Do Bank Mergers Create Shareholder Value?

An Event Study Analysis

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I. Introduction

Since the 1980s, the U.S. banking industry has experienced a large increase in the level of mergers and acquisitions. Between 1980 and 1998, approximately 8,000 bank mergers occurred, involving about \$2.4 trillion in acquired assets that can be attributed to deregulation in the1980s and the removal of legal restrictions on intrastate and interstate banking (Rhoades, 2000). One basis for these mergers is the assumption that such consolidations lead to improvements in efficiency and profits amassed through increased market power, economies of scale, reduced earnings volatility, diversification, and other financial and operational synergies. While proponents of bank mergers argue that these gains are substantial, Coase (1937) tells us that tradeoffs exist between economies of scale (size) and ability to manage. In addition to the significant increase in mergers we have witnessed the collapse of countless financial institutions in the past 3 years due to bad lending practices. While the Coase theory applies to firms in general, how well does it apply to financial institutions? Additionally, has the increased size of financial institutions contributed to the financial crisis of 2008?

This paper investigates the economic role of bank mergers in creating shareholder value based on the idea that shareholder wealth will increase if the consolidation leads to the aforementioned gains. This paper is divided into seven sections. The second section of my paper provides an academic review of the literature, focusing on econometric theory that tests the gains in shareholder value and corporate synergies after a merger. The third section introduces a conceptual model I have designed using econometric tools to test how bank mergers create shareholder value. The fourth section embarks on a discussion about my ideal data followed by the fifth section about my actual data. The sixth section is an analysis of my actual regression results. It was found that the average bank merger has either no effect/ X effect on total firm value. The reasons for these results are also enumerated and critiqued in this section. The study of bank mergers remains an area of interesting econometric research because of the performance implications of such mergers and thus, the concluding seventh section will suggest possible areas for future research.

II. Literature Review

II.I. Basic Economic Theory- Rationale for Bank Mergers

A merger is the combination of two or more companies, generally by offering the stockholders of one company securities in the acquiring company in exchange for the surrender of their stock. The reasoning behind any corporate merger is that two companies together are more valuable than if they were separate because they increase shareholder value over and above that of the two separate firms. In "The Nature of the Firm," Coase (1937) explains that firms exist because they reduce the transaction costs that emerge during production and exchange, capturing efficiencies that individuals cannot. Oftentimes, companies will merge or acquire new companies to create a more competitive, cost-efficient company. Thus the primary reasons behind bank merger activity pertain to (1) creating economies of scale, (2) expanding geographically, (3) increasing the combined capital base size and product offerings, and (4) gaining market power (Frohlick and Kavan, 2000).

Pilloff suggests that cost reductions can occur by eliminating redundant labor, closing overlapping bank branches and consolidating back office functions like check clearing. Mergers with operational overlap can result in cost savings of up to 30% of the target's non-interest

expenses. Revenue augmentation can come from cross selling banking services, an increased number of clients, and new markets. The notion of such synergies implies that a merger benefits shareholders when the company's post merger share price increases by the value of the potential synergy (Pilloff, 1996).

II.II. Previous Empirical Research

The empirical literature on bank mergers examines the effects of mergers utilizing three basic measures of performance. The first set of studies examines cost efficiency of mergers, the second examines the effect of mergers on net income/profits, while the third looks at the reaction of the stock market to the announced merger.

Numerous studies examine the changes in cost efficiency (cost ratios) using accounting data. Berger and Humphrey (1992) used panel data that included 57 mergers occurring between 1981 and 1989.Using multiple regressions, they concluded that cost and profit efficiency, on average, does not improve following the merger and while some mergers improve efficiency, others do not. They also analyzed return on asset ratios and total costs to asset ratios and concluded that there were no average gains to the merged company. Using data on 348 bank mergers between 1987 and 1988, De Young used univariate t-tests and multiple regressions and found that while mergers increased cost efficiency when both the acquirer and the target company were underperforming, in general, efficiency gains did not result from the merger. However, it is important to critique the techniques employed in the aforementioned studies. The drawback of cost ratios is that it does not control for input prices and output mix. Secondly, the revenue effects of mergers have not yet been tested and as total output probably changes after a merger, merely analyzing cost ratios gives an incomplete picture of efficiency. Cost efficiency analysis, which takes outputs as given, cannot evaluate whether any revenue changes from shifts in output offset the cost changes except in the special case in which outputs remain constant.

Corporate finance measures such as non-interest expense ratios were analyzed by Srinivasan (1992) and Srinivasan and Wall (1992) who examined 240 mergers between 1982 and 1986. They also employed an industry-wide sample of non-merging firms to control for industry trends in the univariate tests. Additionally, they used multiple regression analysis with a time variable dummy to conclude that mergers do not reduce noninterest expenses relative to non-merging firms. As these studies do not incorporate total costs, their results cannot be entirely relied upon when discussing cost efficiency.

An example of a research that examines the effect of a merger on net income is in Rhoades (1993). Using data on mergers from 1981 to 1986, Rhodes regressed the change in performance measures on control variables and a dummy variable that differentiated mergers that were in a related line of business from those that were not. Using logit analysis, where the dependent variable measured whether efficiency of a bank increased, decreased or remained unchanged, he found that cost reductions and efficiency were not significantly related to horizontal mergers.

Linder and Crane (1992) used a case study method to analyze operating income performance of one bank merger in 1991 by comparing performance data one year before the merger to performance data two years after the merger. Their results indicated that although operating income did not improve after the merger, the acquiring bank was more efficient than the acquired after the time of the merger.

An example of the third line of research is in Houston and Ryngaert (1994) who examined stock market returns of 131 complete and 22 incomplete bank mergers between 1985 and 1991. They measured cumulative abnormal returns at the time of the merger from T days before the merger announcement was made till the announcement date (day 0). Additionally, they measured the consolidated sum of acquirer and target abnormal returns above that of a value weighted index of bank stocks over the event period. Expected daily returns were estimated for each bank from a standard market model:

ARit = Rit - (ai + bi Rmt)

Their results showed that merger announcements did not lead to overall gains in stockholder wealth as the net gains for each event window were not significantly different from 0. Value created was highest when acquirers were strong pre-merger performers and when there was substantial overlap in services. Madura and Waint (1994) studied abnormal returns of acquirers over the time following a merger. Using a sample of 152 bank mergers between the years 1983 and 1987, they used the event study methodology and found that average cumulative abnormal returns to the acquirers were negative in nearly every month. On the other hand however, Zhang (1995) found that amongst a sample of 107 mergers between 1980 and 1990, mergers led to overall value. He found that diversification also added value to the mergers.

The same methodology was applied by De and Duplichan (1987) to examine inter-state mergers between 1982 and 1985. They calculated the abnormal and cumulative abnormal returns relative to the market of both the acquiring and acquired firms for up to 30 days before and after the announcement date. Using weekly return data for 52 weeks before the announcement, they used residual analysis and found that neither acquiring nor acquired banks had significant abnormal returns during the 30 days before and after the merger announcement.

Cornett and Tehranian (1992), in their study of 30 acquiring and acquired banks, incorporated both the approaches of analyzing accounting data and examining value weighted abnormal stock returns around the time of the merger announcement. They measured the consolidated sum of acquirer and target abnormal returns above that of a value weighted index of bank stocks over the event period. As a proxy for the industry, they included all banks with stock traded on the NYSE or AMEX and found that the market raised the combined value of the merger partners after a merger deal was announced. They also found that changes in several performance indicators like cash flow returns on the market value of assets were positively correlated with the abnormal returns. These findings suggest that the market was accurate in forecasting the benefits of the mergers.

Pilloff (1996) also combined both approaches and studied a sample of 48 bank mergers that occurred between 1982 and 1991. His results improved upon that of Cornett and Tehranian by basing his results on profitability, efficiency and balance sheet measures. Additionally, the performance of merged banks is compared to a benchmark that controls for geographic variation.

Pilloff's results support previous literature as it was found that mergers were not associated with any significant change in performance and that the mean overall change in shareholder value was quite small. There was also immense variation amongst the banks; while some mergers proceeded successfully, others resulted in failure. An important finding was that merger related changes in performance were found to be unrelated to changes in market value at the time of the announcement. While investors recognized that some mergers would lead to shareholder value and other would not, the market is unable to distinguish between the two types of deals at the time of the announcement.

In sum, most of the literature fails to find a positive correlation between merger announcement and shareholder wealth and improvements in performance. However a study conducted by Zhang (1995) does find a positive relationship. Pilloff explains that the contrary finding may be the result of sampling bias that occurs because critical firms that are large acquirers/ have executed multiple mergers (such as Bank One) are removed from the data set. It is possible that such firms have achieved substantial gains that are then not reflected in the results. Additionally, every merger varies by deal size, company size, share prices, company performance and other such statistics, rendering the results of a cross sectional analysis unsubstantial. Pilloff further argues that "averages obscure the fact that many good mergers occur, which add efficiency gains, and that can be explained on a case by case basis. Yet from a technical point of view, the efficiency gains are both feasible and estimable."

III. Conceptual Model

To analyze the impact of a bank merger on shareholder wealth, I will utilize the event study methodology that has been used in previous empirical studies (Pilloff (1996), Dodd and Warner,

1983 and Kang, 2000). The market event study methodology is based on the assumption that the return of a security is linearly correlated to the return of the market portfolio. This model will analyze the stock return of the acquiring bank relative to a portfolio of stocks. The differences in returns of the acquiring firm relative to the market return will be calculated over a period of time before and after the event of the merger announcement using dummy variables. Thus I will attempt to verify whether the announcement of the merger causes the return of the acquiring firm's stock to perform differently in comparison to the general return of the market. For a given security, the abnormal return in each of the trading days around the time of the announcement is defined as the residual.

I will use a general market model:

$$R_{it} = a_i + b_i R_{mt} + e_{it}$$

With E (e_{it}) = 0 and Var (e_{it}) = $\sigma^2 e$

Where

 R_{it} = actual returns to bank stock i at time t

 a_i = Ordinary Least Squares estimate of the intercept of the market model from a regression over Lj days surrounding the Tj days for which abnormal returns are computed.

 b_i = Ordinary Least Squares estimate of the market model slope coefficient reflecting change in the market return relative to the stock return for bank i

 R_{mt} = actual returns to a market portfolio of value-weighted bank stocks at time t

$$E_{it}$$
 = residual

The resulting estimates of the coefficients a_i and b_i are then substituted into the following model to calculate the abnormal return for a given time period around the merger announcement date:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt})$$

Where

AR_{it} = abnormal returns to bank stock i at time t, and *Rit, ai, bi, Rmt* are as defined previously.

These calculations specify whether the stock return of the acquiring bank is greater than the return to the market portfolio of bank stocks. For each observation, I will estimate the coefficients *ai* and *bi* over the days -150 to -21 (as done by Pilloff (1996)) in relation to the merger announcement date (time t = 0). I will then calculate abnormal returns over the interval t = -15 through t = +15 relative to the announcement date. As done by Dodd and Warner (1983), I will standardize the abnormal returns, cumulate them over the event period and then generate a test statistic. The test statistic Z, is the mean standardized residual multiplied by the square root of the number of securities as shown below.

The aggregate cumulative abnormal return of a security i within the event window (T1, T2) can be calculated as:

CAR
$$(T_1, T_2) = \sum AR_{it}$$

The average cumulative abnormal return (CAAR), the overall abnormal return of N securities within the event window (T_1,T_2) is calculated by the following:

CAAR
$$(T_1, T_2) = 1/N \sum AR_{it}$$

The expected value of CAAR is zero in the absence of an event and thus our hypotheses are:

Null hypothesis: CAR(T1,T2) = 0Alternative Hypothesis: CAR(T1,T2) is not = 0 Test conducted at 5% significance level Test statistics for CAAR, as determined by Dodd and Warner (1983) is

$$Z = \frac{CAR (T1,T2)}{(VAR (CAR (T1, T2)))^{\frac{1}{2}}} \sim N (0,1)$$

Where *VAR* (*CAR* (*T1*, *T2*)) = $\underline{1} \sum \sigma^2 i$ (*T1*,*T2*) and $\sigma^2 i$ (*T1*,*T2*) = (*T2*-*T1*+1) $\sigma^2 e$

Each CAR is assumed to be distributed unit normal in the absence of abnormal performance. Under this assumption, Z is also unit normal.

IV. Ideal Data

In order to test the hypothesis that the cumulative abnormal return for all acquiring bank's stocks is 0, I would ideally require daily stock returns of all target and acquiring banks within the time period I am examining. The problem with this data is that the stock prices of banks that have merged or that have been acquired by other banks are not readily available. Thus I had to incorporate a sample of banks whose stock prices around one year of their merger announcement are still available. I would also incorporate stock returns of non-acquiring banks to compare them to those of acquiring banks. Additionally, the ideal model would include daily returns of a value-weighted bank stock index as incorporated by Pilloff (1996) and De and Duplichan (1987) in order to determine the abnormal returns of the acquirer's stock over and above that of the value-weighted index of bank stocks.

However, this begs the question of whether stock price returns are the ideal measure for the value of a merger. During a certain time period, does the stock market accurately reflect the

value of a merger or acquisition? Is it able to accurately reflect changes such as top employees leaving? In other words, are stock market returns the ideal proxy for valuing a merger?

In order to take into account macroeconomic changes, I would incorporate historical daily returns of the S&P500 which is a capitalization weighted index of 500 large cap stocks actively traded in the United States. Assuming that markets are semi-strong efficient and incorporate all publicly known information, any changes in the macro economy will be incorporated in the closing values of the S&P500. The dummy variables would incorporate the individual merger announcement dates for every acquiring bank in my data set so as to determine the various event window dates for each of the acquiring banks. However, determining event windows that accurately reflect shareholder wealth depends on how soon researchers think information leaks out, a question that is still to be debated.

V. Actual Data

The actual time series data that I have used does not meet all the specifications of my ideal data. My data incorporates daily historical acquiring-bank stock prices of 20 acquiring banks. To be included in the sample, acquiring bank stock prices must be publicly reported for at least 1 year around the announcement date of the merger.

I do not have access to the value-weighted bank stock index available from the CRSP that has been utilized by Dodd and Warner (1983), Kang (2006) and Pilloff (1996). Thus I will weight the abnormal returns of each of my bank stocks in terms of their market capitalization with respect to the entire banking sector. Market cap data was obtained from www.finance.yahoo.com. The merger/ acquisition announcement dates were obtained from the *Wall Street Journal* and the *New York Times*. I obtained daily S&P500 values from year 2000 till 2008 from finance.yahoo.com.

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I examine 3 event windows of stock returns: (-15,15) as examined by Kang (2006), (1,30) and (120-130) in order to determine how long the effects of the merger last.

Table 1: Summary Statistics of Data Sample

Acquirer	Target	Announcement Date	Mean Returns	Standard Deviation of	Maximum Return	Minimum Return	No. of Observations
Chase Manhattan Corp. Wells Fargo & Co. Citigroup Inc.	J.P. Morgan & Co. Inc	13-Sep-00	0.13%	2.15%	7.22%	-8.92%	253
	First Security Corp.	17-Apr-00	-0.02%	1.78%	5.17%	-6.05%	253
	Golden State Corp.	21-May-02	-0.06%	3.98%	12.64%	-15.73%	253
M&T Bank	Allfirst Bank	26-Sep-02	0.01%	1.89%	8.15%	-7.36%	253
Bank of America J.P. Morgan Chase and Co. Bank of America	Fleetboston Financial Corp.	3-Nov-03	-0.14%	3.29%	2.44%	-49.93%	253
	Bank One	26-Jan-04	0.00%	0.95%	2.55%	-2.62%	253
	MBNA Corporation	1-Sep-05	-0.01%	0.98%	3.83%	-3.70%	253
PNC Bank	Riggs Bank	16-Jul-04	0.10%	1.27%	3.86%	-4.18%	253
Capital One Financial Corp. Capital One Financial Corp. Bank of America Regions Financial Corp. Bank of New York Bank of America TD Banknorth J.P. Morgan Chase and Co. Bank of America J.P. Morgan Chase and Co. Wells Fargo & Co	Hibernia National Bank	1-May-05	0.07%	1.35%	9.28%	-7.59%	253
	Northfork Bank	13-Mar-04	-0.06%	1.03%	2.76%	-6.89%	253
	LaSalle Bank	23-Apr-04	-0.02%	1.51%	5.68%	-9.83%	253
	Union Planters Corp.	29-May-06	0.00%	1.01%	5.18%	-3.54%	253
	Mellon Financial Corp.	4-Dec-06	0.14%	1.37%	12.04%	-3.83%	253
	U.S Trust	20-Nov-06	0.17%	1.12%	13.60%	-3.64%	253
	Commerce Bancorp	2-Oct-07	0.03%	1.69%	5.98%	-5.58%	253
	Bear Stearns	16-Mar-08	0.00%	3.32%	15.87%	-9.47%	253
	Merrill Lynch	15-Sep-08	-0.43%	-8.47%	30.98%	-20.89%	253
	Washington Mutual	16-Mar-08	0.01%	6.53%	25.09%	-20.73%	253
	Wachovia	1-Oct-08	-0.18%	6.57%	32.77%	-23.80%	253
PNC Financial Services	National City Corp.	23-Oct-08	0.03%	6.98%	37.09%	-41.30%	253

VI. Results

The effects of the merger announcements on the acquiring banks' stock returns are shown in Table 2. Note that the 5% significance level has been used for my observations.

Table 2: Cumulative Abnormal Returns of 20 Acquiring Banks Over 3 Event Windows

Acquirer	Target	Announcement Date	CAR (-15,15)	CAR (1,30)	CAR (120,130)
Chase Manhattan Corp.	J.P. Morgan & Co. Inc	13-Sep-00	0.87	0.23**	0.46**
Wells Fargo & Co.	First Security Corp.	17-Apr-00	0.34**	0.54	0.92
Citigroup Inc.	Golden State Corp.	21-May-02	0.54	0.13**	1.23
M&T Bank	Allfirst Bank	26-Sep-02	0.27**	0.42**	0.97
Bank of America	Fleetboston Financial Corp.	3-Nov-03	1.45	2.24	1.78
J.P. Morgan Chase and Co.	Bank One	26-Jan-04	1.85	1.54	1.12
Bank of America	MBNA Corporation	1-Sep-05	0.34**	0.54	0.21**
PNC Bank	Riggs Bank	16-Jul-04	0.94	0.65	0.21**
Capital One Financial Corp.	Hibernia National Bank	1-May-05	0.43**	0.78	0.43**
Capital One Financial Corp.	Northfork Bank	13-Mar-04	0.97	0.22**	0.28**
Bank of America	LaSalle Bank	23-Apr-04	2.54	1.54	0.63
Regions Financial Corp.	Union Planters Corp.	29-May-06	0.58	1.12	1.1
Bank of New York	Mellon Financial Corp.	4-Dec-06	1.65	0.81	1.43
Bank of America	U.S Trust	20-Nov-06	0.45**	0.67	1.45
TD Banknorth	Commerce Bancorp	2-Oct-07	0.65	0.7	0.76
J.P. Morgan Chase and Co.	Bear Stearns	16-Mar-08	1.21	1.05	1.24
Bank of America	Merrill Lynch	15-Sep-08	0.12**	0.65	1.78
J.P. Morgan Chase and Co.	Washington Mutual	16-Mar-08	0.95	1.34	1.14
Wells Fargo & Co.	Wachovia	1-Oct-08	0.43**	0.45**	0.57
PNC Financial Services	National City Corp.	23-Oct-08	0.62	0.35**	0.73
Test Statistic			1.39	1.49	1.89

** CAR significant at the 5% level







In my sample of 20 banks, the CAR has a positive trend for my entire sample of 20 banks. Significant positive returns appear for Chase Manhattan's merger with J.P. Morgan and Co. over the two longer-term event windows, suggesting that their merger created shareholder value in the long term. Additionally, Capital One Financial Corp's acquisition of Northfork Bank However, as the long term even window analyzes stock prices for four months after the merger, one cannot necessarily conclude that this shareholder value persisted beyond that period (unless it is tested).

With an average of 5 significant bank mergers per event period and the highest significant CAR of 0.45, it may be concluded that overall, bank mergers do not create significant shareholder value. In the longer run, there are fewer statistically significant Cumulative Abnormal Returns (5) than the short run event windows (7). In the third event window, Bank of America's acquisition of MBNA Corporation, PNC Bank acquisition of Riggs, and Capital One's acquisition of both

Hibernia and Northfork Bank are significantly positive, thus implying that the CAR is different from 0.

In the short run however, significant cumulative abnormal returns were seen by the mergers of Wells Fargo with First security Corp, M&T Bank with AllFirst Bank, Capital One with Hibernia Bank, Bank of America's acquisition of Merrill Lynch and Wells Fargo's acquisition of Wachovia. It is interesting that within the 30 day event period examined (-15,15), whilst the acquisitions of Wachovia and Merrill Lynch's increased shareholder value of the acquiring company, those of Bear Stearns and Washington Mutual, (the two banks that required some form of financial rescue) did not increase shareholder value.

It is possible that buying pressure created by purchases of target stock by acquirers prior to the public announcement of the acquisition plays a role in creating abnormal returns. Additionally, information leakage by insiders can also affect abnormal returns. Econometricians in this field have speculated about insider information leakage and offered that if information about a few mergers leaked, this could cause the CAR for the entire sample to be positive prior to the official merger announcement.

Overall, the returns to acquirers do not seem to be significantly different from zero, although the CAR for every bank is positive. This implies that acquisition/ merger announcements seem to have little effect on acquiring shareholder returns. These results are consistent with previous empirical analyses of bank mergers that have yielded either positive but insignificant abnormal returns or slightly negative abnormal returns.

VII. Conclusion

This paper examines the hypothesis that bank mergers lead to shareholder. The event study methodology yields positive cumulative abnormal stock price returns but a large proportion of the returns are insignificant, and thus I fail to reject the null hypothesis that cumulative abnormal returns are equivalent to zero. On average, shareholders of the acquiring bank fail to benefit from the merger.

The findings of this paper are in line with those of previous literature (Pilloff, 1996, 1994) but it is important to note some of the limitations of this paper. Whilst stock price returns reflect market changes and macroeconomic changes, the extent to which they accurately reflect the efficiencies associated with bank mergers is questionable; the prices do not accurately reflect employee efficiency or dissatisfied customers. They may not reflect top management leaving the company after a merger.

Secondly, with banks engaged in discussions prior to announcement and investor speculation regarding potential merger targets, the event window time period becomes difficult to determine. One of the questions raised is to what extent do the merger effects last? There is a limit to the extent that a merger can be held accountable for a firm's performance over a period of time.

Whilst the proxies for measuring the value created by a merger may be insufficient, it is difficult to imagine that the results reported by numerous academicians using these proxies are insignificant. It seems then, that expectations of gains before the merger are exceed the actual performance gains after the merger. (Pilloff, 1996). Rhoades (1994) offers an interesting closing

remark. While economists focus on efficiency aspects of mergers as measured by accounting ratios or stock price returns, bankers focus on dollar volume or the percentage of costs that will be cut. If dollar volumes are cut following a merger, but assets decline proportionally, both the banker and the economist would be right in their claims.

Lastly, correlation studies between accounting and stock market based performance measures have shown that the market is not accurately able to predict the ultimate success of mergers.

Future research should focus on what is going on in the process of bank consolidation. Whilst individual bank mergers have indicated potential for value creation, why is this not shown in the aggregate form? Research should also aim to look for proxies that will better take into account fundamental analysis and the effects of industry consolidation.

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