposits.²⁵ After the BIF and SAIF reserve ratios reached their target of 1.25 percent of deposits the rate structure was soon changed to 0-27 cents, where it remains today.

The current policy, however, is fundamentally flawed due to the irreconcilable conflict between maintaining a risk-based premium and a targeted reserve fund once the targeted fund level has been reached. If the reserve fund is fully capitalized the FDIC will be unable to charge banks any premiums without further expanding the size of the fund.²⁶ Pennacchi (2000), recognizing such flaws in the conflicting agendas concluded that if the FDIC were to adhere to risk-based pricing then the reserve fund would explode. Conversely, if the FDIC maintains the reserve fund around its target level then the actual premium will be far less than the fair risk-based premium.²⁷ The FDIC has generally adhered to the later and as a result insurance premiums have been eliminated for nearly all banks. Currently the reserve fund is comfortably above its 1.25 percent target and 93 percent of all banks and thrifts have been relieved of any insurance premiums.²⁸ Further, if a bank were to take on additional deposits they would still pay no additional premiums as long as it did not change their capital profile.²⁹ Since so few banks now pay for deposit insurance there is no upward shift in their marginal cost curve to mitigate the

²⁵ The actual premium charged was dependant upon the evaluated risk of the bank.

²⁶ Holding constant losses to the fund.

²⁷ Pennacchi, George G. (2000)

²⁸ FDIC Options Paper (2000). <http://www.fdic.gov/deposit/insurance/initiative/optionpaper.html>

²⁹ If the increase in deposits however, dropped the BIF/SAIF reserve ratio below 1.25 then rates would be raised equally for all banks/thrifts to bring the reserve ratio back up to its target. This presents the classic public good/free rider problem, where the bank/thrift gets all the benefit of the additional deposits but would only pay a small fraction of the extra cost of insurance.

distortions caused by the safety net. As a result, reforms that were intended to diminish the adverse consequences of the subsidy may have actually made matters worse by further lowering the banks marginal cost of raising funds.

The following chapter gives a more in-depth discussion of the relationship between banking and the government policy that has existed since the earliest days of the republic. A review of some key points shows that the government continually has involved itself with banking, particularly in times of crises. The results have all too often been wrought with unintended consequences that have in turn prompted additional government action. The current situation is not surprising when looked at in such a historical context. The simple fact is that banking has a close connection with the public and disruptions with the sector may have dire impacts on the savings of average Americans. That fact, coupled with the vital role banks play in economic policy, growth, and the funding of government debt have made it virtually impossible for officials to adopt a hands off policy with the banking sector. A walk through of this history reveals the constant tinkering or wholesale policy changes by the government, and that this relationship is unlikely to change anytime soon.

II. CHAPTER 2

A. Review of Relevant Banking Developments

By the time of the 1991 FDIC Improvement Act it had become apparent that the United States was operating under a policy that effectively guaranteed all liabilities for nearly all banks. This applied to banks no matter how big or small and regardless of any actions the banks themselves may have taken. Additionally, the extent of oversight, or lack thereof, by depositors and other creditors to the banks was immaterial in the decision to protect the failing banks assets. This represents a complete breakdown of market discipline and involves government assistance to prevent failure that is virtually unparalleled in any other American market. This of course begs the question as to how did the United States get to this point.

Despite the common perception that government involvement in protecting banks and the public deposits was first established as a result of FDR's New Deal programs, in truth the involvement starts much earlier with the very founding of the nation. It wasn't long after the colonies gained their independence from England that the first federal protections to the banking system were granted. While these protections were not explicit as they are since the depression era, such as defined depositor guarantees, the government started to habitually step into the banking markets during any time of crises. There is little doubt that this practice led to a widespread belief that banking was a unique market

unto itself that could not be subject to perceived vagaries of the free market system and therefore accorded special participation from the government. Government guarantees of bank deposits and TBTF policy are therefore not spontaneous policy decisions resulting from an isolated incident, rather they are the end product of a codependent system between banking and the government that begins even before the birth of the Republic.

The government support of banking originates from the multifaceted role that banking serves in a market economy. Banks not only serve as a store of assets and a source of credit, but historically they also acted as the source for the medium of exchange. As such, any economic performance is very much correlated to the health of the banking system (although the causation can run both directions). The tie between the economy and bank performance gives the public, and therefore government officials the desire to intervene in any bank crises.

Early collaboration between the banking sector and the government is largely the result of banks as a source of credit. European banking is one replete with examples of the state demanding loans from private and state run banking systems, almost always as a means to finance a war effort. Taking from this example the founding fathers of this country saw a similar need to fund the war for independence. Alexander Hamilton articulated in 1780 that the army had become nothing more than a “mob”, and together with Robert Morris, argued for the creation of a national bank to help pay for the army.³⁰

³⁰Hanweck, Gerald A., Shull, Bernard, *Bank Mergers in a Deregulated Market*. (Connecticut: Quantom Books, 2001), 45.

In 1781 the Continental Congress chartered the Bank of North America, America's first national bank, and as part of the charter it was required to lend money to the government.³¹ This was the first of several national banks created by the government. The First Bank of the United States, which lasted from 1791-1811, and the Second Bank of the United States operating from 1816-1836. Additionally, during this time the States began to actively issue charters to private banks resulting in the creation of over 700 banks by 1836.³² The issuance of state charters was no less removed from government involvement as nearly all aspects of the charters were subject to negotiation between the bank and the issuing government. Prominent in these negotiations was the obligation between the bank and the government, and the government and the bank.³³

Although the new nation's first experiment with a national bank ended quickly with the repayment of all the federal debt by 1783, this hiatus was only temporary as another charter was issued to the First Bank of the United States in 1791.³⁴ While there was no war ongoing the charter of the bank was granted clearly as a means of aiding the country and the government. The bank would be granted the privilege of issuing notes, redeemable in specie, that would be accepted as payment in taxes, and further the bank would be the official depository for public funds.³⁵

The new bank rapidly began to ease credit and expand the money supply buying millions in federal debt, loaning millions directly to the federal government and issuing

³¹Hanweck and Shull, 46.

³²Board of Governors (cited in Hanweck and Shull 47).

³³Hanweck and Shull, FN 21 p. 48..

notes on a fractional basis backed by limited specie. Additionally, the number of commercial banks expanded rapidly, from 4 at the time of the First Banks charter to 117 when the charter ended in 1811. More importantly, the reserve ratio in 1811 was .23 with severe differences in the amount of expansion between the conservative New England banks and more aggressive mid-western ones.³⁶

The War of 1812 was a watershed period in the relationship between banking and the government. At the start of the war the charter of the First Bank had been revoked when a combination of hard money advocates, and strict constitutionalist forces successfully defeated the re-charter bill.³⁷ But the demands of war time finance compelled the government to turn towards the growing number of commercial banks to buy large amounts of debt. Over the course of the four year war the number of banks nearly doubled from 117 to 212, and the rate of monetary expansion was just as significant.³⁸ A crises soon emerged however due to the disparity in lending between banks. The more conservative New England banks soon began to demand payment in specie of the notes issued by banks in Pennsylvania, South Carolina and other southern states, notes that the government had been using to pay for materials to promote the war effort.

³⁴Rothbard, Murray N., *A History of Money and Banking in the United States: The Colonial Era to World War II*. (Alabama: Ludwig Von Mises Institute, 2002), 64.

³⁵Rothbard, 68.

³⁶Rothbard, 71.

³⁷Rothbard, 70-71.

³⁸Rothbard, 73.

The situation was clearly not sustainable as the inflated notes issued by southern and mid-western banks were backed by only a fraction of actual specie. In effect the country was witnessing its first bank run, but instead of a panicking public, the run was by more conservative banks that did not want inflated notes but the actual hard currencies of gold and silver that the notes were said to represent. Technically it was within the government's power to let a severe contraction happen, let the worst inflating banks fail, prices fall, but eventually restore economic order as the healthy banks would survive and the value of money would be restored. But such an event seems almost impossibly far fetched as the relationship between banks and the government had grown and solidified, banks serving the purpose of financially backing the government's various ventures and providing easy credit when it was deemed necessary. By banks serving such a perceived necessary role to the Federal government it should come as no surprise that the banks in turn would receive their own benefits.

With this backdrop the federal government made the critical decision in August 1814 to allow banks to suspend the repayment of notes. For the next two and a half years banks did not need to meet their obligation of redeeming their notes in gold or silver, as Rothbard so eloquently states it,

“In short, in one of the most flagrant violations of property rights in American history, the banks were permitted to waive their contractual obligations to pay in specie

while they themselves could expand their loans and operations and force their debtors to repay their loans as usual”.³⁹

The government had now made it clear that it considered banks too critical to let fail. Equally important the government protected those banks that had most recklessly expanded from meeting their obligations, while the banks that had been more conservative in their operations were left holding the bank notes of the former that they could not redeem. The groundwork was now set for banks to believe that they had a special status, and could therefore more aggressively expand with the knowledge that in a crises the government was their as a supporter of last resort. Not surprisingly the experience of 1814 was to be replayed over and over again.

In the years between 1814 and the Civil War alone, there were four additional major suspensions of specie payment, 1819, 1837, 1839, and 1857.⁴⁰ So in a period of just over 40 years the government responding to financial crises proactively protected bank solvency by suspending specie redemption bank runs.

As a response to the 1837 crises a wave of reform spread through the majority of states to enact what was termed ‘free banking’.⁴¹ A growing number found troubling the policy of bank charters getting issued at the sole discretion of state governments. Such a policy left opening a bank to the whims of government and allowed states to limit competition among banks. Political connections were then as much of an asset to a potential banker as their skill in managing money. Free banking at its core was an effort

³⁹Rothbard, 74.

⁴⁰Rothbard, 76.

to remove legislative obstacles to new entry and replace them with known, easy conditions that as long as they were met, made bank entry available to anyone. Of course some organization needed to monitor these conditions, so entry was not free in an absolute sense, as banking officials or agencies were created to monitor and approve applications, replacing the role of the legislative body.⁴² Additionally, by leaving entry decisions up to the legislature of individual states there was limited uniformity in banking.

The start of the free banking era began with the expiration of the charter of the Second Bank of the United States in 1836. Combined with the wave of new entry from state chartered banks the U.S. economy underwent a significant change in its medium of exchange. Both the First and Second banks of the U.S. held national charters and as such issued a national currency. With free banking, banks were largely independent in issuing their own notes. With little conformity of regulation and a large number of banks, the number of bank currencies in circulation exploded. By 1860 there were more than 1500 banks and literally thousands of types of currency.⁴³

The free banking era was not devoid of bank failures and panics. Bordo (1989) identifies at least three occurrences, 1837, 1839 and 1857. In all three instances he points out that the existing set of controls was insufficient to prevent the panics, but in reality

⁴¹Hanweck and Shull, 56.

⁴²Hanweck and Shull, 57.

⁴³ Moen, Jon R., Tallman, Ellis W. 2003. New York and the Politics of Central Banks, 1781 to the Federal Reserve Act. *Federal Reserve Bank of Atlanta Working Paper Series* 42.

the market did respond with arrangements designed to stem the panic. The Clearinghouse system, first established in NY in 1853 was a private association of member banks that would replace the risk for depositors from a single bank to the aggregated association (see, Gorton 1985, Gorton and Huang 2001). In the event a member bank was faced with a severe liquidity constraint the clearinghouse would monetize long term assets through loan certificates that were backed by the clearinghouse. Since the arrangement was a private system the association closely screened and monitored member banks, and would expel banks for failure to abide by designed regulations. Gorton (1985) explains that the threat of expulsion was a severe threat keeping potential wayward banks in-line.

It is interesting to note that the free banking era saw the rapid expansion of banks and its share of runs and monetary panics. But absent significant government involvement, or any sustained type of insurance program, private methods arose to address the most severe issues that arise from panics. That is, there is a distinction to be made between runs on healthy banks and large scale corruption or mismanagement of banks. The clearinghouse system would provide support for a short term crises by monetizing illiquid assets. But, in order to do so, since the Clearinghouse was a private association with voluntary membership effective regulation was required to prevent free-riding and the eventual collapse of the system. It is a testament to the overall effectiveness of this system that it remained in place until eventually being replaced by the Federal Reserve in 1907.

The general effectiveness of the private bank system and Clearinghouse was not sufficient however to prevent the continued incursion on the monetary system by the

government. Largely in reaction to the enormous numbers of currencies in circulation there was a drive for a single currency system. It is of course important to note that the huge number of banks, and therefore currencies, was in large part driven by the extensive state regulations (especially in rural states) that were unit banking states. By limiting branch banking, and interstate banking, the US was unable to develop any national banks similar to those that arose in Europe and Canada.

Unwilling to allow consolidation and a few large dominant banks the US instead turned to additional legislation to create a single uniform currency.⁴⁴ The National Banking Era began in 1863 with the passage of The National Bank Acts of 1863 and 1864. The genesis of the legislation was to create a single national currency (in fact, the original name for the legislation was the National Currency Act). National banks would be subject to capital requirements and reserve requirements on deposits and could issue a single currency backed by government bonds. Of course capital and reserve requirements require government monitoring to try and prevent fraud, so the act also created the Office of the Comptroller of the Currency to supervise the national banks.

The law also ended up increasing the concentration of NYC banks by allowing rural banks to count deposits in reserve city banks as part of their capital requirements (see Moen and Tallman 2003). As a result the National Banking act created, in effect, two explicit roles for large banks in government policy. First, by creating a currency backed by US bonds it provides a means of funding for the Federal government, an

⁴⁴ In fact, the National Bank Acts specifically prohibited branching across state lines (Gorton and Huang 2001b).

extremely valuable resource for the Union during the period of the Civil War (see Economic History Online Encyclopedia). The second is that city reserve banks became holders of rural bank reserve requirements. Such a policy expands the incentive for regulators to preserve large city banks.

Originally public officials' interest in intervening in bank policy was limited to the extent that they would want to prevent economic disruption that would undermine their policy and their chances for re-election. But with an explicit role of keeper of reserves, city banks now take on an added dimension. Regulators now are interested in preventing their failure in order to ensure the credibility of the law to rural banks, and further to preserve the overall competency in the system they created. To the extent that Congress created city banks to keep reserves it puts the government in the position where they can not allow the system to fail, otherwise they would assuredly incur the wrath of rural voters. As if there was not already sufficient tensions between the rural and urban regions, now city banks are de-facto legal holders of rural bank assets. I would argue that this is a foundation for creating TBTF policy. By making banks an actor for government policy legislators have an added incentive to prevent their failure. The failure of banks in a fully private system only reflect poorly on legislatures to the extent the voters hold them accountable for the general economic disruption. This can of course be significant. But by explicating creating a role for banks as agents for government policy, and explicitly setting reserve requirements and other ratios in an effort to promote stability, officials are signaling to the market that they are taking action to improve banking functions and

stability. Under such a light the legislature's reputation is much more at risk in the event of bank panics and as such they have an added incentive to prevent bank failure.

Although the National Banking acts did immediately create a uniform currency they did little to stem the periodic panics and bank runs. During the national banking era (1863-1913) there were at least 5 panics (1873, 1884, 1890, 1893, and 1907) and three of these resulted in suspensions of converting currency into gold (1873, 1893, and 1907) (see Bordo et. Al 1995, Bordo 1989, Moen and Tallman 2003). In all three of these instances the safeguards put into place by the Federal Government and the oversight by the OCC were apparently insufficient to prevent the panics. Besides the government the Clearinghouse system was still very much active, acting as a lender of last resort. In the three panics ending in suspension the Clearinghouse system injected significant amounts of currency into the system equal to 2.5% of the money stock in 1893 and 4.5% of the money stock in 1885 (Gorton and Huang, Gorton 1985). While the panics of 1884 and 1890 were not as severe and largely averted due to Clearinghouse action part of the process involved suspending the conversion of customer deposits into currency. While an effective means to delay the panic this was not a power granted to Clearinghouses and would require authorization by the state banking authorities (for a discussion see Moen and Tallman 2003). Thus, part of the efforts undertaken by the Clearinghouse were illegal but permitted presumably in the name of preventing economic turmoil.

Again this is evidence of further erosion between the private market for banking and government involvement. During the national banking era the government through the OCC was already regulating banks, using them as a means for funding through

monetizing bonds, using reserve banks as an agent for the government, and now in the name of economic solvency were allowing somewhat flagrant violations of the law.

Already having suffered through 5 severe panics the next event in 1907 appeared to be a galvanizing event for additional regulation. The severe downturn that year highlighted the numerous flaws in the current financial system, most notably the problem caused by the pyramiding of reserves in New York (leads to contagion effects from bank collapses) and the lack of a central bank to serve as a lender of last resort (Moen and Tallman 2003). There had been a growing perception as a result of the boom and bust trend of banks that there was a need for a lender of last resort. A central organization could serve two valuable purposes; first it could inject liquidity into the system to try and prevent major economic disruptions, and second it could serve as a discount window to specific banks that were facing a short-term liquidity crises due to the inability to turn long term assets into money.

The Federal Reserve Act of 1913 put into place the Federal Reserve and charged it with the responsibility of managing the money supply, holding the reserves of member banks, and acting as a lender of last resort. This power given to the Federal Reserve effectively nationalized the existing private Clearinghouse system (Gorton 1985).

The concept of a lender of last resort (LLR) was first used regarding the Bank of England in 1797.⁴⁵ The general notion was that the LLR would protect only the

⁴⁵ See Humphrey (1989) for literature review of early theory regarding lender of last resort. Initial defense for LLR was as an agent to provide liquidity and protect the money supply in a time of financial crises, but not represent the interest of any individual bank.

aggregate money supply and not protect individual institutions but only provide funds to solvent ones that were suffering from a severe short-term liquidity crises. Therefore the LLR was to serve the general interests of the macro-economy but not those of any particular bank or financial institutions (Humphrey 1989). There is of course a relatively obvious fundamental problem to such a concept. Who is to determine exactly what is the ‘general interests’? If the concept is to provide liquidity to banks that would otherwise fail (even if, absent the short-term shock the bank was healthy, the issue is that it would fail in the short-term), then some regulator or policy maker must make a judgment as to what financial institutions to protect, and when.

It is of course never clear if a series of threatened bank failures are just part of a modest adjustment or the start of a domino effect. Any risk-averse regulator would likely elect to intervene earlier in the process, before the full extent of any fallout could possibly be known lest they be criticized for failure to act. Additionally, there is of course the opportunity for rent-seeking by select banks to garner loans during times of crises. And finally, politicians will always have a vested interest in using their influence to encourage LLR lending to a troubled bank in their district regardless of the fact that the overall threat to the macro economy may be minimal at best.

Put another way, the creation of the Federal Reserve with an explicit role of acting as a LLR to avert monetary crises presents a nearly inevitable situation where selected institutions will receive government support. The progression works this way, the role of the LLR is to prevent major disruptions to the money supply which grants it the right to provide funds to solvent institutions during times of crises. But in protecting shocks to

the economy the LLR needs to ensure that there is no cascading effect from failing banks and so must take early action, which results in the LLR now acting to prevent any major loss of wealth (Bordo 1989). Again, what is a major loss of wealth, the collapse of a series of regional banks, one large bank, one small bank with market power in a given location? The definition is not clear and so the opportunity for greater government involvement is wide open.

If the intention of the Federal Reserve Act was to create a LLR to protect the aggregate money stock and severe money and bank contractions, it of course failed. The events around the Great Depression need little introduction- a massive contraction in the economy precipitated by and correlated with the failure of thousands of banks. One of the outcomes of the collapse was again another government solution of bank insurance through the FDIC. The main component of the National Banking Acts of 1933 and 1935 was the creation of the FDIC to act as a regulatory body that would protect the par-value of deposits. All national banks were required to join with membership optional for state banks. Almost immediately the vast majority of banks joined the system and within 6 months of its creation 97 percent of all deposits were under the review of the FDIC.⁴⁶ But it is interesting to note that the idea for bank insurance were not new, there had been deposit insurance plans at the state level for more than 100 years.

⁴⁶ Phillips, Ronnie J. 1994. The Regulation and Supervision of Bank Holding Companies: An Historical Perspective. *The Jerome Levy Economics Institute of Bard College and Colorado State University*. Working Paper No. 116.

The earliest state deposit system was founded in NY in 1829 (for discussion on state banking insurance see White (1981), FDIC (1998), Calomiris (1990)). It established an insurance fund with mandatory membership and a board of commissioners given examination powers. From 1831-58 five other states adopted similar insurance programs. From 1908-17 after the panic of 1907, 8 states adopted insurance funds. All of these plans ultimately ended in failure due to excessive risk taking and lack of sufficient oversight. Additionally, the passage of the Banking Acts of 1933 and 1935 creating the FDIC were not new ideas. By one count from 1907 to 1933 there had been 150 bills introduced in Congress that would have guaranteed bank deposits.

What had floated around with limited success at the state level for more than a century and had been proposed at the Federal level time and again for more than 25 years had finally become law. There is no doubt that the start of the great depression and the apparent collapse of the banking system were the motivating factors to finally get a national insurance fund created, but there is a broader question. Why was the United States buffeted by a seemingly endless number of monetary crises and bank failures? For more than 130 years the country had suffered from periodic shocks and had taken one approach after another to try and solve the problem. Almost every solution offered and implemented gradually increased government involvement into banking in an effort to promote stability, yet none were successful. The first national banks came and went and were unable to prevent panics, free-banking (which was far from free) still had failures. The national banking era was introduced to no avail, state deposit schemes were universally unsuccessful, the Federal Reserve did not prevent the great depression, even

the FDIC witnessed the massive savings and loan crises of the 1980s. So what was it about the early history of US banking that made it so susceptible to instability?

The cause appears to be the underlying structure of banking in America. U.S. banking law, even when less restrictive such as during the free banking era, has always had restrictions on branching and interstate expansion. Numerous states had a policy referred to as ‘unit banking’ where branching was not allowed. Further, the National Bank act explicit prohibited interstate banking. Combined with relatively easy entry these restrictions resulted in thousands of small rural and city banks all serving small local markets. With a small asset base and a lack of access to geographic diversity the banks were highly susceptible to local and macro shocks making the entire banking system highly volatile.⁴⁷ Additionally, due to the great number of banks coordination between them during times of panic was equally difficult. In many instances bank runs may be limited to a specific region, or set of banks within a region. Such events could likely be offset if there were cooperation among the banks so that uninvolved banks could provide liquidity to those facing the run. This is the basis of the Clearinghouse, but this was largely limited to NY banks that were generally larger and more concentrated. But such a network was significantly more cumbersome and therefore unavailable in more rural markets that were even more beholden to a single economy, generally agriculture.

The U.S. stands in stark contrast to the banking system in other countries. Take our northern most neighbor. Canada has never had branching or merger restrictions of

⁴⁷ Gorton and Huang (2001(b)) show that smaller independent banks are more susceptible to bank panics and runs compared to large banks due to greater access to liquidity and consumer expectations.

any significance and as a result has always had a highly concentrated banking market dominated by a handful of large banks. In fact a wave of bank mergers in Canada throughout the early period of the 20th century is credited with greater geographic diversification and stability (Bordo et al. 1995). As a result Canadian banks were never forced to suspend payments on demand deposits. Additionally Canadian banks routinely worked cooperatively to stem panics so that over the period 1870 – 1913 U.S. depositor losses were 60% greater than those in Canada (Williamson and Summer 1989). Even during the severe disruption of the 1920s when over 6000 small U.S. banks failed only one Canadian bank closed and that was due to fraud (Bordo 1989).

Looking at the stark differences in results between the U.S. and Canada, it is the United States that is the outlier and not Canada. For example, during the National Bank era panics in the United States, Britain had shocks to their system but no panics, while France and Germany had no significant disruptions (Bordo 1989). The difference between the systems is that the U.S. with no interstate banking and a heavy reliance on unit banks was more susceptible to shocks and panics. For example, Calomiris (1990) after finding that states that allowed branch banking had much lower failure rates comments that unlimited branch banking would be sufficient to protect the payment system during panics. Gorton and Lixin (2001) in a survey of relevant literature conclude that bank panics are much less likely where there are fewer, larger banks that have sufficient diversification. White (1981) found an inverse relationship between branch banking and bank failures for the period 1907-29.

What is more, the U.S. established policy of small unit banking as the dominant form gave them undue political influence that led to additional perversions in the market. The 8 states that adopted deposit insurance from 1908-17 were all in unit banking states and all of the support for federal deposit insurance came from unit banking states (see Calomiris 1990 and White 1981). In fact during panics it was usually the small banks that failed while large banks were supported by the clearinghouses (Kaufman 2003). As found by Calomiris (1990) the creation of deposit insurance only worsened this condition as small bank failures as measured by asset losses were deepest in those states the longer the compulsory insurance system was in place.

By 1935 the United States therefore found itself in a position of protecting an inefficient system that would not have existed absent existing state and federal laws. Over the past 80 years all government attempts at stopping panics had failed; a national bond backed currency, creation of the federal reserve, and numerous state insurance funds had all been unable to, or had contributed to panics and bank failures. Meanwhile, nothing had been done to address the apparent underlying cause of systematic instability in the huge number of small, risky banks. Unable to address the underlying cause, the US in 1935 instead turned to a national compulsory (or nearly so) deposit insurance system. Now depositors in all banks, no matter how small and unstable would get guaranteed deposit insurance.

Two additional actions further contributed to the universal TBTF policy to virtually all banks that existed in the 1980s. In 1950 the FDIC requested, and was granted permission by Congress the ability to; grant loans, purchase assets and assume liabilities

of at risk banks (Kaufman 2003). The second was the Douglas Amendment of the Bank Holding Act in 1956 that again affirmed the restrictions of interstate bank acquisitions. The first of these two actions gave the FDIC expanded authority to intervene in occasions where banks were threatened with failure, while the Douglas Amendment further ensured the existence of a market largely defined by small local banks.

As a result bank concentration in the United States was remarkably high despite the presence of approximately 10,000 banks. The reality is that the huge number of banks did not in fact compete with one another, it was simply the result of restrictions on branching and mergers that forced a large number of banks to serve the nation. Therefore local market concentration was quite high. Shull and Hanweck (2001) found that in 1960 rural communities frequently had only 1 or 2 banks and that the percent of deposits held by the two largest banks in metropolitan markets average 64 percent.⁴⁸ The high concentration in all markets means that virtually all of the thousands of banks are vital to the interest of the market that it serves. Further the failure of that bank would certainly have significant and lasting effects on that community and one could imagine that the negative economic impact could spill over to neighboring communities.

There is of course an inherent difficulty for any regulator in determining when there is in fact a threat to the entire system and when a bank collapse will be isolated in nature. But combine this conflict with the fact that regulators are likely reluctant to admit failure by allowing collapse (Kaufman 1990), that virtually all markets are heavily concentrated,

⁴⁸ Also see Heggstad (1977), that as late as the 1970s local bank markets were a near monopoly.

and that the FDIC was granted extensive powers for intervening, and the groundwork is fully in place to protect virtually all bank deposits.

The FDIC also provided liberal assistance to larger banks, protecting Franklin National in 1974, First Pennsylvania in 1980, and most notably Continental Illinois National Bank in 1984. It is the FDIC takeover of Continental that started the common usage of the term TBTF (Kaufman 2003). The FDIC spent more than \$1 billion dollars rescuing the bank and its liabilities out of concern that its collapse would spread to other banks. According to Irvine Sprague, director of the FDIC at that time, “The problem was there was no way to project how many other institutions would fail or how weakened the entire banking system might become”.⁴⁹ Therefore, fear of unknown consequences and a reluctance to accept losses created an activist FDIC that protected failing banks regardless of their size or reason for the failure.

This policy would remain largely unchanged until the passage of the 1991 FDIC Improvement act. The 1991 act by limiting actions available to the FDIC, and creating a formal policy for instituting TBTF effectively ended the practice of protecting all banks. Further, it bears mentioning that recent reform measures, most notably the Riegal-Neal act allowing interstate acquisitions has permanently changed the banking landscape. The Riegal Neal act touched off an enormous and ongoing merger wave with significant consolidation leading to true national banks. As the U.S. banking market becomes closer to that off other countries, for example Canada, where banks are national in scope and

⁴⁹ See Irvine H. Sprague, *Bailout* (New York: Basic Books, 1986), 155.

geographically diverse, it is likely that there will be fewer failures and more competition in local markets. As such there will be less need for the protection of all deposits to protect local markets and arguably only a need to grant TBTF policy to the largest institutions to prevent a true major collapse in the financial markets.

III. CHAPTER-3 MODEL

A. Overview of collapse and saving of LTCM

Long Term Capital Management (LTCM) represented a new breed of active Wall Street trading firms.⁵⁰ Hedge funds as they are called, are lightly regulated organizations that offer a myriad of investment options to largely wealthy investors. In order to avoid the heavy SEC and exchange regulations that mutual funds must meet hedge funds must limit the number of potential investors. This presumably means those involved are fully informed and so do not need government protections to establish and safeguard the integrity of the funds managers. One would also expect that the government would allow hedge funds to thrive and fail as market forces dictated, eliminating any moral hazard threat so prevalent in other areas where the Feds involve themselves in financial matters. But in September of 1998, when LTCM collapsed under the weight of a series of bad investments, the Federal Reserve actively involved itself in the stabilizing, and bailout of the fund. Even though the original investors lost most of what they had put in, the message emanating from the Fed was clear-- that they take steps to prevent the failure of any institution if, in their judgment, it's failure would threaten the financial stability of the U.S. economy.

⁵⁰ The following summary of Long Term Capital is taken largely from the excellent description provided by Roger Lowenstein, *The Rise and Fall of Long-Term Capital Management: When Genius Failed*, (Random House, 2000).

LTCM was the genesis of John Meriwether, a veteran of Wall Street. By enlisting a cadre of academics and traders, most notably Robert Merton and Myron Scholes he was able to attract capital from an impressive list of Wall Street banks and large investors. Together they outlined a strategy to exploit small arbitrage opportunities, which, if leveraged sufficiently should generate above market returns. Their initial investments were fairly straight forward and seemingly with little risk.

After the initial auction newly issued thirty-year treasuries display a pattern of declining liquidity as some investors store the actual physical bills for long term investments. With the next issuance, the new bills, compared to the t-1 bills, will often have a lower yield because they are more liquid and hence more heavily traded. The group at LTCM believed this was the result of a Wall Street mindset where they would only stay in the most liquid investments. By using historical models LTCM believed they could predict when the spreads between back to back issuances was too great, and hence would converge at some future point. Such a gap presented an arbitrage opportunity where they would sell the stale issue, and hedge against it by purchasing the newer issuance. In this way LTCM was protected against any general swings in bonds as the t and t-1 bands are highly correlated and over time the prices between the two issues would converge. It was this closing of the gap that enabled LTCM to make money.

Of course the spreads between the issues were quite small and earning outsized returns required huge leverage, 20-30 times the size of their base capital. This strategy worked well for LTCM, and for an extended period of time the fund did in fact deliver as promise. From 1994-98 the fund increased in value by more than 300 percent. But like

all successful innovations other entrants soon began to copy the very success of Long Term. As a result the arbitrage opportunities soon became more difficult to find and exploit.

LTCM soon became heavily involved in two other investment strategies. One was termed 'selling volatility'. Based on the Black Scholes pricing theory, that the underlying force determining the value of options is the volatility of the share price, Long Term took simultaneous positions in options, both long and short. Long Term believed that opportunities existed where the price of options would get too high because investors overestimated risk. As a result investors would seek, and overpay for insurance, which Long Term was willing to provide. Over time however, as investors fears eased the price of the options would decline and Long Term would make a return as they purchased the options which they had sold short.

In a similar strategy, LTCM would also take positions in two types of debt. If for example, Long Term felt that the yields had grown too high on German debt relative to the United States, they would sell the German debt and hedge it with a position in domestic bonds. In this way they were again protected from general trends, but would profit as the gap closed between the respective interest rates.

In early and mid-1998 Long Term began taking large positions in both of these trades; selling equity volatility to risk adverse investors, and selling short on foreign debt (much of it Russian) and hedging against treasury bonds. But 1998 was not a typical period in the world financial markets, and Long Term's failure to properly read the tea leaves would have devastating implications.

A series of financial and geopolitical events shook the world investment community throughout 1998. The Asian debt crises brought several nations to their knees, ultimately resolved only through an international bailout through the IMF. Domestically, investor confidence was shaken and distracted by the President's ongoing saga with a White House intern and a hostile Congress. And worst of all, investors had for years been systematically underestimating the strains on the Russian economy and the risks facing their currency and debt. A myopic mantra seems to have taken hold that "nuclear powers don't default" which was seen as sage investment advice. Of course nuclear powers can default provided they grossly mismanage their economies and the world community displays a willingness to finely stop acting as a lender of last resort.

In the summer of 1998 Russia's economy was in a virtual freefall. People had lost faith in the ruble, hard dollars and currency were fleeing, the price of oil was dropping, and interest rates on Russian bonds was surging. A \$23 billion U.S. orchestrated bailout in July had passed with barely a blip, supporting the crumbling market just long enough to allow Russia to pay off a handful of debt holders with the newly minted dollars. The remainder of the hard dollars simply left the country, or were stolen by corrupt Russian officials. By mid-August Russia could take no more. On August 17th, Russia stopped servicing a selected \$13.5 billion of their debt, and ended the support of Rubles in the international market. Effectively Russia was making a choice to use their currency to pay for needs other than foreign debt, and allowing a devaluation of their debt through market forces.

Within three days world financial markets began to buckle. Investors shunned any debt viewed as risky and poured money into 30 year treasuries, or their equivalent in other stable nations. As a result the spread between riskier bonds and treasuries was widening by the day. Equity markets would alternately drop in panic selling, only to recover just as quickly, causing the price of ‘insurance’ in the form of options to surge. Two of Long Term’s core holdings were going in the exact opposite direction that their models had predicted, and they were losing millions.

By the end of August LTCM had lost nearly \$2 billion, about half of its capital and was leveraged at an untenable 55 times its base. The months of September and October brought no relief. World markets continued to tremble and spreads on all of Long Term’s positions continued to go in the wrong direction. Day after day the fund lost tens of millions with no end in sight. The people at Long Term recognized the severity of the situation and also recognized that they could not ride out the turmoil on their own. They frantically sought out a source for sufficient capital in order to give them the breathing room they would need to wait out the crises and ultimately profit when the spreads converged. Soros, large banks, even Buffet were approached and one by one the hope of a white Knight turned up futile. The reality is that events were simply moving too fast, and there was too much uncertainty for anyone to come in and try to both understand the complexity of Long Term’s positions and reach a deal to bail them out.

By mid-September the public was fully aware of Long Term’s massive losses and the threat of its failure sent ripples through the financial system. A complete collapse

would force the rapid unwinding of over \$1 trillion dollars in various positions⁵¹, an event that was perceived as a threat to the stability of the entire economic system. As Fed Chief Alan Greenspan explained immediately after the bailout, a collapse of Long Term threatened to cause a complete drying up of market liquidity⁵² and the health of national economies;

“Had the failure of LTCM triggered the seizing up of markets, substantial damage could have been inflicted on many market participants, including some not directly involved with the firm, and could have potentially impaired the economies of many nations, including our own...Moreover, our sense was that the consequences of a fire sale triggered by cross-default clauses, should LTCM fail on some of its obligations, risked a severe drying up of market liquidity”.⁵³

Whether such events would have come to pass is open to debate, but ultimately irrelevant as what mattered was the Fed’s perception at that time. And so, over the weekend of September 19th and 20th, the NY Federal Reserve office agreed to meet with the heads of LTCM. The initial meeting was actually prompted by Long Term. They had secured what they believed was a private buyout of the fund that would ensure its solvency. The meeting was intended to simply inform the Fed of the developments and to keep them apprised of the ongoing situation. But the private proposal eventually failed to materialize and the Fed was on hand to witness the entire event. What is more, during the initial meetings they were given the full details of Long Term’s financial condition and

⁵¹ Lowenstein, 200.

⁵² Fisher, the head of the NY Fed Trading desk was the most active Fed employee with the Fund and arranged and managed many of the meetings leading to the rescue. At the time he a collapse of Long Term as threatening liquidity to the point that markets would not trade at all (See Lowenstein, 189).

⁵³ Testimony of Chairman Alan Greenspan before the Committee on Banking and Financial Services, U.S. House of Representatives. October 1, 1998.

positions. Evidently this was enough to cause real concern with the Fed, and as a result they morphed from mere spectator to an involved participant.

On Tuesday, September 22nd, when Long Term had reached the near absurd position of a 100 to 1⁵⁴ leverage ratio, Fisher invited the big-3 banks, Merrill, Goldman, and J.P. Morgan to a breakfast meeting at the Fed. The Fed in principal supported a Merrill proposal of numerous banks each giving equal amounts to shore up Long Term's dwindling capital reserves. Fisher called in 12 banks for a 6:00 p.m. meeting at the NY Fed offices and went over the details for each bank to invest \$250 million into the fund. The meeting did not see the achievement of a definitive deal but it opened the door of communication between multiple banks to truly consider a joint purchase of the collapsing Long Term.

A follow up meeting the next day at 10:00, again held at the Fed offices, continued to keep a fluid situation moving in something of a steady direction. By 3:00 on the afternoon of the 23rd, word of the meeting and the Federal Reserve's involvement started to leak out. Between 5-7 p.m. a tentative agreement and press release were issued stating that 14 banks would come up with a total of 3.65 billion dollars to purchase what remained of LTCM.⁵⁵ Even though the deal was on very thin ice, the press reported the deal as complete and very much played up the role the Fed played in the negotiations, much of it already suggesting that TBTF was the driving force.

⁵⁴ Lowenstein, 191.

⁵⁵ Lowenstein, 207-08.

While Fisher apparently was fairly discrete in the meetings and generally did not play a forceful role, the very fact that the meeting was held at the Fed offices must have indicated the severity of the situation. The leaders of the banking industry no doubt recognized the need to maintain good graces with key regulatory officials. Getting a call to attend a meeting at the Fed for the purpose of ‘resolving’ the LTCM issue, would certainly suggest that the regulators want, if not demand, some type of resolution. Indeed it seems fairly unlikely that any other organization could have managed to call in the leaders of more than a dozen of the leading Wall Street banks and get them to engage in fast paced negotiations. All of the Fed’s claims after the bailout that the solution to LTCM was really a private deal simply do not ring true. While in the strictest sense there was no direct tax-payer dollars involved, without the clout of the Fed offices, the presence of Fisher, and the constant oversight of the NY Fed it seems highly unlikely that such an agreement would have been met. Any subsequent commentary that saw the deal as an extension of TBTF is therefore both legitimate and probably true.

1. Empirical test

a. Description of theory

Large financial institutions should see a beneficial impact to the extent that the bailout re-affirmed TBTF policy. This assumes of course that; 1- the policy is considered beneficial, and 2- there was at least some doubt that the government would intervene and the bailout removed this uncertainty. For publicly traded banks this should show up in

their market capitalization at the time the policy action became clear. Furfine (2002) found that the borrowing rate for Fed Funds did not change for the large money center banks involved with Long Term around the time the crises unfolded. Although the banks did reduce their borrowing, likely in an effort to become more liquid, the market apparently did not perceive that the current crises threatened the survivability of the most affected banks. In the period after the crises (September 24th – December 31st) the Long Term banks did pay higher rates compared to large banks not directly involved with Long Term (i.e., banks that did not lend to, or hold positions with Long Term, before or during the crises). He considers this evidence ambiguous. On the one hand, it could indicate a confirmation of TBTF status that the largest banks relative rates decreased. Alternatively, since only the non-Long Term banks saw rate reductions the market may have perceived these banks as better run because they had managed to avoid the crises. Therefore, the events around the crises signaled to the market that some banks may have had better management or risk-assessment abilities that enabled them to stay clear of lending to Long Term.

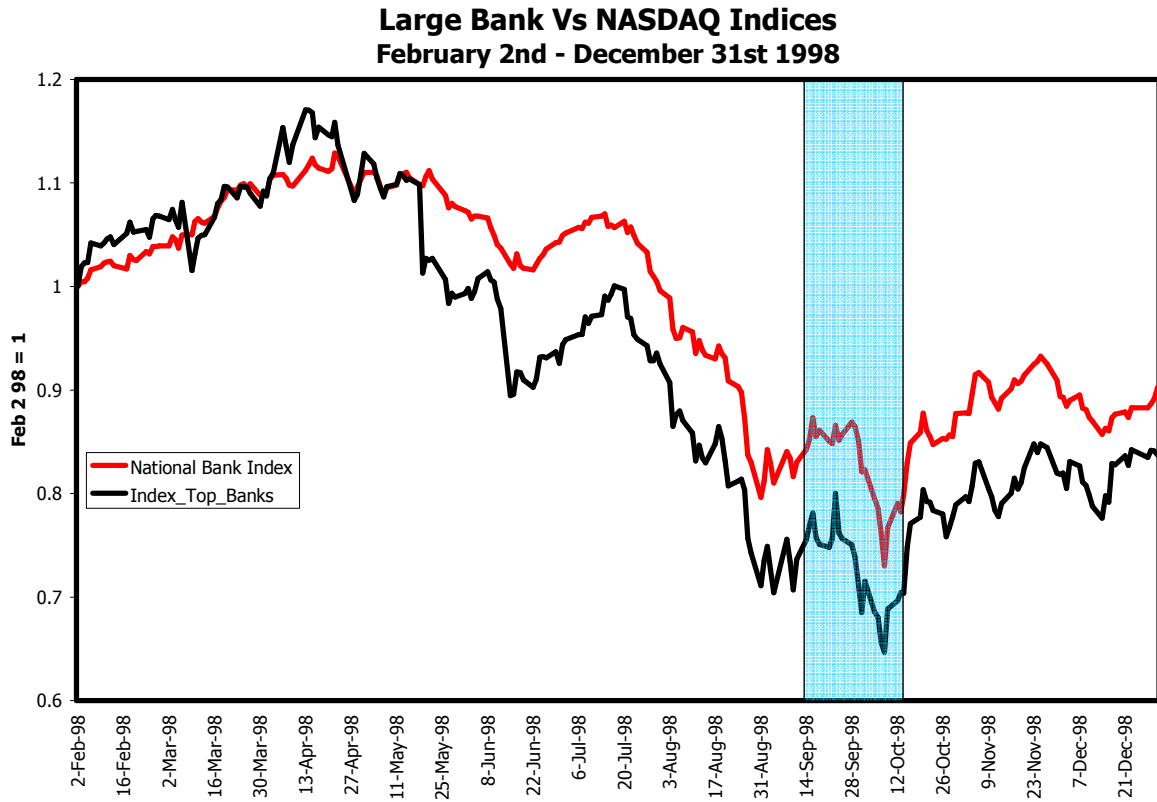
The model tests to see if there were abnormal returns to the stock prices of the ten largest banks as the events around the Long Term bailout unfolded. If the market perceived that the bailout now fully conveyed that the government was willing to keep large institutions solvent in order to prevent disorderly markets then the largest banks, considered TBTF should have excess returns when compared to the entirety of the banking sector. I estimate the following equation:

$$1) \quad \text{Large Bank} = c + x + \text{NBI} * \beta + \text{Event} * \alpha + \mu$$

Large Bank is a combined index of the 10 largest banks' stock prices.⁵⁶ *NBI* is the Nasdaq bank index which tracks the stock prices for all Nasdaq banks. The index is ideal for the event study because it consists of few large banks and hundreds of smaller regional banks that fall well clear of any TBTF umbrella. The two series should then be closely correlated for micro and macro events that affect the banking sector in general, but for events that are specific to TBTF banks the NBI index should deviate from the *large bank* variable.⁵⁷ The common movements between the two bank price series are seen in the chart below.

⁵⁶ Chase Manhattan, Citicorp, Bank of America, Wachovia, Bankers Trust, Wells Fargo, National City, PNC bank, Keycorp, US Bancorp.

⁵⁷ As of 2006 the NBI consisted of over 500 banks.



Yahoo finance.

Figure 3 Large Bank Vs NASDAQ

Event is a dummy variable to test the implications of announcements regarding the bailout of Long Term Capital Management. Several versions of the *event* variable are tested here; one for September 23rd, this is the date that the announcement was formally made that a consortium had achieved, and would implement plans to prevent Long Term from collapsing. While the news of the agreement was not released until after the market close on the 23rd, news of the meeting apparently began to leak out late in the afternoon (before the market close) of the 23rd. It is hard to determine if the market would have

reacted to this and if it would consider it a TBTF argument. It is known however, that the release after the market close did prompt some commentary to speculate on TBTF implications.⁵⁸ Therefore the later date (a dummy on the 24th) is likely the preferred specification, but because of this uncertainty two versions (for the same event) will be used, one for the 23rd and another for the 24th.⁵⁹

An alternative event variable covers the period when the Fed first became involved starting September 20th.⁶⁰ It is possible the market perceived that when the Fed first became formally involved by organizing a meeting on NY Fed property that the government was very concerned about the ramifications of a Long Term collapse. As such, this may have been the first indication that the government was willing to take action to prevent a complete Long Term failure, and this action alone may have served to reinforce, or confirm in peoples mind that the Federal Reserve very much considered certain institutions TBTF.

The final date is October 1st, the date which Alan Greenspan and William McDonough (President of the Federal Reserve Bank of New York), provided testimony regarding the collapse of Long Term before the House Committee on Banking and Federal Services.⁶¹ Their combined testimony comes across as almost alarming due to the contrast of trying to explain that the Fed had only limited involvement but seeking to

⁵⁸ Lowenstein.

⁵⁹ The model was run using a two day window of the 23rd and 24th, the results were not materially significant from the 23rd variable alone, although the coefficient and level of significance was lower.

⁶⁰ September 20th was a Sunday, therefore the variable begins with the 21st.

⁶¹ The testimony was reported no later than 1:38 by the afternoon of the 1st. CNNMoney, Fed chief defends bailout, October 1st, 1998.

also justify their involvement. The testimony is so awkward and poorly conceived that the reader could justly think that not only is TBTF policy alive and well, but that it has been extended to any development that might undermine the markets. Consider some of the following statements intended to mitigate the level of Fed involvement:

“We must also remain mindful where to draw the line at which public-sector involvement ends. The efforts last week were limited to facilitating a private-sector agreement and had no implications for Federal Reserve resources or policies”.

“As President McDonough just related, no Federal Reserve funds were put at risk, no promises were made by the Federal Reserve, and no individual firms were pressured to participate”.⁶²

“At no point in this early morning meeting, nor at any stage last week, was there discussion of the use of public monies -- Federal Reserve or otherwise. No Federal Reserve or government guarantees, actual or implied, were offered, discussed or solicited”.

“Although Federal Reserve officials were present at the meeting, we did not participate in the discussion about terms and conditions”.

“I want to emphasize a few points. First, this was a private sector solution to a private-sector problem, involving an investment of new equity by Long-Term Capital's creditors and counterparties. Second, although some have characterized this as a "bailout", control of the Long-Term Portfolio passed over to this 14 firm creditor group and the original equity holders have taken a severe hit. Finally, no Federal Reserve official pressured anyone, and no promises were made. Not one penny of public money was spent or committed”.

“Let me emphasize, yet again, that the Federal Reserve has no regulatory authority over hedge funds and no regulatory authority over Long-Term Capital”.⁶³

⁶² Testimony of Chairman Alan Greenspan, October 1, 1998.

While all of this from their perspective may have been accurate- voluntary participation, no direct tax-payer dollars used- they then had to justify their involvement. That is, having said that the Fed did so little one might wonder why did they then even get involved in the first place. The statements explaining their involvement are then alarming in how broadly they might be interpreted. Consider some of the following;

“In effect, the threshold of action was lowered by the knowledge that markets had recently become fragile”.

“The price gyrations that would have evolved from a fire sale would have reflected fear-driven judgments that could only impair effective market functioning and generate losses for innocent bystanders”.

“In situations like this, there is no reason for central bank involvement unless there is a substantial probability that a fire sale would result in severe, widespread, and prolonged disruptions to financial market activity”.⁶⁴

“Two factors influenced our involvement. First, in the rush of Long-Term Capital's counterparties to close-out their positions, other market participants -- investors who had no dealings with Long-Term Capital -- would have been affected as well. Second, as losses spread to other market participants and Long-Term Capital's counterparties, this would lead to tremendous uncertainty about how far prices would move. Under these circumstances, there was a likelihood that a number of credit and interest rate markets would experience extreme price moves and possibly cease to function for a period of one or more days and maybe longer”.

“But, in the circumstances that did in fact exist, it was my judgment that the American people, whom we are pledged to serve,

⁶³ Statement by William J. McDonough, October 1, 1998.

⁶⁴ Greenspan Oct 1 1998.

could have been seriously hurt if credit dried up in a general effort by banks and other intermediaries to avoid greater risk”.⁶⁵

Consider the litmus test they are in-effect creating to warrant fed involvement; any failure of a significantly large entity that would cause disruptions to the market that would harm outside parties. Thus, any entity that can make itself sufficiently large creates a circumstance where the Fed might justify involvement.

In their combined statements there is no reservation on their part, nothing to suggest that they might have erred by bailing out Long Term. They don't even seem to entertain the possibility that if they were to do it all over again that they would do it differently. Therefore it seems plausible that market participants might consider the Fed's follow up comments on October 1st as absolute confirmation of a TBTF policy. The actual involvement in the first place is not confirmation, as the Fed would have several days to go back on their decision and admit that perhaps they were wrong. This would create some uncertainty in the markets as to the limits, and if TBTF policy even existed. In fact, the Fed perhaps had an opportunity even after the bailout, to further limit TBTF policy by admitting that they had gone too far.

But in their effort to justify their action they made it clear to all observers that they acted under a TBTF policy, that they believed that was the correct decision, that they would do it again, and finally they defined in loose terms what was required for TBTF status. As a result the two dates of September 20th and 23rd (the day news began to leak

⁶⁵ McDonough Oct 1 1998.

and the actual announcement of the bailout) do not necessarily represent additional confirmation of TBTF status, while October 1st may do so.

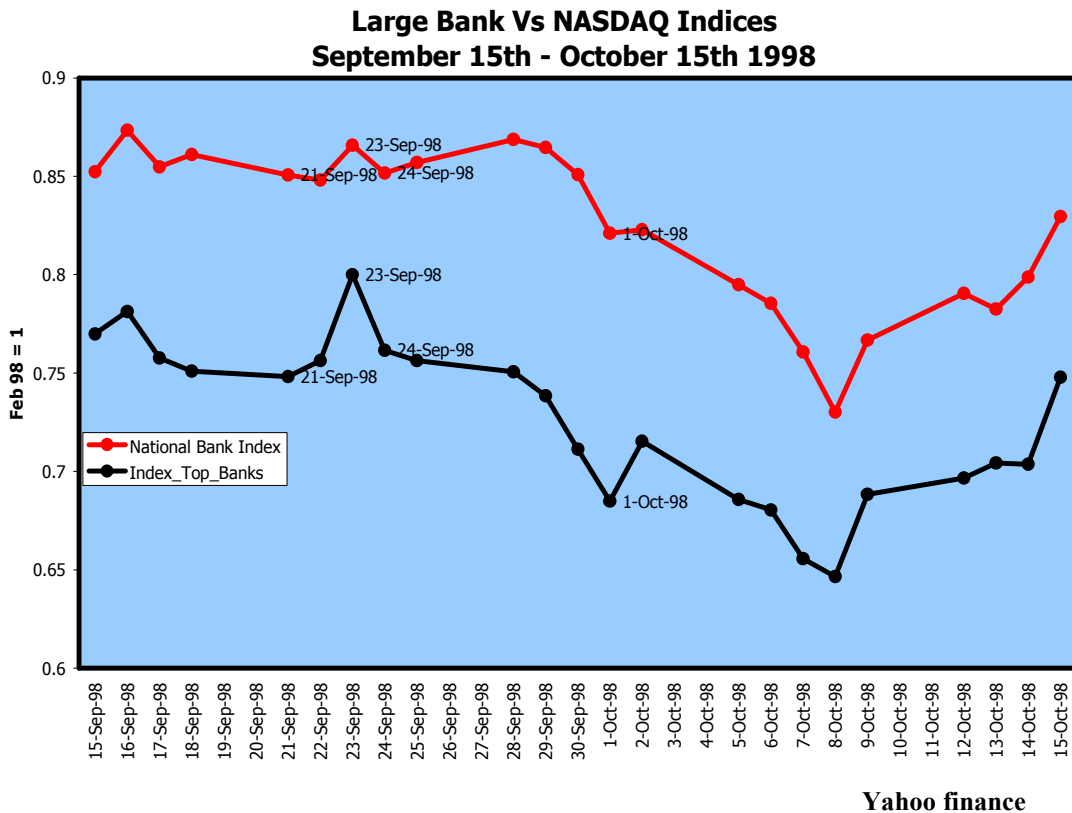


Figure 4 Large Bank Vs NASDAQ One Month Window

The above chart shows the index values for the one-month period surrounding the three events to be studied. As seen all three events show differences between the NBI and Large Bank Index. During the September 20th event the two indices are moving in different directions, the 23rd event the Large Bank index rises more significant than does the NBI but in turn drops more severely immediately after. The October 1st event shows a slightly larger drop leading to the event for the NBI, and a much larger jump for the Large

Bank index immediately after. It should be noted that for all of these events there is roughly equal movements for each of the individual stocks in the Large Bank variable, that is, it is not driven by a large swing in one or two member stock prices.

An important definition for the event dummy variables is that the dummy variable itself is continuous after the event. That is the dummy variable is 0 for all dates leading to the event, then 1 for each date after the event, continuing to the end of the time series. This is one approach out of two theoretical alternatives. On the one hand if the event is considered short-term in nature and only has a momentary affect on the stock then the dummy variable should only apply for the actual dates of the event. An example of this is a rumor circulates about a stock which later is proven false. The impact on the stock is only felt during the period of the rumor and after the rejection of the rumor the correlation between the indices will return to its normal relationship. The alternative is a permanent level shift where the ongoing relationship between the indices is permanently changed. The test here for confirmation of TBTF status meets such a definition. To the extent that TBTF status is confirmed by the Fed actions surrounding Long Term Capital Management there should be a fundamental and permanent shift in the relationship between the NBI and Large Bank Index. Therefore the dummy variable (value of 1) is kept for the duration of the time series.

Finally, it should be noted that the value behind the TBTF dummy variable would change given market conditions. As discussed in the opening section of this paper, the value of the government guarantee on deposits fluctuates depending upon overall market conditions and specific conditions for a specific bank. During periods of macro economic

distress or poor results for an individual bank the value of 100 percent insurance is greater. During strong economic growth and good results the value is less. This is the exact same phenomenon behind the pricing of insurance, higher and lower rates depending upon risk. Therefore the relationship between the NBI and Large Bank index as affected by TBTF status is not constant. The worse the economic environment the greater the benefit to TBTF, and therefore the greater the expected coefficient on the event variable. To the extent that the value of TBTF declines, the coefficient should decline as well.

If this event study were to measure the relationship between the two indices over a multiyear period this fluctuating relationship would present an issue that would likely deserve attention. But given that the current study is limited to a total of 10 months, and the post TBTF event variable extend for only 3 months it should not be a concern here. The short duration of the post-event time period should minimize the potential for any major changes in the perceived TBTF value.

2. Results

Four separate models were run, each using the same format from equation 1, regressing the NBI on the index of top banks along with an event variable.⁶⁶ The model was run from February 1998 through the end of December, a total of 229 observations. The NBI as a benchmark variable proves to be quite robust. When used as the only regressor the NBI has a coefficient near one and the R squared (correlation) equals .91.

Thus we can be confident that the two indices are moving together. A comparison between the pre and post Long Term bailout shows that the NBI is highly correlated in both periods, but the coefficient is smaller for the post period (.78 vs .62).⁶⁷

All four event variables, September 20th, 23rd, 24th, and October 1st are positive as expected, with similar coefficients and all are statistically significant. This provides support for the theory that the investment community took the bailout as a positive development for the largest banks. In the end of September, early October time period the large bank index ranged around .88, so coefficient values in the range of .014 to .02 amounts to a change in the index of 1.6 to 2 percent, a fairly large change in value.

Table 1 Event Study Standard OLS Results

Standard OLS					
<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-statistic</u>	<u>p-value</u>	<u>R-squared</u>
National Bank Index	0.613	0.012	49.097	0.000	0.982
SEP20_DUMMY	0.015	0.005	2.987	0.003	
National Bank Index	0.613	0.012	50.665	0.000	0.982
SEP23_DUMMY	0.016	0.005	3.163	0.002	
National Bank Index	0.610	0.012	50.798	0.000	0.982
SEP24_DUMMY	0.014	0.005	2.874	0.004	
National Bank Index	0.617	0.011	55.523	0.000	0.983
OCT1_DUMMY	0.020	0.005	4.451	0.000	

⁶⁶ The event variables were not combined into one equation, each was run separately.

⁶⁷ Both coefficients are significantly different from 0, and 1, at 99% confidence.

These initial results however, suffer from a great deal of serial correlation. A quick review of the residuals in a correlogram shows extreme partial correlation on the first lags. This appears to be the result of differences in trends between the two time series.

In order to correct for this an AR1 term was included in the model. Additionally, a control variable was added for the large May 19th drop in the large bank index.⁶⁸ The large drop was a result of an adjustment in the US Bancorp stock price series that occurred on that date. This event represents a one time level shift and so can be controlled for by a simple dummy variable.

Re-running the model above this time with an AR1 term corrects for serial correlation. As can be seen there is little change on any of the variables except for the September 24th which is now negative and insignificant. The other variables remained statistically significant and generally saw an increase in the coefficient value.

⁶⁸ I also ran models with dummy variables to control for the August Russian debt default, but the variable was consistently insignificant.

Table 2 Event Study AR1 Results

With AR1 Term					
<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-statistic</u>	<u>p-value</u>	<u>R-squared</u>
National Bank Index	0.648	0.026	25.026	0.000	0.994
SEP20_DUMMY	0.019	0.010	1.897	0.059	
National Bank Index	0.653	0.025	26.306	0.000	0.994
SEP23_DUMMY	0.027	0.010	2.764	0.006	
National Bank Index	0.628	0.027	23.329	0.000	0.994
SEP24_DUMMY	-0.001	0.011	-0.066	0.947	
National Bank Index	0.646	0.025	25.691	0.000	0.994
OCT1_DUMMY	0.020	0.010	2.059	0.041	

All three events on the 20th, 23rd, and October 1st saw a significant increase in large bank value. This suggests the news of the meetings, leaking of the news that an agreement had been set, and Greenspan's comments confirming TBTF policy were viewed as positive developments. The first two September events however seem less likely to be a TBTF reaction as it might signify investor reaction to the news of Long Term's bailout. Investors might perceive large banks, with greater international exposure and likely greater derivative exposure, as facing a greater threat from a hedge fund collapse than small banks. So the initial response in September may reflect restored investor confidence that large banks would not face a significant loss in equity and derivative positions.

The October 1st event in contrast is much more specific to the testimony on the Hill regarding Long Term and the implications for TBTF policy. Indeed a news search

found that the banking stories for that day were dominated by the testimony of Greenspan and others, with little else of note reported and none of it (in the view of the author) sufficient to cause a divergence between large and small bank stock prices. Therefore a reasonable conclusion is that the first (nearly) significant result is based on investor belief that large bank exposure to Long Term will be mitigated by the bailout, while October 1st was seen as TBTF confirmation.

The .02 October 1st coefficient may appear relatively modest, but given that the large bank index in that period was roughly .9, this represents a nearly 2% change in the stock prices. A 2 percent increase for the 10 largest banks represents a large increase in total market capitalization. The 10 banks in the index on October first had a combined market value (based on stock price) of about \$500 billion. A 2 percent increase amounts to \$10 billion in increased value. If the bulk of this can be credited to TBTF confirmation this shows that the subsidy is quite large and valuable.

The process of running each equation with only a single event variable and not multiple event variables in a single equation may produce spurious results. Because each variable runs for the entire remaining time period they may in part be capturing the same event, that is a general shift between the two indices beginning in the late September period. This would explain the similar sized coefficients and consistent significant results for three of the events. Running each variable in a single equation would eliminate this effect but will also likely reduce each of the coefficients because the events are so close in time they will be highly collinear. Regardless of this concern the model was re-run with all the events in a single equation.

Table 3 Event Study Single Equation Results

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
C	-0.134	0.058	-2.305	0.022
NBI/1000	0.651	0.027	24.314	0.000
SEP20_DUM	0.010	0.012	0.840	0.402
SEP23_DUM	0.029	0.013	2.297	0.023
SEP24_DUM	-0.027	0.013	-2.124	0.035
OCT1_DUMMY	0.014	0.012	1.111	0.268
MAY19_DUMMY	-0.107	0.010	-11.233	0.000
RUS_DEFAULT	0.024	0.009	2.507	0.013
AR(1)	0.814	0.040	20.340	0.000

The September 20th and October 1st variables are now insignificant, while September 23rd remains basically unchanged and the 24th now significant. This is consistent with a general favorable response on large banks from the news of an impending bailout of Long Term. While not a rejection of TBTF, it is likely an indication of just a favorable development for large banks, but not necessarily specific to TBTF policy. That is, as stated above this could simply reflect investor belief that large banks were more exposed to a Long Term collapse than smaller banks. It is impossible to disentangle any TBTF effect from these results. That said, even though the October 1 variable is insignificant it is still positive with a sizeable (if not somewhat smaller) coefficient and p-value of .268. This is some weak evidence for a TBTF effect, and perhaps if the September 23rd variable could be disaggregated between less large bank

exposure and TBTF, the disaggregated 23rd amount and the October 1 results would add up to a TBTF effect.⁶⁹

As a final check the events were again each run separately, but this time they were run as point estimates. This was not done by limiting the dummy variable to a single day but by ending the time period on the day of the event. This should capture any level shift from the event, while removing the longer term trend effects for the remainder of October through December.

Table 4 Event Study Point Results

Point Estimate Results with AR1 Term					
<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-statistic</u>	<u>p-value</u>	<u>R-squared</u>
National Bank Index SEP20_DUMMY	0.664 0.010	0.032 0.014	21.089 0.724	0.000 0.470	0.992
National Bank Index SEP23_DUMMY	0.654 0.032	0.030 0.013	22.092 2.355	0.000 0.020	
National Bank Index SEP24_DUMMY	0.652 -0.018	0.030 0.014	21.406 -1.312	0.000 0.192	0.992
National Bank Index OCT1_DUMMY	0.679 0.004	0.032 0.014	21.372 0.277	0.000 0.782	

⁶⁹ Because of the close overlap between events the preferred method to attempt to disentangle the effects was to use separate dummy variables. But as an additional test, a more traditional method of determining the cumulative abnormal rate of returns was also used. This method used the NBI coefficient up to September, forecast the model from each event, and compared the actual to forecasted return. The results were similar to the main model. The cumulative return for large banks was positive, and significant, for Sept. 23 forward. The results for the Oct. 1 event forward were also positive, but marginally insignificant. The interpretation for these results is the same as what was found for the main model.

These results confirm what has already been learned. Namely that the leak on the 23rd of an impending rescue favorably affected large bank stocks relative to the NBI. The coefficient on the point estimate of .032 is the largest of any of the previous models. This indicates that the immediate boost is larger and that including the post event months actually decreases the size of the coefficient. The insignificant results on the remaining events reject the importance of subsequent shocks to the Large Bank index.

3. Summary

Studying the events surrounding the collapse and subsequent bailout of Long Term Capital Management yields the relative unsurprising result that the fund rescue improved the stock valuations of the largest banks. Given that large banks have high exposure to international and domestic equity markets the stabilizing of Long Term no doubt reassured domestic investors. As stated by Greenspan and others of similar influence a complete collapse of Long Term would have had severe ramifications on global markets. Therefore it is expected that when news of the rescue was leaked the event was reflected in large bank stock valuations.

Other results showed some promise that there was a follow on effect that indicated a TBTF effect. But after controlling for serial correlation and the residual effect from the original news of the bailout there appears to be little significance to the Federal Reserve October comments that confirmed TBTF policy. It is possible that the very act of the bailout and the resulting boost in the stock prices on September 20th already incorporated TBTF confirmation. The market may very well be sufficiently farsighted as

to recognize immediately that the hedge fund bailout removed any doubt that TBTF policy was real. If so the coefficient on the September 20 variable is in part a measure of this effect. But disentangling TBTF from the general improvement in the market conditions seems impossible.

There is also another consideration, simply that prior to the event there was no uncertainty regarding TBTF policy for the largest banks. If true the news of the bailout, and the Fed's follow up comments would be meaningless from the perspective of a TBTF event variable. The market was perhaps already fully incorporating such status into large bank valuations. If true, it might also be the case that other institutions (besides large banks) saw a boost because the market might now see them as under the TBTF umbrella. The Fed's October 1 comments were so broad that they left open the policy as to potentially covering any entity if its failure would undermine the stability of the financial markets. Perhaps insurance companies or other large entities with large portfolios now are considered to fall under the government safety net. Future research could investigate such a phenomena.

B. Merger Premium Analysis

1. Overview of Merger Premium Methodology

Analysis of bank mergers can be split into two broad groups, event studies that focus on the market's reaction to the acquisition announcement and merger premium models that seek to understand the factors that influence the price paid for the target bank.

Event studies are at their core nothing more than attempts to judge whether the market reacts favorably or unfavorably to a given event and therefore have nothing to say about the characteristics of the banks involved and how they may influence the purchase price. In contrast, merger premium models attempt to explain the underlying causes for the price difference between target banks.

‘Premium’ models benchmark the actual purchase price against some tangible value and attempt to explain the deviations from the benchmark. Nearly all of the previous research uses the ratio of the purchase price to the book value. The bank’s book value is simply the tangible assets (does not include goodwill) less total liabilities. Other potential ratios include the purchase price to earnings and purchase price to market value. These later two suffer from two significant limitations; using earnings becomes problematic at small, zero, or negative earnings values. The firm’s market value has the advantage that it is based on (presumably) the discounted expected cash flows of the firm (and therefore measures its true value), but is of limited value due to the great number of acquisitions that involve non-public banks. It is for these reasons, and no doubt a certain amount of institutional lock-in, that of the seven empirical merger premium models all but one uses the price to book value as the dependant variable. A summary of the models is available in the appendix.

Beatty, Santomero, and Smirlock (1987), regress target and regulatory variables on the price to book ratio in order to serve as a guide for price negotiations in future

acquisitions.⁷⁰ They find that target banks with higher capital asset ratios and greater holdings in riskless treasury stock receive a lower purchase price, suggesting that conservative management is penalized by acquiring firms. Their results show that banks in states with restrictions on branching receive a higher premium, and positive results on market concentration (HHI), supporting the theory that acquiring firms place a premium on banks that allow entry into restrictive markets. This seems at odds with their negative result on the target's market share, but in itself, a higher market share does not indicate competitive restrictions. Finally, they find a positive and significant result on the target's return on equity, and they find that the method of payment, either cash, or a combination of cash and stock reduces the magnitude of the purchase premium.

Fraser and Kolari (1987) find that the merger premium depends not only on the profitability of the target, but specific aspects of the income generating items as well. They find positive results for banks with; higher net interest income margins, a higher proportion of loans to total assets (loans are more profitable), and higher ratio of demand deposits to time deposits (demand deposits pay lower rates and are therefore more profitable). Supporting the theory that commercial loans are less profitable than retail loans, they find negative and significant results for the ratio of commercial loans to total loans. Fraser and Kolari also include market demographic variables, per-capita income

⁷⁰ In the following discussion on extant merger premium research I only mention what I consider significant developments in the literature. I withhold a detailed discussion on individual variable results for a later section where I outline each of the variables included in my model.

over 30 thousand and population growth, to serve as proxies for growing markets and find positive results.

Rhoades (1987) finds that it is the growth rate of the target firm that has the most significant impact on the merger premium. He finds positive and significant signs for the return on equity, growth of earnings, and the growth of assets. Like Beatty et al he finds that high target capital to asset ratios are penalized, again showing acquirers dislike for conservative or inefficient management. Rhoades for the first time includes several acquirer specific variables; assets, rate of return on assets, growth of deposits, whether it is a branch bank, and whether it is part of a multi-bank holding company. All of the acquirer variables are insignificant, except for the growth of deposits which is positive. The lack of significance of the acquirer variables is not surprising given the lack of theory suggesting that it should matter.

Acquirer specific variables are relevant to the merger premium to the extent that they measure potential synergies or unique characteristics. Potential synergies include returns to scale, offerings that can be rationalized (such as product offerings or branch locations) resulting in cost savings, and negative correlations between the two firms earnings (i.e. earnings diversification). Unique characteristics include specific aspects of the acquiring firms management, for example are they prone to empire building (in which case they may overpay for the target firm), or are they interested in diversifying their holdings to the detriment of shareholders? None of the variables used in Rhoades, with the exception of deposit growth which might be a proxy for empire building capture potential acquirer specific effects.

Cheng, Gup, and Wall (1989) build upon the concept of including acquirer specific variables and essentially add numerous potential explanatory variables into the mix. They use three different specifications of OLS models (they add and drop variables), and a fourth principal components regression (PCR) model to control for the likelihood of multicollinearity. Variables that they include to serve as proxies for acquirer management quality include; return on equity, income growth, growth of assets⁷¹, earning asset growth, core deposit growth, equity growth, ratio of charge-offs to total loans, ratio of market value to earnings, and ratio of market value to book value. They find significant negative results for the first four (return on equity, income growth, growth of assets, earning asset growth), positive, significant results on the ratio market to book value, and the sign on core deposit growth is positive and significant in the PCR model. They attribute the positive sign on this last variable to acquirers bulking up their required capital for regulatory reasons. They also include target variables and reach the same conclusion as Rhoades (1987) that acquirers pay a premium for growth. Cheng et al do not include any market demographic variables.

Palia (1993) controls for management's ownership stake in both the acquirer and target bank. Palia recognizes the agency problem between shareholder and manager that can allow for managers to engage in self-interest mergers that do not maximize shareholder value. Managers have specific assets that can not necessarily be easily

⁷¹ They also discuss that acquirers already growing internally would likely not pay as much to grow externally and they cite their negative, significant results as supportive of this theory. They fail however to account for the method of asset growth between internal growth and historical acquisition, which renders such a conclusion impossible.

transferred to other forms of employment so they have incentives to take steps to maximize their job security. Palia suggests that they can reduce their risk by diversify the bank holdings via expansion for the acquiring firm. Expansion provides the acquiring bank with geographic and/or product offering diversity that might reduce the cyclical nature of the bank and reduce the chances of performance related job loss. At low levels of holdings, managers receive the benefit of diversification while bearing little of the cost of an excessive premium. As the insider holdings increase however, the manager's interest becomes more aligned with the stockholders, therefore the expected sign is negative. For the target, they may be interested in diversifying (by selling) provided they can receive guarantees of continued employment by the new parent. Managers, the lower the level of holding bear less of the cost and therefore are more likely to accept a lower premium. The expected sign is then positive.

When Palia included the percent of ownership holdings, he found significant results that were consistent with the self-interest management hypothesis. Additionally, Palia included the square of management holdings, to test if the relationship was U-shaped. That is, at some percent of holdings the manager's interest become less aligned with shareholders because they are not able to diversify their stock holdings as easily as shareholders. Under such a scenario, Palio suggests that the managers are more likely to diversify to balance their portfolio. Again Palia found significant results consistent with this hypothesis.

Palia also found that market concentration and restrictions on branching were positively correlated with the merger premium, results consistent with the findings of

Beatty et al (1987). Palia also reports a significant sign on a dummy coefficient for state laws that allowed acquisitions by holding companies. Palia argues that allowing out of state acquisitions by holding companies should increase the number of potential bidders and therefore raise the merger premium. Much of the remainder of Palia's results are of nominal interest as he generally finds insignificant results for variables used in earlier research, although they are of the same sign.

Esty, Narasimhan, and Tufano (1999) look at the impact of interest rates on bank merger activity. They find first, an inverse correlation between overall merger volume and the level of interest rates. They also find that acquirer banks are more liability sensitive and therefore better positioned for a drop, but less protected against an increase in rates, compared to target banks. This may in part explain the large increase in bank mergers over the past decade during a period of generally declining market rates. Including interest rate measures in merger premium models they find some evidence of higher rates leading to lower premiums.⁷² Both higher current interest rates, and expectations for higher rates (as measured by the spread between 10 year and 1 year rates), appear to reduce the purchase price for target banks. But they also find a positive correlation between recent interest rate changes (current less 12 month average) and price- that is an upward (down) interest rate shock increases (decrease) the premium.

The positive coefficient on interest rate changes is at odds with their conclusions of liability sensitive acquirers and fewer bidders at higher rates. While they do not offer

⁷² They use three measures of merger premium; 1- price paid less target book value, 2- ratio of purchase price to earnings per-share, 3- ratio of purchase price to core deposits.

an explanation for the seemingly contradictory results, perhaps one explanation lies in the evidence that targets are more protected against rising rates. Rising rates may increase demand for potential targets with attractive balance sheets that enable a liability heavy bank the opportunity to hedge. Once rates have stabilized however (for example at the higher rate), there may be less concern about further increases and the need to hedge, so that the lower volume of activity dominates resulting in lower premiums at the new, higher level. If true, the merger premium is not simply a function of the change in rates, but the interaction between the change in rates and the target's portfolio.

By analyzing the relationship between the merger premium and earnings variance, Bentson, Hunter, and Wall (1995) test between two alternative explanations for bank mergers; earnings diversification versus increasing the value of the FDIC deposit guarantee. If banks seek out targets that have earnings negatively correlated with their own this suggests that the acquirer is seeking to diversify their earnings risk. Seeking out banks that have a high variance of earnings or with correlated earnings increases the overall risk of the bank and increases the value of deposit insurance. Benston et al find negative and significant coefficients for the variance of both the target and acquirer's earnings, and marginally insignificant negative sign on the covariance of earnings, which they conclude to mean that banks are interested in earnings diversification.

There are fundamental differences between Bentson et al and the topic of this paper, that a motive for bank mergers is to capture the benefit of the safety net, despite the similarities of appearance. Benston et al looked at mergers from 1981-86, a period when virtually all banks were assumed to receive complete coverage. Therefore, they are

testing whether banks took efforts to *further* exploit the safety net through additional risk taking, not whether banks try to reach the TBTF status to *get* insurance coverage. This is important because the test of Benston et al assumes a continuous relationship between greater risk and price paid. This is a reasonable assumption given the de-facto 100 percent coverage of the time. Gaining access to additional coverage was therefore available to any bank, regardless of size, provided they took on greater risk. But to the extent that only certain banks now strive for complete coverage the slope coefficient is an interactive term that only applies to those banks large enough to reach the exalted status of TBTF.

The previous literature has established the use of merger premium models as a legitimate method for analyzing the motives for mergers and determining the factors that influence the purchase price. While the merger premium models discussed above have looked at the target and acquirer financial variables, the regulatory environment, and the competition in the local market, only Benston et al has considered the implications of the safety net as a motive for acquisitions, and none have tested for TBTF status as an effecting force. At the time these papers were written such an analysis was impossible. The mergers reviewed by the above authors look at mergers ranging from 1970 to 1994, which is before the new era ushered in by the FDIC Improvement Act where TBTF status was codified into law, and recognized to apply to only the largest of institutions. Prior to this new era, there would have been no reason to increase in size to achieve a status that one already had.

Apart from TBTF, this paper also extends the research into banking acquisitions by testing for additional factors that have as of yet not been empirically studied. Prior research has looked at the implications from ‘hubris’ the concept that management expands for management sake. Here, I am able to test to see if ‘hubris’ or what I refer to as empire building has empirical support. Additionally I am able to test to see if there is a piling on, or ‘bandwagon’ effect, whereby a merger wave causes banks to overpay for potential targets. Finally, I find support for the concept that banks seek to expand into new markets and diversify their risk.

2. Included variables

Price-to-book value – The dependent variable is the definitive initial offering price divided by the banks book value. The price to book value is preferred over other potential dependent variables, most notably simply using the offering price, because it standardizes the offering price across banks. Simply using the offering price means that any regression will be driven almost entirely by the independent variable measuring the size of the bank. The PB value however, reflects the amount that the acquiring firm is willing to pay over the ‘paper value’ of the firm. Therefore regression analysis will hopefully yield other intangibles that are not reflected in the book value that the acquirer is willing to pay either a premium for, or cause them to reduce their offering price.

The reader likely also notices that the price used in this paper is the definitive offering price, and not the actual closing price paid for the target bank.⁷³ At first blush this may appear to be a limitation of the model, but upon reflection may actually be a strength of this paper over using the actual closing price. There are several reasons for this. First, to be forthright, one of the considerations is simply availability of data. While closing price was available for many of the mergers, there were many instances where the closing price was not made public, but the initial offering price was released. Therefore a larger dataset is available by using the offering price. But in addition to practical considerations there are theoretical supporting reasons as well.

Foremost among these is that in many instances the offering price is a combination of cash and a monetized value of a stock swap, or entirely based on a stock swap. The value of the acquisition is then based on the current value of the respective banks' share prices. Usually, the initial value is calculated based on the current share price, that is, ex ante to the streets reaction to the announced acquisition. Not surprisingly, upon the announcement of the deal there are varied and often large fluctuations in one, or both of the banks' stock price, which can result in the banks revising the offering, for example more or less shares/cash. Or, even more problematic, the offering may not change, but the calculation of the value of the deal changes due to the fluctuation of the share prices. The final acquisition price then will reflect the market's perception of the combined entities, incorporating any perceived synergies, or

⁷³ By definitive I mean the price paid when no subsequent substantial revisions are made to the deal, e.g. offering additional shares of stock, or more or less cash.

costs, in the purchase price that the offering firm either did not recognize or believed they could avoid.⁷⁴ It is for this reason that I use the definitive offering price, understanding that by ‘definitive’ I mean the point where there are no subsequent revisions to the deal. A fluctuation in the value of the offer due to changes in share prices is therefore not a revision to the deal. This means that the definitive price is calculated on the share price at the time of the announcement, and not based on the later share price after the market’s reaction. If, however the terms of the deal change, such as offering additional shares or more cash, then the definitive purchase price is based on the value of the deal at the time of the revision.

Additionally, using the closing price may reflect bidding wars where the premium is bid up (see Grossman and Hart (1980); more efficient markets as uniformed participants are informed of potential targets by the bidding process see Grossman and Stiglitz (1980), or the clarity of information as to what the regulatory implications are for a proposed combination. It can be argued that these events suggest the closing offering price would serve as a better measure of actual value than the offering price. Bidding wars and the conveying of asymptotic information held by the original offering firm may result in a true price for the target bank, that is it is the result of a true English auction, while the initial offering price might just reflect a starting offer by the first mover. While there may certainly be some truth to these arguments, they are also somewhat specious in that the market for banking mergers is extremely active and competitive. There are

⁷⁴ In contrast, a cash offer does not change due to fluctuations in the share price, unless it causes the banks to revise the deal and offering terms.

literally hundreds of combinations per-year, with scores of banks constantly hungry for potential targets. In such a competitive environment it seems somewhat unlikely that an acquiring firm would realistically believe that it could consistently make lowball offers and have realistic hopes of consummating mergers. Additionally, a practice of offering below market value would invite a competitive bidding process that would likely be counter productive to the original bidder. A below market offer would draw attention to the target and force the original bidder to directly compete with other banks. Such a bidding war induces greater market uncertainty (due to questions as to the winning bidder) that the original bidder would almost certainly want to avoid.

Finally, the suggestion that the closing price reflects the outcome of regulatory uncertainty and therefore a more accurate measure of true value, may have some truth. But there are two issues with this; first, measures such as the HHI and change in HHI will reflect regulatory uncertainty and as such are measurable and potentially important factors affecting the merger premium. The second is that the regulatory process for banks tends to be fairly straight forward. In a somewhat interesting counter-intuitive result, many of the large bank mergers often clear the government agencies with little antitrust scrutiny, while the smaller, more local combinations will often run afoul of regulators.⁷⁵

The above arguments suggest that there should be little difference between the original offering price and the actual closing price. Competitive bidding markets, large

⁷⁵ Larger banks tend to serve competitive markets and large customers that have many other banking options, as a result despite their size they do not raise antitrust concerns. Smaller banks however, may serve small local or regional markets where individuals or local business have fewer available banking options. See statement from John D. Hawke, Under Secretary, Domestic Finance, Department of the Treasury,

knowledgeable bidders, and an understanding of regulatory behavior should result in initial bids that generally closely reflect the market value of the target. Where there are available data on both the offering price and the closing price supports such a conclusion. In 64 percent of the combinations there is no difference between the offering and closing price, in the remainder the closing price is greater by an average of 11 percent, and a median of 7 percent.⁷⁶

(1) Target Variables

Growth of Earnings [IncGrowth_Non] – The target firm’s growth of earnings obviously make it an attractive target and therefore the sign is expected to be positive. Somewhat surprisingly however, while Rhoades (1987) found a positive and significant affect, Cheng et al. (1989) results were negative and insignificant. Therefore it is not a foregone conclusion that the results will follow the expected sign. For this paper, the growth of earnings for the target bank is defined as the three year change in net income before extraordinary charges. Net income could of course be negative, and a negative change to a less negative is treated as a positive increase in income.

Growth of Assets [ChAsst3_Non] – One of the primary factors bidders consider in making an acquisition is the target bank’s growth in assets (Rose 1987, Palia 1993). Prior research has predicted and found a positive and significant affect (Rhodes 1987, Cheng et

before the House Committee on Banking and Financial Services, April 29th, 1998 for a relevant discussion of bank size and antitrust implications.

⁷⁶ There are not a sufficient number of observations to re-run the final model (using the offering price to book value) with the closing price to book value ratio for a point of comparison.

al 1989), or positive but not significant in Palia (1993). Rhoades notes that the historical asset growth of a firm is likely a good predictor of future earnings and perhaps a better indicator of future success than growth in income. Income can fluctuate due to temporary factors such as economic cycles, one time charges, or even expenses associated with a rapidly growing firm. Balance sheet items however, are not as susceptible to short-term fluctuations, and change in them may be more indicative of future events than more variable income.

Palia offers an alternative hypothesis, that managers seek to maximize growth in order to increase their overall compensation (see Baumol 1962). The desire by executives to increase their compensation by growth where it applies to the target bank, only suggest that the executives would be more willing to accept an offer to buy, not that it would make them a more attractive target therefore increasing the merger premium. Thus, contrary to the implied sign suggested by Palia, it seems more likely that the target executives would be more likely to accept a lower priced offer, therefore a negative sign, if their motivation was to maximize their compensation. Or, put into relevant terms for the current variable under discussion, it seems more likely that the compensation seeking managers have maximized growth at the expense of income, therefore the merger premium should be of a negative correlation to the growth in assets. This seems to be of a fairly large stretch theoretically however, therefore confirming the more likely ambiguous relationship between the targets growth and the merger premium. In fact, the theory offered by Palia seems to more closely pertain to the acquirer, and not the target.

This idea is fleshed out more thoroughly latter in the paper under the ‘Empire Building’ variable.

The current variable, growth in the target bank’s assets, is the three year percentage change in assets.

Rate of Return on Assets [Rate_Ret_Assets] – The most frequently used control variable in prior research is the rate of return on the target bank’s assets (Rhoades 1987, Cheng et al 1989, Fraser and Kolari 1987, Esty 1999, Palia 1993). More profitable banks likely make more enticing targets not only because they are strictly more profitable, as could be measured simply by income, but that that they are earning a strong return. Therefore the expected sign on this variable is positive. The rate of return on assets is calculated by dividing the current income by the current assets.⁷⁷

Demand Deposits [DemDp_div_asst_non] – Demand deposits, which are short term in nature and pay lower interest rates than long term deposits are generally more profitable (Fraser and Kolari 1987), and are upwardly rigid (Hannan and Berger 1991). Additionally, individuals and small business tend to overwhelmingly cluster their use of certain banking services; checking, deposits, lines of credit, and money market accounts- at local institutions (Kwast et al 1996). The clustering of services should allow banks to increase their profits on the overlapping products. Target banks that have a higher

⁷⁷ The value of TBTF comes from the NPV of the funding benefit resulting from the government guarantee. This value does not accrue to non-TBTF banks and so will not show up in their financial variables. For existing TBTF banks however, the benefit of TBTF may be incorporated in their financial results, therefore capturing the TBTF merger premium in other financial variables. This will only exist in mega-mergers where an existing TBTF bank is purchased. To test for this I ran the results discussed below excluding targets that were a top 50 bank or larger; this did not materially change the results.

percent of demand deposits to total assets might make a more enticing acquisition target all else equal, therefore the expected sign is positive.

Correlation of Return on Assets between Target and Acquirer [Corr1] – Acquiring banks may consider the correlation in earnings between themselves and potential targets before making an acquisition. By acquiring a bank with positively correlated earnings the combined entity may increase the put option value of government insurance, while targets with a negative correlation in earnings allow earnings diversification for the acquirer (Benston et al. 1995). Because banks may have split motives a single correlation of earnings variable will not capture the intended affect. That is, some banks may desire diversification in which case the more negative the correlation the greater the expected premium. Other banks may desire to increase their risk so that the greater the correlation the greater the predicted merger premium.

The competing forces require the use of two separate variables, one for a negative correlation the other positive. If acquiring firms are paying for a correlation in earnings (either positive or negative) it is likely that they are looking for a non-trivial correlation, that is, significantly different from zero. The test for the put option is a dummy variable equal to 1 where the positive correlation is greater than .75. A positive and significant sign would support the theory that acquiring bank's are attempting to increase their returns through greater risk taking. The diversification test is not so stringent, a dummy variable equal to 1 if the correlation between the two banks is negative. The lower threshold is because so few banks have negatively correlated earnings. This is of course not surprising since they are subject to the same macro (and often micro) shocks. Of the

142 mergers studied, only 7 of the merging firms' earnings were negatively correlated, while 100 had a coefficient greater than .75. A positive sign on the variable controlling for negative earnings correlation would support the earnings diversification hypothesis.

The correlation between the combining banks is the quarterly correlation of the rate of return on assets (income divided by assets) for the three years preceding the combination.

Retail Loans to Total Assets [Retail_Lns_Ratio_Non] – Competition for corporate lending has become so competitive that in order to generate income banks have turned to the more profitable consumer lending market (Calomiris and Karceski, 1998, Cheng et al 1989). Hansell, writing for the NY Times describes the market as,

“Analysts say banks are now charging rates so low that they are not really making a profit once money is set aside in reserve for inevitable future losses”.⁷⁸

Target banks with significant retail loans offer an efficient way for acquiring firms to enter or extend their presence into this more profitable sector, therefore the expected sign is positive. Cheng et al reported a negative but insignificant coefficient for retail loans divided by total loans. Standardizing the variable with total loans however, assumes that banks have similarly proportioned total loan portfolios against their total size, but there is no reason to believe this to be true. That is, banks may have significant variation in their total loan portfolio relative to their total size (assets). If true, then large ratios of retail loans to total loans may reflect either a large balance of retail loans

⁷⁸ Saul Hansell, “Bankers Fear New Lending Risks,” *The New York Times*, 21 February 1995.

compared to total assets, or simply that the retail loans make up a large percent of a relatively modest total loan portfolio. Comparing the values of the retail variable using the alternate denominators, total loans or assets, shows the shortcoming of their approach. Figure 5 graphs the retail loans to total loans percent against the retail loans to assets (retail/total loans is sorted in descending order). While the overall trend is the same there are clearly occasions where the retail/total loans ratio is quite high, but the retail/assets ratio is low.⁷⁹ This is further demonstrated by a correlation coefficient between the two series of .52.

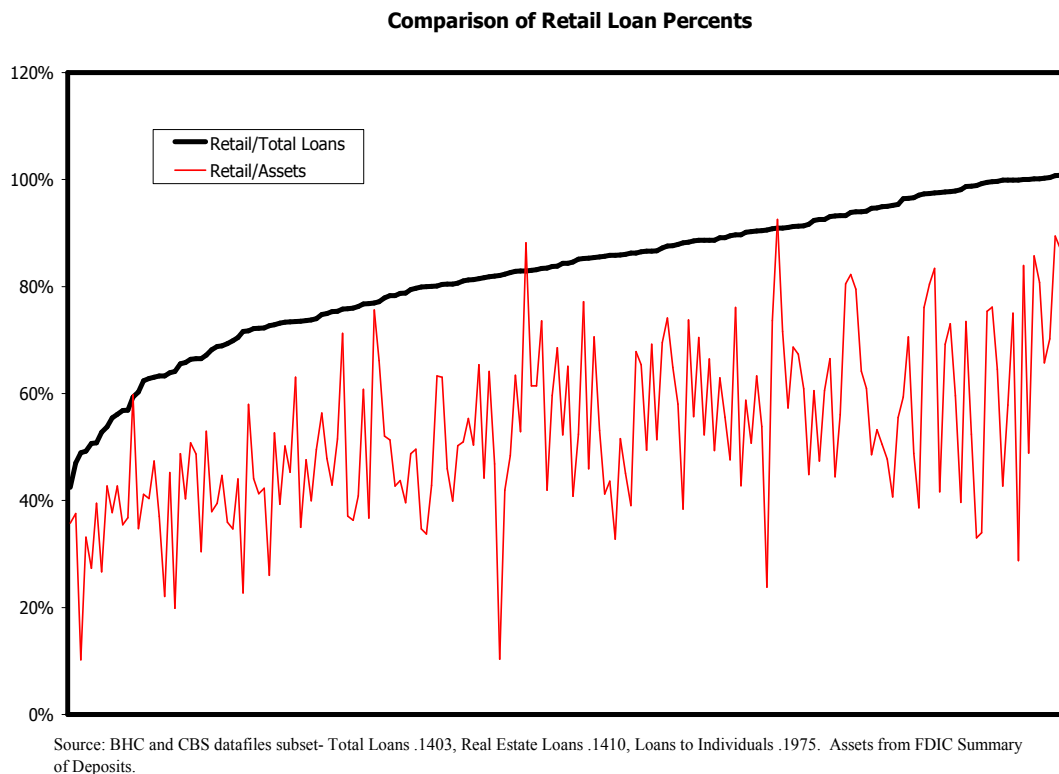


Figure 5 Retail Loan Comparison

⁷⁹ The sample consists of the mergers used in this paper.

A more direct measure is to then use the retail loans to total assets ratio as this controls for the total size of retail loans to the target bank's size. Because there is no definition for retail loans, the variable is the sum of real estate loans and loans to individuals. Real estate loans "include[s] all loans, whatever the purpose, secured primarily by real estate by mortgages, deeds of trust, land contracts, or other instruments, whether first or junior liens (e.g., equity loans, second mortgages) on real estate". Loans to individuals "includes all loans, not secured primarily by real estate, to individuals for medical expenses, personal taxes, vacations, consolidation of personal (non-business) debts; for the purchase of private passenger automobiles, household appliances, furniture, mobile homes, trailers, boats, etc.; and loans not secured primarily by real estate for the purpose of purchasing real estate that will be used as a residence of the borrower's family".⁸⁰ This excludes all commercial and industrial loans, which are reported separately (reported under RCFD1600 and BHC1600- Data Dictionary).

Small Loan Ratio [Small_Loan_Ratio_Non] – After consolidation the acquiring bank will adjust the target bank's loan portfolio to match the parent, often resulting in a reduction in small loans [Peek and Rosengren, 1998]. This practice can easily be mistaken for anticompetitive post-merger effects (Berger et al. 1998), but Carletti et al (2002) suggest that the portfolio of small loans may be inefficient and is eliminated by the parent for post-merger efficiencies. Local banks may find that they can not compete in the larger loan market and so may turn to more costly small loans that have similar fixed

⁸⁰ Chicago Fed Data Dictionary.

costs but smaller income streams. A higher small loan ratio indicates potential efficiencies (positive effect on the merger premium), but may be costly to eliminate and may represent few alternative available local investments (negative effect on the merger premium). The expected sign is therefore ambiguous. The small loan ratio is calculated as the ratio of agricultural loans to assets.

Loan and Lease Charge-offs as a Percent of Assets [Chargoff_Ratio_Non] – Palia (1993) writes that the impact of higher charge-offs has an ambiguous affect on the purchase premium of the target bank. Higher charge-offs could signal quality concerns regarding the bank's loan portfolio, or could be an indication of conservative management. The theoretical argument for a positive correlation between conservative management and a purchase premium seems weak, or at the least far less significant than a relationship between high charge-offs and quality concerns over the bank's entire loan portfolio.

Conservative management may leave avenues for potential earnings that the acquirer is able to exploit. The target's management style would result in factors such as lower earnings, and a set of more conservative balance sheet variables. Palia is speculating that higher rates of loan charge-offs might act as a proxy for income gains available to less risk-averse management. The amount of charge-offs is then not an indication of what would seem apparent, that the bank has bad loans on its book that it needs to write off, rather that management is overcompensating for perceived bad loans. The trouble with this logic however, is that it could apply to virtually any number of income or balance sheet variables. For example, one would think that low income was an

indication of a poorly performing bank or bad market conditions, but instead one might argue that it is actually the result of conservative management underperforming with what otherwise would be a healthy bank. Low income then might have a positive correlation with the merger premium because it is serving as a proxy for conservative management. While the use of income as an example may be extreme, it highlights that this train of logic is applicable to any underperforming variable.

The alternative is to consider that the amount of charge-offs is an indication of what it is purported to represent, bad loans that must be written off. Given the high correlation in bank earnings to local market conditions, high charge-offs seem like an ideal proxy for the overall quality of the bank's loan portfolio. If true, then one would expect to see a negative correlation between the merger premium and the ratio of charge-offs to total assets. Conservative management would come into play by potentially reducing the negative coefficient as outside buyers might detect that excess balance in loan write offs, therefore mitigating the reduction in the merger premium from high charge off balances.

Target Acquire Asset Ratio [Trg_Acq_Ratio] – The target to acquire asset ratio gives the relative size between the two firms and can indicate the extent that scale efficiencies can be applied to the target firm. The higher the ratio (the larger the acquirer's assets relative to the target) the closer the two banks are in terms of scale economies and the fewer gains that can be extended from the acquirer. A lower ratio captures the larger bank's ability to extend new services and scale economies to the target bank (Palia 1993, Cheng et al. 1989, Esty et al 1999) so the expected direction on the sign

is negative. The use of a strict asset ratio may understate the value of the coefficient however, due to shape of typical bank cost curves. Research has shown that scale economies in banking are exhausted at a relatively small level, in the range of \$75-300 million for small banks (Berger and Humphrey 1992), and that larger banks are not more efficient than banks with under \$500 million in assets (Clark and Siems, 2001), which may explain the lack of cost savings found in bank mergers (Houston and Ryngaert 1994, Milbourn, Boot and Thakor 1999, Houston, James, and Ryngaert, 1999). Other research has found evidence that bank mergers due result in cost savings or improvements in profitability (Spindt and Tarhan 1992, Cornett and Tehranian, 1992), and that the lack of supporting evidence for gains is the result of specification and modeling error (Calomaris 1999). Therefore, multiple versions of the variable need to be tested; a strict ratio, and a ratio that only applies to banks of a size that are at the minimum point on the cost curve as suggested by Berger and Humphrey, and Clark and Siems.

These two specifications test two related hypothesis. First, if the direction on the coefficients are in fact negative, then this supports the overall theory that there are diminishing returns to extending new services and scale economies as the difference in bank size approaches unity. The second, is that if the coefficient is negative only on banks below a threshold value (e.g. \$500 million per Clark and Siems), then this supports their theory that the minimum point on the cost curve is near the half billion dollar point. That is, the magnitude of the coefficient on the asset ratio should be larger for target banks on the declining portion of the cost curve.

(2) Acquirer Variables

Multi-bank Holding Company [MBHC_Suv] – The bank holding company structure establishes member banks as subsidiaries of the parent corporation. Any structure that weakens the bond between the subsidiary banks and the holding company will weaken the TBTF effect. The 1989 FIRREA act granted authority to the FDIC to use a cross guaranty provision to charge affiliated banks with supporting a failing subsidiary. This increased the government's ability to force BHC companies to support their affiliated banks. Ashcraft (2004) argues that the FDIC's broader powers will cause BHCs to take pre-emptive action since they are aware that they would be forced to anyway. He offers supporting empirical evidence to show that post FIRREA BHCs are quicker to inject capital into troubled subsidiaries. As a result the bonds between the affiliate banks within the BHC appear to treat them as one unit, as a result the TBTF effect likely remains intact. Knowing that the subsidiaries will be supported by the holding company to prevent failure depositors will not demand a risk premium on deposits. Further, wary of preventing a cascading effect from subsidiary failures the government would support a collapsing BHC company in the same way they would support a single megabank. In order to control that this may not be the case a control variable will be used indicating whether the acquiring bank is a multibank holding company- 1 if it is, 0 otherwise.

Additionally, the looser managerial and board controls of a multibank holding company may affect the purchase price offered. The affiliated banks within the holding company may have boards and management that may have conflicting opinions regarding merger activity. Because the holding company may own as little as 10 percent of the

stock in member banks the parent company is more likely to consider the opinions of member banks than if they had absolute control. Reluctant to create a contentious environment within the wider organization, holding companies may be more conservative in the bidding behavior than wholly owned organizations. As a result holding companies are expected to show a consistent pattern of offering lower prices for potential targets resulting in a negative correlation with the merger premium.

Empire Building [EmpireBldg] – As discussed above bank executives may target growth in order to increase their own compensation by exploiting the correlation between wages and corporate size (Baumol 1962, Berger, Demsetz, and Strahan 1999). Through growth they can increase their total compensation (Allen and Ceboyan, 1991, Brown and Medoff, 1989, Berger et al. 1999), or use acquisition as a signal that they can manage a larger bank and increase their compensation (Fredericks and Arata, 1987, Milbourn et al. 1999). Bank leadership may also seek to rapidly expand through a series of acquisitions out of arrogance, or ‘hubris’ as mentioned by Roll (1986), where they believe that they can engage in market dominance that will ultimately be successful. This type of behavior however, may result in nothing more than a form of empire building, where the bank expands well beyond what could be considered efficient. Managers pursuing this course of action are more likely to overpay and almost assuredly suffer from the winners curse. But because these are behavioral factors there is no way to create a variable that will directly measure the impact on the merger premium. There are a couple of potential proxy variables that may adequately capture the behavior, or the results of the behavior.

Esty et al used a dummy variable equaling one if the acquiring firm announced another acquisition in the last twelve months. While they do not specifically detail that this might proxy for empire building, they do speculate that the variable will have a positive sign. While their results on the dummy variable were positive, they were not statistically significant. In this paper I will use the same variable, 1 if an acquisition occurred in the last twelve months. But using a dummy variable to capture the occurrence of a prior acquisition and not the number of recent acquisitions will bias the effect downward. It seems unlikely that a firm that has engaged in one acquisition is as likely to be engaging in inefficient empire building as one that has engaged in a series of acquisitions. Therefore, I will also test using a second dummy variable equal to one if the acquiring bank has purchased a number of banks that is one standard deviation (3.2) beyond the average (2.93).⁸¹ This should potentially only capture those banks that are aggressively expanding through acquisitions.

The above two dummy variables suffer from the same failure, that they do not distinguish between banks that have expanded recklessly and those that have expanded successfully by increasing earnings and shareholder wealth. In fact, a simple dummy variable measuring the history of acquisitions tells absolutely nothing about the success of past acquisitions, or the success of the bank in managing growth of assets and income. An alternative variable is to measure the ratio of the percent change in income to the percent change in assets. A bank that increased income at the same, or faster rate than

⁸¹ For the period 1995-2004, as derived from the Chicago Fed Merger Database.

assets has obviously managed their growth wisely. A bank that has rapidly increased growth without increasing their return, a ratio below one, seems a more likely candidate for empire building. In fact, this variable has two aspects that make it preferable over a dummy. First, as just discussed it controls for banks that have expanded through acquisition while delivering a return versus those that have not. But just as importantly, it also measures those banks that have expanded internally without increasing income. There is no reason to believe that ‘hubris’ or Baumol wage growth causation applies exclusively to acquisitions. A bank manager can expand internally in a reckless manner— for example, expanding the number of branches, or offering below market rates on deposits or loans in an effort to fuel growth that is ultimately unprofitable. This type of behavior is left wholly un-captured by an acquisition dummy variable, but is measured by an income asset ratio. The variable, Empire building, measures the three year change in the rate of return (income/assets).

$$\text{Current Income/Current Assets} - \text{Income 3 Years Back/Assets Less 3}$$

The variable is restricted only to those banks where the assets increased over the 3 year period prior to the acquisition. This limits the variable to those banks that have been growing in size.⁸² If assets are growing faster than income so the variable is negative (or

⁸² In fact, in the current database, all of the acquiring banks saw an increase in assets during the three year period prior to acquisition. Average assets increased just over 100%. The large increase in assets is not surprising given that the period of the late 90’s to the first part of the new century saw a dramatic increase in internal bank growth and merger activity.

small), this is expected to proxy for empire building and such managers would in turn be more likely to overpay for targets. Therefore, a negative sign on the empire building variable would support the theory of inefficient, aggressive expansion.

There is a however, a competing theory that would lead to a different direction on the coefficient. Banks that have successfully grown in profitability, increasing their profits at a more rapid rate than assets, may have competitive benefits that they can extend to their acquisitions. Managerial skills, knowledge in cost efficiencies, even name brand capital can all be extended to target banks. The potential acquirer that can leverage the greatest gains from the target will be willing to outbid all potential rivals (assuming equal internal rates of return). Therefore, the empire building variable may also serve as a proxy for the most successful banks that are able to pay higher premiums and outbid their competition because they have the most successful strategies for maximizing the return of the investment. If true then the expected sign on the variable is positive.

The empire variable then is testing two competing theories. That higher merger premiums are paid as a result of inefficient management overpaying for targets in an effort to maximize their own personnel utility functions, or that higher merger premiums are paid by the most successful suitors meaning that the market for acquisitions is economically efficient.

Method of Payment (Cash or Stock) [Mop_Cash] – The bidding firm has the option of purchasing the target firm through cash, stock, or a combination of both. The method of payment may have an affect on the merger premium if certain types are more or less preferred by the target stockholders, or if it reveals some type of characteristic

about the bidder. Cash creates an immediate tax effect that forces a higher payment than if there were no tax effect present (DeLong 1999), while the use of stock enables the target shareholders to delay the capital gains until sale (Amihud et al 1990). Amihud et al also point out that cash has tax advantages as well, it enables the acquiring bank to write up costs to the market value so the bank can incur higher depreciation costs to offset future earnings. Acquiring banks may also prefer to use stock when they are aware that their share price is overvalued (DeLong 1999). This can create a higher premium than otherwise (since to get the purchase price the stock is valued at its current cash price), as the bidder may be willing to overpay, and/or the target demands an additional premium if they anticipate that the market may correct the existing over-valuation (rational target stockholders will interpret a stock offer as a signal that the bidding firm's stock price is overvalued, Myers and Majluf, 1984, Krasker, 1986). Amihud et al find evidence of this; in an event study they find a significant, negative, coefficient on the bidding firm's stock price when plans are announced to fund an acquisition with stock, while it is positive under a cash offer. This is an indication that the market has determined that the bidder is overpaying when using a stock offer, suggesting that in the merger premium model that all else equal a cash offer would be at a lower price than equity based. Finally, Amihud also finds that banks with higher managerial ownership rates are less likely to use stock financing indicating a reluctance to dilute their ownership stake. This seems particularly likely for well run banks as it would also dilute future earnings more than a cash, or debt financed acquisition. The cost of a cash acquisition (funded by debt) has a fixed cost at the current interest rate, while a stock based acquisition becomes more costly in an

absolute sense if the share price is expected to appreciate at a more rapid rate than the current cost of debt. Cash offers may then serve as a proxy for a well run bank, with the expectation that a well run acquirer would be less likely to overpay for a potential target, resulting in a negative correlation between a cash offer and the merger premium.

While the existing theory suggests ambiguity in the sign on a method of payment variable, several theories do point in the direction of a negative correlation between a cash offer and the merger premium, and a positive relationship with an equity acquisition.

(3) General

Market Concentration [ch_hhi, post_hhi] – Typically the results have not been strong but there is research showing that higher market concentration ratios lead to lower interest rates and reduced loans (Radecki 1998, Carletti et al. 2002). Mergers then, at least those that result in a non-trivial change in HHI, may increase profitability for the market in general and the combined firms in particular. Beatty et al (1987) and Palia (1993) find a positive and significant effect on concentration⁸³, while James and Weir (1987) have insignificant results on the rates of return and potential market power in merging banks. Broaddus commented that the ease of entry, removal of interstate banking restrictions, and scrutiny of all mergers for potential anticompetitive effects likely reduce or remove any potential gains from market power for recent mergers (Broaddus 1998). As an illustrative example Broaddus points out that in the prior 5 years (1993-98) over 670 new banks had been chartered. In fact, consolidations have been

identified as a primary driver for additional entry (Federal Reserve Board of Governors 1999). Under such intense market conditions where new entry can quickly eliminate market power gains (this is different from efficiencies, implying supply or quality restrictions) it seems unlikely that bidders would pay a merger premium for increased market power. In fact, given the often intense regulatory scrutiny and the potential for long second requests and costly divestitures, banks might chose to steadfastly avoid potential regulatory issues. As a result the expected sign on both the change in HHI, and post HHI is expected to be insignificant.

The change, and post HHI are calculated at the state level for the combined entities total deposits for all branches within each state they overlap. A single HHI value (change and post) is calculated for each acquisition by calculating the weighted average (by overlapping deposits) HHI values for all overlapping states.

Market Growth In Deposits [ChStDep_Non] – Bidders may pay a premium for banks that are in rapidly growing markets (Rhoades 1987, Fraser and Kolari 1987). The market growth in deposits variable is calculated as the one year percentage change in deposits for all states where the target bank has a presence. Where the target bank has a presence in more than one state, the percentage change is the weighted average of those states.

Bandwagon effect [Bandwagon] – Rhoades (1985) has recognized that certain states during certain periods of time can show particularly heavy merger activity. This

⁸³ Palia uses a four firm concentration ratio, Beatty et al market HHI.

can of course stem from a series of sources, such as changes in the regulatory environment or altering market or cost conditions that create incentives that unleash a series of heavy consolidations. As an example of this, the change in federal law removing cross-state banking restrictions is credited for a large part of the 1990s merger wave (Hanweck and Shull (2001) give three reasons for the 1990 merger wave; the elimination of geographic restrictions, relaxing of regulations restricting bank activity in non-banking areas, the bank profit and stock boom). But there may be some ‘irrational exuberance’ involved, where bank executives see other firms merging and getting larger, and they may perceive that they must either grow, or become a target themselves. Banks that make suitable targets then begin to earn a premium as they become increasingly scarce due to consolidation, and the number of bidders increases as the merger wave affects more and more top managers. A high rate of merger activity may then serve as a proxy variable for a bandwagon affect, an expected positive correlation between the number of combinations and the merger premium. The variable used here is the number of acquisitions in the state the year of the acquisition.

Deposit Extension [Extension] – There are two explanations regarding the geographic selection of target banks in relation to the location of the acquirer. The greater the overlap in the merging parties the greater the potential for cost savings (Houston and Ryngart 1994, positive shareholder return to mergers within the same state, DeLong 1999). The extent of the overlap is already captured by the change in HHI value. The other reason is that the bidder may desire to enter a new market where they have no, or little existing presence in order to tap new markets or as a means of diversifying risk;

dispersion between states with low, or negative macroeconomic correlation can reduce profit fluctuations and insolvency risk, (Hughes et al 1999, Benston et al 1995, Hadlock et al, 1999, Berger et al 1997); managers may seek to reduce variance to profits to the detriment of shareholders to reduce their own employment risk, (Amihud and Lev, 1981). Milbourn et al (1999), look at the literature on bank profits and say it is mixed regarding increased profits and risk reduction. Palia (1993) and Esty et al (1999) test for market extension and suggest it will be positive as banks will pay a premium to enter new markets. However, they only use a dummy variable equal to 1 if it is an interstate acquisition. Both return positive results but only Palia's is statistically significant. Rhoades (2000) finds that recent banking mergers have been purely market extension and not horizontal and credits the removal of interstate banking restrictions as the impetus for banks to rapidly set up an extensive multi-state enterprise. The quest for quick expansion might result in higher premiums for targets that are considered particularly attractive for potential suitors to enter a new market.

The use of a dummy variable however fails to capture the extent of the market extension. The target, or acquirer could have a presence of varying size in multiple states. For example, the target may have a minimal presence in a state where the bidder has none, but it is questionable that the bidder would pay a significant premium for minimal entry into a new state. Or the bidder may have a minimal presence in a state where the target has a large presence, but a simple dummy variable would not report this as an extension. Therefore what is needed is a variable that controls not only for an extension merger, but controls for the extent of the extension. The extension variable is then the

sum of the target's deposits for all states where the target's deposits are greater than the bidders, divided by the total survivor's deposits. This creates a ratio that measures not only if there is an extension, but the degree of the extension.

Yearly Dummy – the results from Chapter 2 showed that there is some evidence that the October 1st comments by Greenspan and McDonough strengthened the markets perception that certain institutions were deemed TBTF. If so, the premium for TBTF status should increase for mergers after the October 1st, 1998 statements. Yearly dummies can be used to see if there is an increase in the merger premium for the years post the statement compared to prior.

3. Data

Data for this paper comes from MergerWatch©, the FDIC Summary of Deposit (SOD) database, Chicago Federal Reserve merger activity database and consolidated bank financial data, and LexisNexis© searches.

MergerWatch© is a data compiling agency that tracks acquisition activity in the banking industry. For a fee they will provide purchase price and related financial information for bank combinations. Due to financial considerations the author only purchased a list of all available mergers from MergerWatch that contained the acquiring and target firm, the initial offering price and date of the acquisition. Because MergerWatch only reports a subset of combination activity the list of mergers was augmented with the Chicago Fed merger data and Lexis searches.

The Chicago Fed database only gives the names of the parties, Federal ID, and date of the combination- no price information is available. In order to get the offering price a Lexis search was conducted using the two bank names from the Fed data as the search terms.⁸⁴ Searches were conducted only for those banks where the target was greater than 50 million dollars, and the combined size of the surviving and target bank exceeded 500 million dollars. This was done due to the negligible success of finding price information for combinations that did not meet these conditions (in a sample of 70 combinations, price information was found for only 1 that did not meet these conditions). Additionally, only complete purchases, (i.e. no purchase of selected branches or percent of assets), and domestic banks were included. All successfully found articles were reviewed in sequential time order (furthest in the past to most current), and the pricing information was entered for the first definitive offer.

Financial information for the entities comes from the Chicago Fed Bank Holding Company and Commercial bank data series, as well as the FDIC Summary of deposit database. The three datasets (including the Chicago Fed Merger Database) can be joined by a common bank ID field (each national bank has a unique federal ID number that is reported in each of the databases). All bank holding company variables are for all affiliated banks to the holding company. All financial and deposit data is reported for both the target and bidding bank for the quarter the combination is completed (or the

⁸⁴ To determine that the proper banks found in the Lexis search were the same as what is reported in the Chicago Fed database the assets for the banks reported in the article were compared to the bank's actual assets as reported in the FDIC Summary of Deposits.

most recently available quarter). All variables except deposit and total assets are reported on a quarterly basis; deposits and assets are reported as of June from the Summary of Deposit database.

The dependant variable, price to book ratio, is the offering price divided by the target banks total assets less liabilities at the time of the combination. The dataset consists of 142 mergers from 1995-2003, with a range in price to book values from .3 to 6, with an average of 2.8. This is higher than earlier work, for example Cheng et al 1989, reported an average of 2.04 with a range of .47 to 3.44 from 135 mergers during 1981-86. The higher premiums reported here are likely the result that bank market to book values have been increasing over time (James and Wier, 1996), and a rising equity market, which would result in higher purchase price to book ratios.

The median asset value for the target banks is \$518 million and \$5.7 billion for the bidder, slightly over 10 times the average size of the target (this is the same ratio found in Cheng et al, 1989). The average asset rank (for the nation for the year of the merger) for the survivor is 169, and 1,301 for the targets. For seven of the mergers the combined firms were both in the top-40 for asset size. Of the 142 acquisitions, the bidder was one of the nations 20 largest banks (as measured by assets) in 24, and in the top 10 for 15 of the combinations.

Table 5 Variable Summary Statistics

Summary Statistics				
	Average	Minimum	Maximum	Standard Deviation
PRB_COMB	2.80	0.3	6	1.01
CH_RR_DUM_NON	129	0	1	0.29
INCOME_NON/ASSETS_NON	0.6%	-2.2%	2.4%	0.01
DEM DP_DIV_ASST_NON	13%	0%	43%	0.08
CHSTDEP_NON	6%	-29%	113%	0.10
EXTENSION	7%	0%	163%	0.22
CHASST3_DUM_NON	74	0	1	0.50
EMPIREBLDG	0.0%	-1.4%	1.1%	0.00
TBTF_EXT	14	0	1	0.30
RANK_SUV1	169	1	947	185
CH_HHI	13	0	351	44
POST_HHI	776	242	3097	361
ACQ_TRG_ADJ_RATIO	2058	0	79037	8889
CORRL_POS_DUM	100	0	1	0.46
CORRL_NEG_DUM_ALL_NEG	7	0	1	0.22
MOP_CASH	15	0	1	0.31
MOP_MIX	19	0	1	0.34
RETAIL_LNS_RATIO_NON	47%	2%	80%	0.15
CHRG OFF_RATIO_NON	0.2%	0.0%	1.8%	0.00
BANDWAGON	2.73	1	24	2.87
MBHC_SUV	93	0	1	0.48
MBHC_NON	16	0	1	0.32

4. Results

The overall fit on the model is a modest R squared of .39, consistent with earlier work (.12 to .46). The low R squared is likely the result of the fact that much of the offering price for any acquisition is built on the target firm's assets, and any other factors influencing the price are small in comparison to the dominant affect from assets. As a result other variables will offer only limited explanatory power. Therefore, using the price to book variable (which effectively holds assets, and liabilities constant) as the

dependant variable will result in an overall low R squared since much of what is left may simply be noise. To show the extent of assets on the offering price, the model was run using the same set of control variables, except the dependant variable is the actual offering price, and the target's assets is used as an additional regressor. The R squared moves to .97 (with a nearly equal value for the adjusted R squared). In contrast, the offering price on assets only (without the other control variables), results in an R squared of .92. Therefore, it is clear that the dominant factor in merger premium models is the target firm's assets. This limitation noted, there is room on the margin for variations in the ratio that may be explained by other variables, including the ones used here and in earlier studies.

The target's demand deposit ratio [demdp_div_asst_non], growth in the target states' deposits [chstdep_non], retail loan ratio [retail_lns_ratio_non], and the ratio of loan chargeoffs [chrgoff_ratio_non], where all of the predicted sign and generally consistent with earlier work. Although none of the variables were significant at 95 or 90 percent confidence levels, the demand deposits (p-value .13), and both loan ratio's (.32 and .24) were close. Only the change in state deposits had a standard error nearly equivalent to the size of the coefficient rendering the sign on the coefficient nearly completely insignificant.

The sign on the demand deposits ratio is positive and nearly significant (p value of .1332). This is a similar result to Fraser and Kolari (1987) (positive and significant), and further supports their theory that bidders pay a premium for more profitable demand deposits.

The growth in deposits for the target's resident state is insignificant on the merger premium. This is at odds with Rhoades (1987) that found a positive affect from growing state deposits, and Fraser and Kolari (1987) whom used the growth rate in population and found significant results as well. The current results seem more in line with current market conditions however, where interstate acquisitions, and new entry are likely to quickly eliminate potential gains due to overall market conditions (Berger et al 1999). This is similar to the proposition laid out for market concentration in that the sign is expected to be insignificant as entry (and regulatory obstacles) will prevent any market power based gains. Therefore, absent any particular advantages offered by the target bank there are no expected gains from an acquisition into a growing market as entry will remove them. The insignificant result is consistent with a competitive market model unlike the results of prior research.

The retail loan ratio is positive and insignificant (p-value .3157), offering some evidence that a larger portfolio of more profitable retail loans is an added incentive for bidders. Cheng et al was the only other paper to test the retail loans on the merger premium, their results were insignificant as well but of the opposite sign.

The chargeoff ratio is negative as predicted but insignificant (p-value .2339). The negative relationship implies that the size of the loan chargeoffs acts as a proxy for dubious quality of the entire loan portfolio. Prior research was mixed but generally the same as the results found here; Cheng et al results were positive and significant, and Palia was positive but insignificant. The positive sign was explained as a proxy for conservative management, meaning that there are unexploited gains available. Beatty et

al's results were negative and insignificant. Esty et al (1999) and Palia (1993) also tested a similar ratio, non-performing loans to total assets, and found negative and insignificant and negative and significant results respectively.

As discussed above, conservative management may increase the size of the chargeoffs larger than necessary, and the acquiring bank may recognize this as a potential post-merger gain. While the effect is not expected to be large enough to offset the proxy aspect of the chargeoff ratio, it may be large enough to decrease the size of the coefficient and may explain for example, why Beatty et al's results were insignificant. Future research should look for a way to disaggregate the amount of chargeoff balances due to poor market conditions and any extra amount maintained by conservative management.

The growth in income variable was found negative and insignificant (p-value .53), consistent with the findings in Cheng et al (1989), but opposite of the positive and significant finding of Rhodes (1987). The insignificant finding is not surprising however, given that income growth if it comes as a result of even larger increases in assets is an unproductive use of resources. Efficient markets are more concerned about rates of return than pure growth in earnings. A more productive measure is to account for the growth relative to assets, the growth in the rate of return. Another model was run that included the 3 year change in the rate of return, but this variable was insignificant as well. This may result from the fact that the relationship is not linear, that is acquiring banks are interested in paying a premium for growth but largely indifferent to stagnant or declining growth. This theory is consistent with Palia (1993) citing growth in general as the motivating factor driving merger activity.

A dummy variable was therefore used to replace the change in the rate of return variable, equal to 1 if the rate of return increased over the period, and zero otherwise [ch_rr_dum_non]. The coefficient is positive and statistically significant (p-value .0694) consistent with those found in Rhodes (1987), Palia (1993), Fraser and Kolari (1987) (Esty et al 1999, found a positive but insignificant sign).

The current rate of return on assets was also included, and surprisingly the coefficient is negative but insignificant (p-value .2177). Although the insignificant results were expected, as acquiring banks would not be particularly concerned about volatile current earnings, the fact that the results are negative is still upsetting as the notion that lower earnings would increase the merger premium seems to defy any reasonable interpretation. One thought considered by the writer is that perhaps with the rate of return dummy controlling for growth, the current income may be measuring a few outliers where some target banks had anomalous low earnings for the current period. That is, if some targets had low current earnings, at odds with high historical earnings, this might show a result where negative current earnings are correlated with higher purchase price premiums. To control for this potential effect, a series of alternative dummy variables were created, all designed to capture low current earnings that were significantly less than historical earnings. Including these variables did tend to decrease the coefficient on the current rate of return variable but they did nothing to improve the overall fit of the model themselves, and therefore were left out.

Another consideration is that current low earnings send a signal to the market that make the bank an attractive takeover target. That is, the lower earnings cause the current

management to seek out a potential buyer, and acquirers actively seek for banks that they feel they can turn around. The resulting increase in competition may therefore result in a counter-intuitive effect, where struggling targets actually get higher merger premiums (all else equal) than if their earnings for the current quarter were strong. Note, the author does not care for this interpretation, especially since they appear at odds with the otherwise consistent results of the paper that support efficient markets. Therefore the result on the current rate of return is left as somewhat unexplained.

The target's three year growth in assets is insignificant, but this appears to be the result of acquiring firms most interested in significant growth. Therefore, the growth in assets variable was replaced with a dummy variable equal to 1 if the target's growth rate was greater than 30 percent for the period (therefore equal to about 10 percent growth per-year). The resulting dummy variable is positive and significant (p-value .0747). These results are the same as prior research; Rhoades (1987), Cheng et al (1989), and Palia (1993), all found a positive affect on the merger premium from the growth in assets, but only Rhoades' results were significant.

The multi-bank holding company dummy variables are negative and significant for the target (p-value .0276), and negative but insignificant for the acquirer (p-value .1681). On a per-asset dollar basis, bidders pay less for targets when they are not able to gain absolute control. Thus acquirers may lower their price when purchasing a holding company because they have less control of the target's assets than they would ideally like. Additionally, there is support for the theory that the acquiring holding company may be forced to take a more conservative bidding approach in order to placate affiliated banks.

It is interesting to note, that as a result of this more loose structure holding companies may in fact be less likely to ‘overpay’ for targets, and as such the additional bureaucracy of a holding company may provide some tangible benefits.

The method of payment results strongly reject ambiguity and support the notion that cash payments have lower merger premiums. The sign on the cash payment variable is negative and statistically significant (p-value .0). Additionally, the coefficient on the variable is considerable at – 1.19. Given the significant results, a second variable was included, a dummy variable equal to 1 if the method of payment was a mixed combination of cash and stock. Again, the coefficient is highly significant (p-value .0032) and negative [Beatty et al 1987 had the same results], and importantly the coefficient while large (in absolute terms) at -.72, is less than the cash method of payment. This shows that the reduction in the merger premium is lower when the cash is mixed with stock. A cash purchase reduces the merger premium by more than 40%, and a mixture by more than 26%. It is clear that stock based purchases demand a steep premium.

Future research could look to see if the relationship between the merger premium and the method of payment is linear by seeing if the coefficient changes at a constant rate as the percent of stock is increased. Such an analysis is not possible here as the breakdown between stock and cash for the mixed payment purchases was not available.

The unique approach to diversification originally tested by Benston et al (1995), where they test the covariance in income between the bidder and target is further supported in this paper. Benston et al found mixed results on income diversification,

with consistently negative coefficients across models but of varying levels of significance, offering some support that bidders seek to diversify their risk. The two variables used here to test Benston et al's theory are both dummy variables- the first is equal to one if the earnings correlation between the banks is .75 or greater (*corrl_pos_dum*), and a second variable equal to 1 if there is a negative correlation (*corrl_neg_dum_all_neg*). Both variables are of the expected sign although only the negative dummy variable is significant (p-values of .4184 and .0188). The positive correlation dummy has a negative sign, offering support that bidders offer a lower purchase price for target banks that will exacerbate the variance in the earnings, but it is insignificant. The sign on the negative correlation dummy has a positive sign, which is consistent with the acquirer paying an additional premium for targets that will diversify their income risk. These results are consistent with earning diversification as a motive for mergers and reject the hypothesis of further exploiting the government safety net by increasing the variance of earnings (Benston et al 1995). But it appears that bidders do not necessarily penalize positive correlation, rather they seek out and are willing to pay a premium for target banks that offer diversification. Given the paucity of banks that exhibit counter-cyclical earnings to the bidder, it is logically consistent that their few number would result in a merger premium.⁸⁵

The post-HHI variable is insignificant (p-value .9558), supporting the theory of contestable markets (and overseeing agencies that prevent excessive concentration)

⁸⁵ Other correlation specifications were used, including alternative cutoffs for the dummy variables and interactive variables; none of which significantly changed the results from the final method.

offered by Broaddus (1998) and consistent with James and Weir (1987), (event study showed no gains from increased concentration) and Rhoades (1987), (negative and insignificant coefficient on three firm concentration ratio). Given the potential for such rapid entry, bidders could not rationally expect to maintain gains from market power (Federal Reserve 1999). Beatty et al and Palia's results were both positive and significant on the HHI and four firm concentration ratio. Both of these papers however, look at merger premiums from the mid-80s when interstate banking restrictions were in effect. It therefore appears that the loosening of restrictions on banking expansion has eliminated the gains from increases in market power, a social benefit.

Seemingly in conflict to these results, the change in HHI variable is positive and nearly significant (p-value .2003). This likely reflects less an indication of quest for market power, rather the potential for scale related efficiencies between the target and bidder. The effect from market power is already captured in the post-HHI variable, and further the two are uncorrelated (coefficient of .13). This is not surprising given that if the two were highly correlated the agencies would likely move to block, or require divestitures from the combined entity where both variables were high.⁸⁶ The potential efficiency theory then is the remaining explanation.

The other variables used in this paper to gauge efficiency, or product extension related gains; the deposit extension variable and the target to acquire asset ratio, do not

⁸⁶ The FTC guidelines outline a two part benchmark test to identify potential issues arising from higher levels of concentration, the change in HHI and the post-HHI. The higher the post-HHI, the lower the acceptable threshold value for the change in HHI. The correlation between the two variables is then expected to be low for bidding banks loath to face significant regulatory scrutiny.

capture the same affect as the change in HHI variable. The deposit extension variable is designed to measure the extent that the bidding bank is acquiring assets in states where it does not have a significant existing presence. The target to acquire asset ratio measures the relative assets for the two banks as a whole, irrespective of state boundaries. In contrast, the change in HHI measures the overlap in the two banks within states. A high degree of inter-state overlap may offer efficiencies available from branch closings (Houston and Ryngaert 1994), regional extension within the state, or regional clustering of banking services (Kwast et al 1996). From the results in this paper, it is impossible to tell which of the potential benefits the bidding bank may be seeking, only that all else equal they are willing to pay a premium for overlap within state boundaries.

The deposit extension variable tests the impact on the merger premium from the extent that the target's deposits are in states where the bidder does not have a significant presence. It tests the extent that the bidder is seeking to enter new territory, of which part of the reason may be an effort by the bidder to diversify risk. Therefore a positive coefficient further supports the theory of bank mergers to extend the reach of the target bank and to diversify risk. Consistent with prior work the coefficient here is positive and significant (p-value .0559), similar to Palia (1993), positive and significant, and Esty et al (1999) positive and insignificant, both of which use a dummy variable for an interstate acquisition to serve as a proxy variable for extension.

The target acquire ratio, designed to measure the potential efficiencies that the acquiring bank can extend to the target, is insignificant. This could be the result however, that the variable is mis-specified. As discussed above the economies available from

banking have been found to be quite small (relatively), in the range of \$.5 billion. A simple ratio does not capture the fact that the target may in fact be of a size well beyond where economies are considered available. This will lower the explanatory power of the coefficient. Additionally, upon reviewing the correlation matrix of the independent variables, only the target/acquire ratio, and the extension variable are fairly correlated (correlation coefficient equal to .67). As a result of the multicollierinty between the two variables the confidence level of both will be reduced. In fact, in a model where both the extension variable and the target to acquire ratio are included, both are insignificant (although the extension variable is only marginally so, with a p value of .16).

To correct both the potential misspecification error, and the collinear effects with the extension variable, an alternative asset ratio was created. Dividing the square of \$1 billion dollars by the square of the target's assets give a ratio that rapidly approaches zero for assets beyond 1 billion dollars. Multiplying this ratio by the bidder to target asset ratio, gives a variable that measures the relative difference between the two banks, but decreases exponentially for target banks above \$1 billion (note, this is now a bidder to target ratio). Regarding the selection of \$1 billion, this hurdle seems to clearly cover the range of targets where economies are believed to still exist and offers some margin of error if there are economies beyond these points. The new ratio is no longer correlated to the extension variable (-.08), and should better capture potential efficiencies for only those banks that are small relative to the bidder and offer potential scale economies. The expected sign on the variable is now positive, indicating that the larger the ratio, the

greater the potential efficiencies, or new services that can be extended, and therefore the greater the merger premium.

The resulting variable however is not in fact positive, rather negative but insignificant (p- value .1966). This at first seems counter-intuitive, and at odds with the results found by Cheng et al 1989, Esty et al 1999, Palia 1993, all of which found that the greater the disparity in relative size the higher the merger premium. But looking at this again there are some other issues to address. First, their specifications seem in error. As discussed above it does not control for target banks that are of sufficient size that economies are no longer available. But there is another, more fundamental problem, and that is why would a bidder pay more for a bank that lacks the requisite services that the bidder deems necessary? These supposed services that the bidder will extend, as speculated by Palia and Cheng et al, can not be measured directly. The asset size of the target bank is then acting as a proxy variable for services that the target does not have, and the acquirer will be forced to put in place at considerable cost (if the costs were not considerable, or not efficient, a bank of 1-200 million would certainly offer them). Therefore, minimally sized banks (those under the economies threshold) impart additional costs on the bidder post the acquisition, and do not offer a benefit.

There is also a second point that the relative discrepancy in size may serve as proxy for the ability, or experience differences between the management of the two banks. Larger banks, all else equal, may have more competent management that may be better negotiators, or have access to better pricing information than the management of their smaller counterparts. This would result in the larger bank capturing a better price,

either because they do not overpay, they are purchasing a bank so small that it may be overlooked and therefore there are fewer potential bidders, or they are able to ‘outsmart’ (for lack of a better term) the target management. It is expected that this would only apply to small banks that are significantly smaller than the bidder. That is, a small size alone is not sufficient, the bidder must also be large enough that it has the ‘better quality’ management (in terms of the meaning of the proxy variable). The adjusted acquirer to target asset ratio described here, as of yet not tested in any model, better captures these effects, and the negative sign supports the theory of small banks having an extra cost, and lower quality management, that result in a lower merger premium.

The coefficient on the bandwagon variable is positive as predicted but insignificant (p-value .5213). There is then some weak evidence that recent mergers in the same state may cause a herd mentality that causes bidders to overpay. The lack of significance may be a result of the fact that the relationship is nonlinear. It seems likely that there is some threshold where only a handful of acquisitions would not be sufficient to galvanize bidders into panicked excessive payment. Therefore an alternative bandwagon variable was created that is equal to 1 if the number of acquisitions in the state was greater than the mean number of acquisitions for all states (3). There were 48 combinations in the database where the acquiring firm was in a state where the number of acquisitions for that calendar year was above the mean. The model was re-run replacing the bandwagon variable with the new bandwagon dummy variable. Rather than making the statistic larger, it reversed the sign on the coefficient to negative, and the significance

level dropped even further. Therefore the suggestion of herd mentality is rejected, and an insufficient result consistent with an efficient market is found.

The Empire Building variable is positive and significant (p-value .0063) supporting the efficient market hypothesis. The positive coefficient means that the more the buying bank has been able to increase their rate of return (or the more they could increase income over assets) while increasing assets the more they pay for target banks. That better run banks are willing to pay more for targets supports the hypothesis that they expect to better leverage their expertise, and better utilize the target banks assets. As such they should be willing, and able to outbid less efficient competitors in the market for bank purchases.⁸⁷

There is no evidence that the most profitable banks are the most consistent winners in purchasing auctions (it is not studied here), and in fact, of the 142 mergers analyzed there is variability in the profits of the winning bank. But, on average, the acquiring banks are more profitable than the targets (ROA 32% greater for the acquiring bank compared to the target) suggesting that the banking market is efficient, that is the more profitable (and therefore assumed better run) banks consume less profitable ones.

Finally, it is worth noting that these results differ from what was found in the adjusted target to acquirer target ratio. At first glance, it might appear that the results contradict one another; that is the asset ratio was consistent with evidence that the

⁸⁷ Note, this does not mean that the post-acquisition returns from the purchase will be super-competitive as the buyer was forced to pay the price up to the next highest bidder. The acquirer can only make excess returns based on the marginal difference in extending their expertise beyond what the rate of return the next highest bidder believed they could have earned.

acquirer may have better quality management and as such be able to negotiate a ‘better deal’ against the less savvy, and smaller target.⁸⁸ The results here show that better run (more profitable) purchasers pay more than less profitable. One might be able to argue, that these two results are contradictory, that is one would expect the ‘better’ run acquiring banks to also be more ‘savvy’ and therefore pay a lower price. But the later variable, empire building, says nothing about the size of the target, or the relative size difference between the combining firms. The ability to out-negotiate a smaller bank seems dependent upon finding a bank both sufficiently small (and therefore with less experienced management) and small compared to the buying firm. Therefore, the asset ratio is controlling for the imbalance between management, while the empire building variable is isolating the effect from more profitable banks out-competing their bidding rivals.

Finally, tests regarding TBTF implications had mixed results. A strict dummy variable, equal to 1 if the surviving bank was one of the top-40⁸⁹, and the target the top-100, was insignificant (p-value .5758).⁹⁰ This may be because the market perceives either that the target bank already has some level of TBTF status, or that the target is considered so safe already that there is little to be gained from TBTF status. If so, the acquiring bank would not bid up the price beyond what other rivals would pay (that

⁸⁸ Recall, this was the second of two theories; the first was that the acquiring bank, when significantly larger, and the target is under \$1 billion in assets, may offer a lower price since they will have to incur expenses to add goods and services to the purchased bank ex-post.

⁸⁹ Rank as determined by asset size for U.S. based banks at the time of the acquisition.

⁹⁰ Other variations were tried on the same theme, for example the surviving bank in the top-20 and the target top-100, these were insignificant as well.

couldn't generate TBTF status) as the additional protection for the target's assets is of minimal value.

An alternative version was then created, *TBTF_ext*, equal to 1 if the surviving bank was one of the top-20 pre-acquisition, and the target was the 101 largest bank or smaller. If these smaller banks are considered well outside of the government TBTF range, and are more risky, extending the protected status to them might result in a higher merger premium than combinations that do not extend the TBTF status (for example bank ranked 150 buying one ranked 300). The coefficient is not positive however, but negative and significant (p-value .0666).⁹¹ This implies that the protected surviving bank is actually paying less for the smaller target than would an acquiring bank that did not have TBTF status. Additionally, this variable is not capturing the relative imbalance between the banks (based on asset size) as this is captured by the target to acquire ratio discussed above. Further, by including *TBTF_ext* the significance on the target to acquire ratio is actually improved, suggesting that they are not capturing the same effect.⁹²

A possible explanation for the lower price when a TBTF acquires a small bank may lie in the incentives faced by the managers of the selling bank. Palia (1993) found that managers with higher ownership stakes might accept lower purchase premiums in order to diversify their risk. Although this paper does not control for manager holdings, the results here are consistent with Palia, not necessarily in terms of the management

⁹¹ Alternative restrictions were tested limiting the interaction to smaller target banks, for example outside of the top 200, outside of the top 500. The negative sign remained, although the coefficient and level of significance declined.

holdings, but the risk diversification. An established TBTF bank offers additional security risk to the management and shareholders of a smaller bank, namely that by purchasing the smaller bank the TBTF protection is extended to the target. As such, all else equal the sellers of the target bank may be willing to accept a lower price from a TBTF bank from one that falls out of that range.

As an additional check, a similar variable was created, equal to one if the acquiring bank was sized 40 to 100 [TBTF_marg] (just beyond TBTF status), and the target out of the top-100 largest banks. If the TBTF_ext variable was simply capturing the relative difference in sizes between the two banks, this second variable would likely capture the same affect. The average difference in rank between the target and acquirer for those acquisitions that meet the criterion for this dummy variable is over 1000, so there is clearly a large relative difference between the banks in terms of size. If the TBTF_marg variable is then significant, like the TBTF_ext variable, then the TBTF_ext variable is likely only capturing the relative difference between the banks, but if it is insignificant, this supports the theory that the sellers are seeking to diversify risk and willing to sell at a lower price to gain TBTF protection.

The TBTF_marg variable is insignificant (p-value .4267) supporting the risk dispersion theory. Further its inclusion does not materially change the coefficients or significance level for the TBTF_ext or target to acquirer ratio variables. Finally, another model was run, this time only including the TBTF_marg variable and dropping the

⁹² Additionally, excluding the target acquirer ratio does not materially change the size of the coefficient or

TBTF_ext variable. The overall model results do not change, but the TBTF_marg variable p-value drops even further to .8.

A final test for the potential of TBTF is with the yearly dummies. If the premium increased post the 1998 comments this might be an indication that banks were willing to pay an additional premium to achieve or extend TBTF. With the exception of a positive and significant sign on a 1998 dummy variable, all the post-comment yearly dummy variables are insignificant. The significance of the 1998 variable alone is not strong evidence of an additional TBTF premium. The yearly dummies are based on the date that the merger was consummated. Therefore, virtually all of the 1998 combinations were started long before the Greenspan comments. The insignificance of the 1999 (and later variables) shows that there appears to be little trend, or a one time shift in the merger premium. The 1998 variable is therefore likely capturing some otherwise unspecified variable.⁹³

Inclusion of the 1998 dummy has a modest impact. It increases the overall R squared, but has only a mild effect on any of the other independent variables. The most notable affect is on the change in the rate of return variable, where the p-value changes from .07 to .14, other results are largely unchanged or reflect only changes in the level of

level of significance on the TBTF_ext variable.

⁹³ The model was run with single yearly dummies testing to see if there was a short term shift, other than the 1998 variable the yearly dummies were not significant. Additionally, the model was run with post-1998 yearly dummies testing to see if there was a permanent shift resulting in increased premiums, no such affect was found. Finally, an interactive dummy with the TBTF variable was run for 1998 and 1999 to see if there was an increase in the premium around the Long Term bailout, the interactive terms were not significant.

insignificance. This reflects the overall robustness of some of the key variables.

Complete results can be found in the appendix.

5. Stability Testing

In order to test the overall stability and robustness of the model several checks were performed. Due to the large number of variables relative to the total number of observations the White heteroskedasticity test did not include the cross-terms. The results of the test reject unstable variance in the error terms with an R squared of .28, adjusted R squared of .07 and a probability on the F test of .16. Additionally, 29 of the 34 regressors were insignificant (90 percent confidence level), and of those that were significant three were dummy variables.

There is also a concern with this type of model that the coefficients are being driven by extreme outliers, or that there are structural breaks in the model. That is, that the relationship between the dependent variable and regressors is different for low and high end values in the dependent variable. To check for this the model was rerun, this time only using observations where the dependent variable was within one standard deviation (above and below) the mean.

Doing this restricted the model to 104 observations, eliminating 20 where the price to book ratio was one standard deviation below the mean, and 18 observations one standard deviation above the mean. (It is reassuring to see that the price to book ratio is nearly standard normal, the 104 included observations is about 73 percent of the observations, slightly above the 66 percent range for +/- one standard deviation for a

perfectly standard normal). The R squared between the restricted and unrestricted are close (.39 vs. .37). Additionally, a t-test for each of the 21 variables between the two versions results in seven that are statistically different (at a 90 percent level of confidence).⁹⁴ Of the seven variables that had statistically different coefficients; three were still significant (at the 90 percent level) in both the restricted and unrestricted model, and two were insignificant in both models. So for five of the seven variables the magnitude of the coefficients changed, but the overall implication of the results remain the same. This does not hold true for the last two variables.

There are two remaining variables then where the coefficients are statistically different between the versions, and the significance level changed in the restricted model. The extension variable and the negative correlation in earnings variable- both went from statistically significant to insignificant. The extension variable much more so than the negative correlation dummy (p-value change from .06 to .79 versus .02 to .27). This might mean that values in the tail (I hesitate to call nearly 30 percent of the observations extreme or outliers) of the dependent variable distribution are driving the significance of these variables.

The large change in the value of the extension variable warrants further analysis. A possible explanation is of course that extreme values are driving the correlation and when these are dropped the significance vanishes. But it is not clear on which end, are

⁹⁴ 7 variables were statistically different between the restricted and unrestricted models. Three of them (Rank_suv1, MOP_cash, and MOP_mix) were statistically significant in both models; two (Ch_HHI and MBHC_SUV) were insignificant in both. Only two, Extension and corrl_neg_dum_all_neg, saw their significance level change, from significant to insignificant.

they extreme values on the low or high end of the purchase price premium? To investigate the model was run two additional times, once excluding only the bottom end of the tail and the second excluding the top end. (In contrast, the restricted model excludes all observations where the dependent variable is one standard deviation below/above the mean).

When restricting on the high-end (that is, excluding observations that are one standard deviation above the mean), the extension variable is insignificant (p-value .29), but with the low-end restricted model the extension remains significant (or nearly so, p-value .1082) and is not statistically different from the coefficient in the unrestricted version. A handful of high premium acquisitions then are driving, and highly correlated with the deposit extension variable. Perhaps this makes some sense, that banks are willing to pay a significant premium for major expansions into new markets but are less inclined to pay much, if any premium for only a modest expansion.

For example, one could imagine a roughly equal regional overlap between two combining banks so that they each have at least some presence in many nearby states. In such a situation the banks have regionally a similar footprint even if they have a slightly different presence in specific states. The value to 'extending' into a market (or state) through the purchase of similarly situated bank is therefore of little or no value. The acquiring bank may not value the modest extension because they may be able to expand on their own fairly easily. They are probably already known to the public within the region, even if they are not as large in these other areas as the target. As a result internal growth is a realistic option and the benefit of the target's greater presence is of relatively

less value. Therefore, it may be likely that other factors other than deposit extension drive purchases that have only a marginal overlap.

But consider in contrast an acquisition that involves a major extension for the acquiring bank into a truly new market. A major combination between two large, well established banks that are in different markets, one serving only New England and the other the southern Atlantic for example. Such an acquisition would involve a major expansion into a new market and would have a large value on the deposit extension variable. Such growth for the acquiring bank allows a short cut on the otherwise difficult and costly process of launching and developing internally into a new market.

Aside from direct costs, entry into a new market might spark an aggressive competitive response from existing banks in the region. Desiring to avoid a market share battle the outside bank might chose instead to buy its way into the market thinking that this might be viewed more closely to the status-quo. The important point here is not that the existing market is uncompetitive, it is that the new entrant would 'gain' market share by acquisition and therefore existing banks do not lose any market share. Growth through new entry and expansion however, must come at the expense of existing banks in the region. The established banks may consider it worthwhile to try and protect their market share through steep discounting. The intent may not be to force out the new entrant, it could be simply to force the new entrant to gain market share from other banks in the area. This could of course spark a market wide price war to protect share, all of which would be very costly for the new entrant. To see such a phenomenon in practice, one need only look at the response of Airlines to new entrants on prized routes. Entry from

discount carriers seeking to gain share often sparks a fierce price war, and in at least one instance American Airlines has been accused of predatory pricing in an effort to force out new rivals.

The high-end values of the Extension variable offer some evidence that large banks pay high prices in an effort to undertake a major expansion into a new market. Looking at the distribution of the extension variable shows the extent that the variable itself is skewed with a few major expansions and then a sharp drop-off.

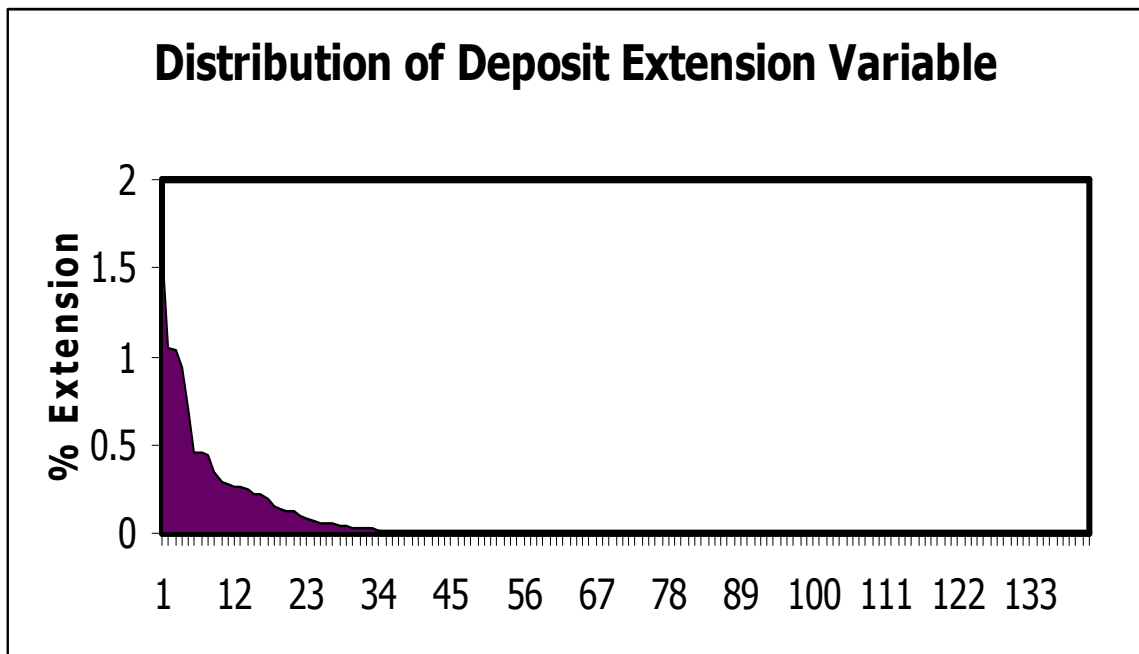


Figure 6 Deposit Extension Variable

The average for the top-20 is 47%, versus 7% for the entire range. Clearly a handful of banks involve major expansions into new markets while many do not.

Another point to consider in this regards the method used to calculate the variable. Recall that it is the total deposits for the acquirer in states where the target is larger than the acquirer, divided by the acquiring bank's total deposits. This means that values of 25%, 50%, and higher show that the target is on par in size (in terms of deposits) with the acquiring bank. In some instances it might be that the target is even larger. So for these high ranges it is the case that the combination involves firms of roughly equivalent size.

This can be seen by further looking into the purchase price for the 20 largest extension variable combinations. For these acquisitions, the average purchase price is just under \$6 billion, with several in the \$10-25 billion range. Compare this to an average purchase price of about \$1.2 billion for the 142 combinations as a whole. Additionally, 8 of the 10 largest acquisitions in the dataset correspond to the 20 highest extension variable values. Clearly then we can see that large banks will sometimes purchase other large banks in an effort to enter a new market. We also have some basic evidence that points to their willingness to pay a significant premium for just such a purchase. This may be, as discussed above, due to the willingness to pay an extra premium to avoid costly startup in new markets or to avoid an expensive price war. Another possibility may be that these out of state/region acquisitions may see sizeable competition as the acquirer market may be more national in scope than a strictly regional acquisition. Regardless of the exact reason, undetermined in this study, the results are broadly consistent with prior research and opinion that one major force in recent merger and megamerger activity is the desire to enter into new markets.

6. Summary

Perhaps reassuringly the overall results of the model are consistent with an efficient banking market. This may not be a surprise to some as the banking industry can be described as fiercely competitive, with thousands of sophisticated participants controlling billions of dollars in assets. Both easy entry and the removal of many restrictions on expansion and merger activity have likely all combined to create a market environment where inefficiencies or incompetent management are rapidly driven out.

The results on the empire building and bandwagon variables show that profitable banks are more aggressive in the bidding market and that acquiring banks do not get caught up in merger waves and overpay. The change in rate of return, deposit extension, correlation in earnings, and change in HHI results provide support that banks seek to expand into new markets, diversify their risk, and seek out targets with a history of intelligent growth. And finally, the insignificant results on the post-HHI and change in state deposits suggests that the recent removal of branching and merger restrictions has resulted in a more competitive marketplace where banks can not hope to take advantage of market power.

Despite these favorable results it was also found that TBTF status may create market distortions because managers and owners of smaller banks may seek to divest risk by selling at a lower price in order to get protected by the TBTF umbrella. The original supposition, that TBTF banks would pay more appears to be completely reversed. The theory as first laid out in this paper suggested that the largest banks would be able to pay more for targets than non-TBTF banks (since they could extend the TBTF benefits). But

this theory in turn depends upon a competitive TBTF market, that is that there would be sufficient competition between TBTF banks to drive up the price for targets. But this theory may in fact not be right.

Consider that there are only around 20 banks that likely would capture the coveted status (and that the market believes would have this status). This is a significantly smaller market than the roughly 10,000 independent banks that exist at any given time. But the geographic reach of even the largest banks is surprisingly regional. Consider Bank of America in 2005, at the time second only to Citibank in terms of size had virtually no presence in 19 of the lower 48 states,⁹⁵ and in 2002 they were absent from more than half.⁹⁶ Finally, large banks over the past several years have been aggressively expanding, again using Bank of America as an example, it has doubled its assets from roughly \$600 billion in 2000 to \$1.2 trillion in 2005.⁹⁷ Since they were rapidly growing and engaging in acquisitions they may not have bid on some potential targets because they were fully occupied with consuming an existing acquisition.

These three factors; a small number of TBTF banks, even TBTF banks surprisingly regional in scope, and preoccupation with consuming current mergers- may mean that the bidding market by TBTF banks is not fully competitive. As a result, targets that desire to sell into the TBTF umbrella may find that the number of potential bidders at

⁹⁵ Based on deposit market share, 2nd Quarter 2005 Bank of America Investor Factbook, http://library.corporate-ir.net/library/71/715/71595/items/174680/2005_Q2_fb.pdf

⁹⁶ 27 of the lower 48. 2nd Quarter 2002 Bank of American Investor Factbook, http://library.corporate-ir.net/library/71/715/71595/items/174673/2002_Q2_fb.pdf

⁹⁷ 2nd Quarter 2000 and 2005 Bank of America Investor Factbooks.

any given time is very small, and they may therefore be forced to accept a lower price than a fully competitive TBTF market would warrant.

The government TBTF status will then cause overexpansion in the current environment as the largest banks are able to expand at below market rates. It seems unlikely however, that this trend will continue as the current situation seems only transitory in nature. The current uncompetitive TBTF market is likely only a gap that exists between the government reforms (and action demonstrating) that TBTF only applied to the largest banks, and the largest banks ability to expand to a fully national scope. At the rate that the largest banks are expanding they will soon all be fully national in scope so that all of the TBTF banks will be potential bidders for target banks.

While this does not remove the inefficiencies from the TBTF guarantee, it likely means that the greater returns from lower price targets will diminish as the number of bidders increases. The lower returns should then results in less merger activity by these same banks as they need to look elsewhere to earn above market rates on their investments.

IV. CONCLUSION

This paper studies factors affecting merger premiums and tracks some of the historical developments in United States banking that resulted in heavy regulatory and government involvement in the banking sector. By the second half of the 20th century the banking market was heavily fragmented with tens of thousands of small banks but remarkably high levels of concentration in any local market. These banks lacked significant resource and geographic diversification that likely made them highly susceptible to local and macro shocks, potentially further exacerbating harm to the local economies they served. Unable to allow most banks to fail, US policy evolved to the point where by the 1980s nearly all liabilities in all US banks were protected from loss.

Landmark reform in the 1991 FDIC Improvement Act fundamentally changed banking policy in that it explicitly granted protection to large, so called TBTF banks, but removed this protective umbrella from all but the largest institutions. The policy shift of truly limiting complete coverage to only the largest banks may have the unintended consequence of creating an additional incentive for banks to merge in order to achieve the requisite size. In this paper I have studied the effects of the merger premium paid for a set of 142 bank acquisitions and have found, in general, that there was not an effort to capture TBTF status as a reason to merge. Further, and positively, it appears that in most instances the US banking market is now one best characterized by a high level of

competition and efficiencies. This is likely the result of reforms in the final decade of the 20th century that significantly liberated banks from heavy government restrictions regarding interstate acquisitions and allowable product offerings. As a result it appears that US banking policy is headed in a positive direction of greater flexibility, efficiency, and greater asset and geographic diversification making the banking sector more resilient against economic shocks and less dependant on government guarantees.

APPENDIX

Summary of Results from Prior Work								
	Variable	Rhoades (1987)	Cheng, Gup, Wall (1989)	Benston, Hunter, Wall (1995)	Fraser + Kolari (1987)	Esty et al (1999)	Beatty, Santomero, +Smirlock (1987)	Palia (1993)
	R2	0.0 - .39	.401-.468	0.81	0.224	32.9	0.121	0.363
	# obs (Years studied)	1,835 (1973-83)	135 (1981-86)	302 (1981-86)	132 (1985)	133 (1980-94)	264 (1984-85)	137 (1984-87)
Target								
Growth	Growth of Earnings	+	-					
	Growth of Assets	+	mixed					+
	Core deposit growth		+					
	Earning Asset Growth		mixed					
	Equity Growth		-					
Earnings	Return on Equity		+				+	
	Rate of Return on assets	+	-		+	+		+
	Demand deposits/Time deposits				+			
	Net Interest income/total assets				+			
	Variance of return on assets			-				
	Covariance ROA trgt and seller			-				
Balance Sheet								
	Capital/Assets	-					-	-
	Ratio of BV to total assets			+				
	Total equity/total assets				-	-		
	Market Value/Book Value			-				
	1/total assets					+		
	Treasury stock/total assets						-	
	Non-performing loans as % of total assets					-		-
Loan Portfolio								
	Provision for loan losses/net loans						+	+
	Commercial loans/total assets				-			
	Total loans/total assets				+		-	
	Retail Loans/Total Loans		-					
	Chargeoffs/Total Loans		+				-	+
Other								
	If in SMSA	+						
	Non-interest exp/total avg assets					+		
	Manager Holdings							+
	Manager Holdings^2							-
	Market Share	-					-	

Acquirer								
Assets	+							
Rate of Return on assets	+	mixed						
Growth of deposits	+							
Core deposit growth		mixed						
Income growth		-						
Growth of assets		-						
Earning asset growth		mixed						
Equity Growth		+						
Branch Bank	-							
MBHC or subsidiary of MBHC	+							
History of acquisitions						+		
Return on equity		-						
Chargeoffs/Total Loans		+						
Market Value/Earnings		+						
Market Value/Book Value		+	+					
Retail Loans/Total Loans		-						
Target/Acquirer total assets		-				-		-
Variance of return on assets			-					
Manager Holdings								-
Manager Holdings^2								+
General								
Industry Concentration	- (3 Firm)						+ (HHI)	+ (4 Firm)
Mrkt growth in deposits	+							
Mrkt size in deposits	+							
Horizontal or extension	+							
Regional (location) variables	mixed		only 1 significant					
Per Capita Income over 30k					+			
population growth					+			
Current 10 year treasury yield						-		
Trend (current minus 12 mth avg)						+		
Yield spread (10 year minus 1 year yield)						-		
Type of acquisition (cash=1)						+	-	
Intrastate acquisition						+		+
Unit banking state - target							+	+
State law for multibank HC							-	+
State allows statewide electronic banking							-	
Combination cash stock							-	

Standard Results

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
C	2.608	0.5280	4.941	0
CH_RR_DUM_NON	0.631	0.3443	1.832	0.0694
INCOME_NON/ASSETS_NON	-24.133	19.4735	-1.239	0.2177
DEM DP_DIV_ASST_NON	1.467	0.9705	1.512	0.1332
CHSTDEP_NON	-0.015	0.7486	-0.020	0.9839
EXTENSION	0.691	0.3577	1.931	0.0559
CHASST3_DUM_NON	0.306	0.1700	1.798	0.0747
EMPIREBLDG	63.646	22.9024	2.779	0.0063
TBTF_EXT	-0.508	0.2745	-1.852	0.0666
RANK_SUV1	-0.002	0.0005	-3.688	0.0003
CH_HHI	0.002	0.0019	1.288	0.2003
POST_HHI	0.000	0.0002	-0.056	0.9558
ACQ_TRG_ADJ_RATIO	0.000	0.0000	-1.298	0.1966
CORRL_POS_DUM	-0.141	0.1733	-0.812	0.4184
CORRL_NEG_DUM_ALL_NEG	0.988	0.4148	2.382	0.0188
MOP_CASH	-1.191	0.2595	-4.589	0.0000
MOP_MIX	-0.717	0.2383	-3.007	0.0032
RETAIL_LNS_RATIO_NON	0.498	0.4944	1.008	0.3157
CHRG OFF_RATIO_NON	-39.143	32.7170	-1.196	0.2339
BANDWAGON	0.019	0.0294	0.643	0.5213
MBHC_SUV	-0.233	0.1683	-1.387	0.1681
MBHC_NON	-0.560	0.2511	-2.230	0.0276
R-squared	0.3935	Mean dependent var		2.8006
Adjusted R-squared	0.2873	S.D. dependent var		1.0130
S.E. of regression	0.8551	Akaike info criterion		2.6664
Sum squared resid	87.7516	Schwarz criterion		3.1244
Log likelihood	-167.3157	F-statistic		3.7071
Durbin-Watson stat	1.4497	Prob(F-statistic)		0.0000

Inclusion of 1998 Variable

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
C	2.579	0.5177	4.982	0
CH_RR_DUM_NON	0.509	0.3413	1.491	0.1387
INCOME_NON/ASSETS_NON	-24.222	19.0917	-1.269	0.207
DEMDP_DIV_ASST_NON	1.347	0.9528	1.414	0.16
CHSTDEP_NON	0.315	0.7465	0.422	0.6736
EXTENSION	0.704	0.3507	2.008	0.0469
CHASST3_DUM_NON	0.359	0.1681	2.134	0.0349
EMPIREBLDG	56.339	22.6557	2.487	0.0143
TBTF_EXT	-0.455	0.2700	-1.685	0.0946
RANK_SUV1	-0.002	0.0005	-3.801	0.0002
CH_HHI	0.002	0.0019	0.946	0.346
POST_HHI	0.000	0.0002	0.291	0.7715
ACQ_TRG_ADJ_RATIO	0.000	0.0000	-1.448	0.1503
CORRL_POS_DUM	-0.125	0.1701	-0.734	0.4644
CORRL_NEG_DUM_ALL_NEG	0.890	0.4086	2.179	0.0313
MOP_CASH	-1.078	0.2587	-4.166	0.0001
MOP_MIX	-0.716	0.2336	-3.063	0.0027
RETAIL_LNS_RATIO_NON	0.471	0.4848	0.972	0.333
CHRGOFF_RATIO_NON	-36.114	32.1000	-1.125	0.2628
BANDWAGON	0.000	0.0299	0.000	0.9999
MBHC_SUV	-0.274	0.1658	-1.650	0.1015
MBHC_NON	-0.571	0.2462	-2.318	0.0221
YEAR_98	0.436	0.1803	2.418	0.0171
R-squared	0.4219	Mean dependent var		2.8006
Adjusted R-squared	0.3150	S.D. dependent var		1.0130
S.E. of regression	0.8384	Akaike info criterion		2.6325
Sum squared resid	83.6416	Schwarz criterion		3.1113
Log likelihood	-163.9099	F-statistic		3.9473
Durbin-Watson stat	1.3686	Prob(F-statistic)		0.0000

Restricted Model One Standard Deviation Above/Below Mean

Included observations: 104

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
C	2.568	0.4350	5.903	0
CH_RR_DUM_NON	0.373	0.3260	1.143	0.2562
INCOME_NON/ASSETS_NON	-7.196	13.6774	-0.526	0.6002
DEM DP_DIV_ASST_NON	0.687	0.6447	1.066	0.2897
CHSTDEP_NON	-0.170	0.4350	-0.392	0.6963
EXTENSION	0.086	0.3264	0.262	0.7937
CHASST3_DUM_NON	0.229	0.1172	1.957	0.0538
EMPIREBLDG	36.715	17.5827	2.088	0.0399
TBTF_EXT	-0.517	0.1733	-2.986	0.0037
RANK_SUV1	-0.001	0.0003	-2.454	<i>0.0163</i>
CH_HHI	-0.002	0.0021	-0.960	<i>0.3399</i>
POST_HHI	0.000	0.0001	-0.318	0.7513
ACQ_TRG_ADJ_RATIO	0.000	0.0000	-0.565	0.5733
CORRL_POS_DUM	-0.157	0.1183	-1.331	0.1869
CORRL_NEG_DUM_ALL_NEG	0.363	0.3233	1.121	0.2653
MOP_CASH	-0.427	0.2122	-2.011	<i>0.0476</i>
MOP_MIX	-0.247	0.1500	-1.648	<i>0.1032</i>
RETAIL_LNS_RATIO_NON	0.016	0.3399	0.046	0.9633
CHRG OFF_RATIO_NON	-8.725	21.1062	-0.413	0.6804
BANDWAGON	0.048	0.0253	1.900	0.0609
MBHC_SUV	0.039	0.1097	0.356	<i>0.7231</i>
MBHC_NON	-0.525	0.1809	-2.901	0.0048
R-squared	0.3687	Mean dependent var		2.7290
Adjusted R-squared	0.2070	S.D. dependent var		0.5345
S.E. of regression	0.4760	Akaike info criterion		1.5387
Sum squared resid	18.5803	Schwarz criterion		2.0981
Log likelihood	-58.0106	F-statistic		2.2804
Durbin-Watson stat	1.6095	Prob(F-statistic)		0.0044

Bold indicates coefficient statistically different from standard model and change in significance. *Italics* indicate coefficient statistically different from standard model.

Restricted Model One Standard Deviation Above Mean

Included observations: 124

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
C	2.121	0.4017	5.280	0
CH_RR_DUM_NON	0.694	0.2600	2.671	0.0088
INCOME_NON/ASSETS_NON	-16.129	15.1302	-1.066	0.2889
DEMDP_DIV_ASST_NON	0.734	0.7223	1.016	0.312
CHSTDEP_NON	0.336	0.5269	0.637	0.5257
EXTENSION	0.426	0.3987	1.069	0.2875
CHASST3_DUM_NON	0.378	0.1345	2.808	0.006
EMPIREBLDG	41.792	18.7331	2.231	0.0279
TBTF_EXT	-0.431	0.2091	-2.064	0.0416
RANK_SUV1	-0.001	0.0004	-3.539	0.0006
CH_HHI	-0.001	0.0025	-0.549	0.5844
POST_HHI	0.000	0.0002	-0.049	0.9607
ACQ_TRG_ADJ_RATIO	0.000	0.0000	-0.521	0.6037
CORRL_POS_DUM	-0.051	0.1292	-0.398	0.6913
CORRL_NEG_DUM_ALL_NEG	0.438	0.3120	1.403	0.1637
MOP_CASH	-0.774	0.1874	-4.131	0.0001
MOP_MIX	-0.377	0.1732	-2.177	0.0318
RETAIL_LNS_RATIO_NON	0.279	0.3907	0.714	0.477
CHRGOFF_RATIO_NON	-3.553	24.4503	-0.145	0.8847
BANDWAGON	0.017	0.0295	0.584	0.5603
MBHC_SUV	-0.114	0.1258	-0.904	0.3682
MBHC_NON	-0.728	0.2124	-3.427	0.0009
R-squared	0.3974	Mean dependent var		2.5198
Adjusted R-squared	0.2734	S.D. dependent var		0.6976
S.E. of regression	0.5946	Akaike info criterion		1.9577
Sum squared resid	36.0637	Schwarz criterion		2.4581
Log likelihood	-99.3787	F-statistic		3.2035
Durbin-Watson stat	1.5620	Prob(F-statistic)		0.0000

Restricted Model One Standard Deviation Below Mean

Included observations: 122

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
C	3.002	0.6537	4.593	0
CH_RR_DUM_NON	0.364	0.4945	0.736	0.4633
INCOME_NON/ASSETS_NON	-12.103	20.2634	-0.597	0.5517
DEMDP_DIV_ASST_NON	1.283	1.0166	1.262	0.2097
CHSTDEP_NON	-0.544	0.7238	-0.752	0.4537
EXTENSION	0.551	0.3401	1.621	0.1082
CHASST3_DUM_NON	0.189	0.1706	1.108	0.2706
EMPIREBLDG	64.370	23.6283	2.724	0.0076
TBTF_EXT	-0.575	0.2640	-2.179	0.0317
RANK_SUV1	-0.001	0.0005	-2.690	0.0084
CH_HHI	0.002	0.0018	1.259	0.2111
POST_HHI	0.000	0.0002	-0.214	0.8309
ACQ_TRG_ADJ_RATIO	0.000	0.0000	-1.384	0.1696
CORRL_POS_DUM	-0.209	0.1822	-1.146	0.2546
CORRL_NEG_DUM_ALL_NEG	1.019	0.5131	1.986	0.0498
MOP_CASH	-0.933	0.3465	-2.693	0.0083
MOP_MIX	-0.636	0.2432	-2.613	0.0104
RETAIL_LNS_RATIO_NON	0.368	0.4928	0.748	0.4565
CHRGOFF_RATIO_NON	-49.862	33.0487	-1.509	0.1345
BANDWAGON	0.033	0.0285	1.158	0.2495
MBHC_SUV	-0.128	0.1712	-0.745	0.4579
MBHC_NON	-0.476	0.2469	-1.929	0.0565
R-squared	0.3416	Mean dependent var		3.0250
Adjusted R-squared	0.2033	S.D. dependent var		0.9039
S.E. of regression	0.8069	Akaike info criterion		2.5705
Sum squared resid	65.1012	Schwarz criterion		3.0761
Log likelihood	-134.7978	F-statistic		2.4701
Durbin-Watson stat	1.6332	Prob(F-statistic)		0.0015

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