EFFICIENCY, VALUE ADDITION AND PERFORMANCE OF US BANK MERGERS

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Abstract

There is little consensus regarding the overall performance of mergers and acquisitions in the banking industry. The goal of this paper is to investigate the change in operating performance, efficiency, and value addition of US bank mergers and acquisitions after GLBA. We extend the previous research by combining all the previous methodologies used in mergers and acquisitions studies and add a new methodology, namely Expected EVA improvement. We will test whether these performance metrics yield similar results or if the performance of mergers varies depending on the measurements. We will also examine the factors that have significant impact on changes in bank performance. Our empirical results lead to the conclusion that the industry-adjusted operating performance of merged banks increases significantly after a merger. This finding is consistent with the findings of Cornett et al. (2006).We also find that the acquirer expected EVA improvement increases significantly after a merger. Revenue enhancement opportunity appears to be more profitable if there exists more opportunity for cost cutting such as geographically focused and diversified mergers. Product diversification mergers increase the industry adjusted performance more than product focused mergers. The efficiency or profitability of targets have either a positive or no effect on acquirer performance.

Keywords: Merger and Acquisitions, Diversification, EVA, DEA, Performance, US Banks
JEL Classification: G21, G28, G30, G34

1. INTRODUCTION

Bank mergers and acquisitions (M&A) have been a trend in the US since the mid-1980s. This bank consolidation process was accelerated with the passing of the Riegle-Neal Interstate Banking and Branch Efficiency Act (1994) and the Gramm-Leach-Bliley Act of 1999 (GLBA), or Financial Service Modernization Act. These acts removed the restrictions on interstate banking and the barriers between depository institutions and securities and insurance firms. The GLBA presented US banks the opportunity to shift away from lending activities toward broader financial services and opened the way for full financial integration, or universal banking. According to most practitioners and academics, the process of banking integration is far from complete; this trend is expected to continue and become more comprehensive[9]. Berger et al. (1999) argue that M&A are banks' strategic answer to a regulatory environment. This consolidation is largely motivated by the fact that the acquirer can improve performance through economies of scale and scope, revenue enhancement, cost reduction, cost and profit efficiency, increased market power, and reduced earnings volatility. Although the number and size of mergers within the banking industry have steadily increased, there is little consensus regarding the impact of consolidation on industry performance. These mixed findings reflect the different methodologies used in previous studies, but the high incidence of contradictory findings results from the differences in the time period being studied. Much of the extant literature examines M&A data at early stages in the industry consolidation process, mainly from the mid-1980s through the mid-1990s, and consequently may have been observing disequilibrium or pre-equilibrium phenomena (DeYoung, Evanoff, & Molyneux, 2009). This raises the question of whether all bank M&A have a significant impact on bank performance or whether it is possible to differentiate the types of M&A that lead to significant gains from those that do not add value. The goal of this paper is to investigate the change in operating performance, efficiency, and value addition of bank M&A after the GLBA. Following prior research, we will examine the operating performance and efficiency of bank mergers. Then we will add a new measure, the Expected Economics Value added (EVA) Improvement, which will interest both academic researchers and practitioners. We will test whether these performance metrics have similar results or the performance of mergers varies depending on the measurements. We will also examine the factors that significantly affect the change in the banks' performance. As there is little consensus regarding the overall performance of M&A, we will also extend our analysis to address the impact of activity- and geographically focused mergers versus activity- and geographically diversified mergers.

[9] Source: Mishkin (1998) observes that regulatory and technological changes will allow banks to expand, and in twenty years, the number of banks will be less than half the current number.

In this paper, we will take a very simple route and define activity-focused mergers as when the two-digit standard industrial classification codes (SIC) of the target and the acquirer are the same. If both the target and the acquirer are from the same state, we will call this type of merger a geographically focused merger. There appears to be a significantly different set of goals between a focused and a diversified merger. While cost savings are anticipated from focused mergers, revenue growth is usually the goal of diversified mergers. For example, in the year 2000, when Chase Manhattan Bank, a bank, acquired JP Morgan, a non-bank financial firm, the CEOs of both companies claimed the merger was driven more by *revenue growth potential* than by cost reduction (Cornett, McNutt, & Tehranian, 2006). This merger added diversification to Chase's business in the form of equity underwriting, equity derivatives, and asset management—areas Chase had been trying to build by itself. Less than four years later, JP Morgan Chase acquired Bank ONE for almost twice the deal value of its earlier acquisition and claimed the combined entity was anticipating an annual cost savings of $2.2 billion[10].

The financial gain from M&A can come from improving either market power or operating performance and efficiency. We will directly test the merger-induced operating performance and efficiency by comparing pre- and post-merger levels of financial ratios and non-parametric efficiency measures, namely input-oriented efficiency and output-oriented efficiency. To test if mergers create value for shareholders, we will compare pre- and post-merger expected EVA improvement. In addition, while it is not simple to determine if mergers attract two firms with similar activities, we can easily differentiate between banks whose last two-digit SIC codes are different. For example, the SIC code is 6000 for depository institutions, 6100 for non-depository credit unions, and 6200 for securities and commodities brokers. Due to financial deregulation, the US banking industry is steadily shifting away from traditional sources of revenue, that is, loan making, toward non-traditional activities that generate fee income, service charges, trading revenue, and other types of noninterest income. Some of the reasons that commercial banks acquire non-banks are regulatory changes, capital adequacy requirements, an increase in cost efficiency, revenue growth, and managers' personal incentives.

Finally, we will test the relationship between the change in bank-performance and merger-related factors, along with other firm-level control variables that are found to be significant in affecting performance. Our merger data was collected after the GLBA was passed; hence, our entire merger sample will have a similar regulatory effect. We will consider a merger if the target size measured by total assets is greater than $100 million. Most of the literature on the US bank merger study sample periods falls between two regulatory regimes. For example, examining the sample period of mergers from 1996 to 2004 will provide biased results due to the differences in merger motivation before and after the GLBA. Our paper will overcome this issue. To our knowledge, no other study has explored the value addition of bank mergers by the expected EVA improvement methodology. This will be the main contribution of this research.

The rest of the paper is organized as follows. Section Two summarizes the literature review and highlights the main findings in this area. Section Three describes our data and methodology. Section Four analyzes our results, and Section Five concludes the paper.

2. LITERATURE REVIEW ON MERGERS AND ACQUISITIONS

Extensive research has been done on consolidations in the banking industry. Overall, these studies provide mixed evidence, and many fail to show a clear relationship between M&A and performance. In this section, we review the portion of the literature most relevant to our work. Interestingly, some empirical evidence suggests that M&A operations in the US banking industry have not improved performance (DeLong & DeYoung, 2007; Amel et al., 2004; Berger, Demsetz, & Strahan, 1997). Beccalli and Frantz (2009) investigated the effects of M&A on the performance of banks and explored the sources of merger-induced changes in performance. They used a sample of 714 deals involving European Union (EU) acquirers and targets throughout the world from 1991 to 2005. Their results showed that M&A slightly deteriorate performance measured by return on equity, cash flow return, and profit efficiency, while improving performance measured by cost efficiency. They attributed these changes in performance directly to M&As' operations and argued that the changes would not have occurred in the absence of M&A. Hagendorff and Keasey (2009) found some evidence for a cost-cutting and revenue-enhancing strategy that entails an increase in both on- and off-balance sheet activities for US mergers during the three years after a merger of European banks. They also discovered that a European merger resulted in an increase of small performance gains for the acquirer during the post-merger period, while a US merger did not result in any performance changes. Considering the impact of M&A on cost X-efficiency (Vander Vennet, 1996, 2002; Altunbas, Molyneux, & Thornton, 1997); the impact on profitability ratios such as ROE and ROA (Vander Vennet, 1996; Altunbas and Ibáñez, 2004); and the impact on profit X-efficiency (Huizinga et al., 2001; Vander Vennet, 2002), a handful of literature on M&As in the EU banking industry also seems to conclude that M&A seldom improve performances. By using a hybrid translog cost function, Altunbas, Molyneux, and Thornton (1997) found limited opportunities for cost savings from big-bank mergers. An increase in total costs appeared more likely. By using a sample of 492 M&A operations related to EU banks from 1988 to 1993, Vander Vennet (1996) showed that domestic mergers among equal-sized partners significantly increase the accounting profitability of the merged banks, while improvements in cost efficiency are observed only for cross-border acquisitions, not for domestic operations.

Another study by Cornett, McNutt, and Tehranian (2006) found a contrasting result showing that industry-adjusted operating performance of merged banks increases significantly after a merger. They used 134 samples of US bank mergers from 1990 to 2000 to examine the changes in overall industry-adjusted operating performance and long-

[10] Source: Harjoto, Yi, and Chotigeat, 2012.

run stock returns of commercial bank mergers. They also found that large bank mergers produce greater performance gains than small bank mergers, activity-focusing mergers produce greater performance gains than activity-diversifying mergers, and geographically focusing mergers produce greater performance gains than geographically diversifying mergers. The performance gains were even larger after the implementation of full nationwide banking in 1997 via the Riegle-Neal Act. The improved performance results from both revenue enhancement and cost reduction activities.

DeLong (2001) examined the wealth effect of bank mergers by distinguishing between types of mergers according to their focus or diversification along the dimensions of activity and geography rather than differentiating among various organization types. She found diversifying mergers to have a low correlation between the stock return of the bidder and the target at the time of the merger announcements. Her results showed that bank mergers that focus both on geography and activity are value-increasing, whereas diversifying mergers do not create value. Cornett et al. (2006) used the same methodology to test the post-merger performance of diversifying mergers. They found that large bank mergers produce greater performance gains than small bank mergers, activity-focusing mergers produce greater performance gains than activity-diversifying mergers, and geographically focusing mergers produce greater performance gains than geographically diversifying mergers. They also showed that the improved performance comes from revenue enhancement and cost reduction activities. Revenue enhancement opportunities appear to be most profitable in those mergers that offer the greatest opportunity for cost-cutting activities, such as activity-focusing and geographically focusing mergers. Johnston and Madura (2000) examined market valuation at the announcement of the Citicorp-Travelers Insurance Group merger on April 6, 1998, and found favorable share price responses for commercial banks, insurance companies, and brokerage firms. Their evidence supports the argument that mergers between banks and non-bank financial services will facilitate cross-selling and efficiencies. However, their review of market reactions was based on the announcement of only one event, the Citicorp and Travelers Insurance Group merger.

Another way banks can achieve potential economies of scale is through geographical diversification, because once the basic infrastructure is in place, organizations can expand the system elsewhere at a potentially reduced cost. Benefits of geographical diversification include better access to capital markets in other regions or countries, which potentially leads to reduced cost of capital (Deng and Elyasiani, 2008), greater market power (Iskandar-Datta and McLaughlin, 2005), and reduced tax liabilities because geographically diversified banks can transfer resources from high-tax to low-tax areas. Gleason et al. (2006) examined market reaction to mergers between banks and non-banks and joint ventures from 1980 to 1998. They discovered that, in both cases, the market responds favorably and product market expansion provides value-enhancing opportunities to US banks.

Harjoto, Yi, and Chotigeat (2010) demonstrated that, when a bank merges with a non-bank, subsequent annualized stock returns are diminished by 2%, but the same choices do not significantly produce abnormal returns during the two days before and two days after the announcement dates. This finding was consistent with those of previous studies (DeLong, 2001; 2003), which found that focusing mergers among banks are more value enhancing to shareholders than diversifying mergers.

Altunbaş and Marqués (2008) showed improvements in performance after a merger particularly in cross-border M&A's; broad similarities between merging partners are also conducive to improved performance. Berger (2000) and Hughes et al. (1999) argue that most of the efficiency gains from mergers are on the revenue side, arising through asset diversification. Value creation from market-related considerations has also been reported in US markets. Kane (2000) found that mergers are likely to generate value when the target bank is a large deposit institution and when both firms are headquartered in the same US state.

Some explanations for this puzzling evidence are the following:

- The absence of best-practices guidelines for planning and executing increasingly large and complex acquisitions (DeLong & DeYoung, 2007),
- Failure to consider the mean-reversion behavior in industry-adjusted performance (Knapp et al., 2006),
- The longer time (up to five years) needed to realize efficiency gains, leading to more favorable prices for consumers (Focarelli & Panetta, 2003),
- The difficulties of integrating broadly dissimilar institutions (Marques-Ibanez & Altunbas, 2004; Vander Vennet, 2002),
- Increased costs associated with changes in post-merger risk profiles, and
- Business strategies (Demsetz & Strahan, 1997; Hughes et al., 1999).

Nevertheless, all the above studies refer to the overall change in performance by comparison in a dynamic analysis (according to the definition by Berger, 1998 and 1999) of the post-M&A performance with the pre-M&A performance. However, some of this difference could be due to a continuation of firm-specific performance before the merger or economy-wide and industry factors, as stated by Healy et al. (1992).

3. DATA AND METHODOLOGY

3.1. Sample Description

The data set was obtained by combining three sources: Thomson ONE Banker M&A for data on M&A operations, Bankscope for balance sheet and income statement of the banks involved in M&A operations (M&A sample), and the CRSP/Compustat database for market-level data. Our sample comprises M&A deals announced between 1/1/1999 and 31/12/2009 in which the acquirer is a US public Bank Holding Company (BHC) and the target is a bank operating in the US. The initial M&A sample refers to 1,264 mergers. To be included in our sample, the M&A must fulfill the following criteria:

1. The merger should not involve any federal government assistance.
2. The target banks must have at least $100 million dollars in asset book value at the time of the merger announcement. That reduces our sample from 1,264 to 555 mergers.

3. The acquirer and target bank can be involved in no other merger in the year before and after the merger in questions, which leaves 311 mergers.
4. We match the acquirer and target from the Bankscope database; 134 mergers remain.
5. We eliminate those merger samples for which we had missing values either for acquirer or target. Finally, we were left with 79 mergers in our sample.

3.2. Performance Measure

One of the measures we use to evaluate the M&A performance is the operating profitability of an average asset. Healy et al. (1992), Cornett et al. (2006), and Hagendorff and Keasey (2009) used similar metrics as pre-tax operating cash flows divided by the book value of each asset. Conversely, accounting measures relying on return on asset (ROA) and return on equity (ROE) will include general interest expenses, which are influenced by both the method of accounting (pooling vs. purchasing)[11] and takeover finance (cash vs. equity)[4]. Those measures will allow limited inferences about the changes in economic performance[4]. Hence, we use the EVA method which overcomes the limitations of using operating profitability to estimate performance.

Although accounting ratios are useful performance indicators, they have been criticized for not accurately reflecting real changes of the firm in the long run, especially when they are subject to manipulation (DeYoung, 1997; Bauer et al., 1998; Berger et al., 1999; and Kohers et al., 2000). The rapid evaluation of both parametric and non-parametric efficiency methodologies have made the traditional techniques obsolete in the study of bank performance. Despite the intense research effort, there is no consensus on which method is the best. Regardless of the method used to estimate efficiency scores, it should be consistent in its efficiency levels and ranking. The method should be able to identify the best and worst firms and be consistent over time and with competitive market conditions. Following Al-Sharkas, Hassan, & Lawrence (2008), we choose to use the non-parametric Data Envelopment Analysis (DEA) methodology to estimate input- and output-oriented efficiency.

3.2.1. Accounting Measure

We use operating profitability over average asset to measure accounting performance. The benefit of using this measure is that it excludes the effect of interest on debt used as capital financing by the bank. To measure pre-merger pro forma performance, we combine the operating performance of target and acquirer. Following Cornett et al. (2006), the performance of the combined banks is the weighted average of values for the target and acquirer, where the weights are the relative sizes of the two firms at the end of the year before the merger. Following the same method, we also obtain the industry-adjusted operating performance for both the target and the acquirer. Then we compute the difference between the year-end operating profitability of the acquirer one year after the merger and the operating profitability of the pre-merger pro forma year-end operating performance one year before the merger.

3.2.2. Economic Value Added

Sirower and O'Byrne (1998) developed the Economic Value Added equation (EVA) methodology for forecasting and evaluating post-acquisition *operating* performance both for corporate practitioners and researchers. From a performance evaluation perspective, when an acquirer takes over a target, the past essentially becomes irrelevant. Performance should be forward looking. Even a firm with a stellar past can lose market value if it fails to meet market expectations. Hence, the main challenge would be to develop a post-acquisition benchmark to determine what level of performance the market was expecting before the transaction was announced (Sirower and O'Byrne, 1998). The main idea behind their methodology was to separate the known components of market value from the expectational components. They broke the total market value of the firm into its known and expected components as follows:

$$MV_0 = Cap_0 + \frac{EVA_0}{c} + \left[\frac{(1+c)}{c}\right] * \sum_{t=1}^{\infty} \frac{\Delta EVA_t}{(1+c)^t} \qquad (1)$$

where, MV_0 is the market value of the firm (sum of the market value of the equity, book value of preferred stock, minority interest, and interest-bearing debt) at the end of Period 0, Cap_0 is the book capital (total assets minus total non-interest-bearing current liabilities) at the end of Year 0, EVA_0 is the EVA for Year 0, c is the weighted average cost of capital, and ΔEVA_t is the expected EVA improvement in Year t. The sum of the first two terms is referred as current value of operation and the third term, which is the capitalized present value of the expected annual EVA improvements, is called future growth value (FGV). To measure the future growth value (FGV) that is the capitalized present value of the expected annual EVA improvements in Equation 1, we will rewrite that as:

$$FGV_t = MV_0 - Cap_0 - \frac{EVA_0}{c} \qquad (2)$$

The EVA_0 is derived as follows:

$$EVA_0 = NOPAT_0 - c * CAP_{t-1} \qquad (3)$$

where, $NOPAT_0$ is the net operating profit after tax at the end of Year 0 and CAP_{t-1} is the book capital at the beginning of Year 0. The cost of capital is derived as:

$$c = w_d * k_d(1-T) + (w_e * k_e) \qquad (4)$$

where, w_d is the weight of debt, w_e is the weight of equity, k_d is the cost of debt before tax, T is the tax rate, and k_e is the cost of equity derived from the Capital Asset Pricing Model (CAPM).

$$CAPM: k_e = r_f + (r_m - r_f) * \beta_i \qquad (5)$$

where, r_f is the risk-free interest rate, r_m is the market return, and β_i is the beta of the firm.

Investors expect a cost of capital return on the total market value of the firm, which is the sum of the cost of capital return on current value of operation and the cost of capital return on future growth value (FGV). However, the EVA will only provide a cost of

[11] Source: Healy, Palepu, & Ruback (1992).
[4] Source: Cornett et al. (2006)

capital return on current operation value; the EVA improvement is required to earn a cost of capital return on the FGV. The cost of capital return on FGV or the expected EVA improvement must satisfy the following equation:

$$\Delta EVA_1 + \frac{\Delta EVA_1}{c} + \Delta FGV_1 = c * FGV_0 \quad (6)$$

where, EVA_1 is actual *EVA* improvement, $\frac{\Delta EVA1}{c}$ is the capitalized actual *EVA* improvement, ΔFGV_1 is the change in *FGV,* and $c*FGV_0$ is the cost of capital return on *FGV*.

To provide a total value of $c*FGV_0$, the substantial ΔEVA is required to satisfy the following:

$$\Delta EVA_1 * \frac{(1+c)}{c} = c * FGV_0 \quad (7)$$

or,

$$\Delta EVA_1 = \left[\frac{(c*c)}{(1+c)} * FGV_0\right] \quad (8)$$

where, $\frac{(c*c)}{(1+c)} * FGV_0$ is the actual expected EVA improvement. The actual improvement is compared to the expected EVA improvement to get the excess EVA improvement for post-merger periods. Positive excess EVA improvement indicates that the return is above what was expected in the operating performance of the firm after the merger and acquisition, whereas negative excess EVA improvement indicates the return is below what was expected.

3.2.3. Efficiency Measurement

We use the non-parametric Data Envelopment Analysis (DEA) method to compute the efficiency of merged banks. DEA has become very popular in measuring efficiency and is based on the pioneering work of Farrell (1957), proposing the frontier function to measure efficiency. DEA is a non-parametric linear programming technique used to compare the input and output data of decision-making units (DMUs) to measure and evaluate the relative performance of DMUs. Charnes et al. (1978) extended Farrell's model to a multiple input-output pattern and employed mathematical programming to develop an efficient frontier and to estimate the efficiency score (the CCR model). But the CCR model is limited to constant returns to scale (CRS) and the convexity of the production possibility set. However, the CRS assumption is only appropriate when all DMUs are operating at an optimal scale. When all DMUs are not operating at optimal scale, the use of the CRS specification results in measures of technical efficiency being confounded by scale efficiencies. Banker et al. (1984) suggested an extension of the CRS CCR model to account for variable returns to scale (VRS) situations. In this paper, we will employ VRS technology to compute the two types of efficiency, namely input-oriented efficiency and output-oriented efficiency. The input-oriented technical efficiency measure addresses the question "How much can input quantities be proportionally reduced without changing output quantities?" Alternatively, the output-oriented technical efficiency measure addresses the question "How much can output quantities be proportionally expanded without altering input quantities?"

The main reasons to choose the DEA method over the parametric stochastic frontier are that, unlike stochastic models that require a large sample size and proper functional form of the frontier to make reliable estimations, the DEA demands relatively less data and does not require knowledge of the proper functional form of the frontier, error, and inefficiency structures (Evanoff & Israilevich, 1991; Grifell-Tatje & Lovell, 1997; Bauer et al., 1998; Wheelock & Wilson, 1999). The DEA is based on the individual firm, so it is easy to analyze efficiency by firm, which is particularly convenient for studying scope economies. The DEA technique measures the performance of each bank in the industry relative to best practice-efficient frontiers consisting of the dominant banks in the industry. Efficiency scores vary between 0 and 1, with fully efficient banks having efficiencies equal to 1 and inefficient firms having efficiencies between 0 and 1. Technical efficiency for a given firm is defined as the ratio of the input usage of a fully efficient firm producing the same output vector as the input usage of the firm under consideration. Technical efficiency can be achieved if the firm operates on the production frontier. We use the following input and output variables to compute efficiency.

Input vectors:

(1) Labor: Measured by staff costs (the number of full-time employees on the payroll);

(2) Fixed capital: Measured by costs of premises and fixed assets; and

(3) Customer and short-term funding: Measured by the sum of deposit (demand and time) and non-deposit funds as of the end of the respective year.

Output vectors:

(1) Total loan: Both short-term and long-term loans;

(2) Other earning assets: Loans to special sectors (directed and specialized loans), inter-bank funds sold, and investment securities (treasury and other securities); and

(3) Off-balance sheet items: Guarantees and warranties (letters of guarantee, bank acceptances, letters of credit, guaranteed pre-financings, endorsements, and others), commitments, foreign exchange and interest rate transactions, as well as other off-balance sheet activities.

3.3. Regression Analysis

To analyze the effect of a merger on performance, we will empirically test the following model:

Δ performance = β_0 * Constant
+ β_1 * Year
+ β_2 * Relative size
+ β_3 * Transaction value
+ β_4 * Same state (dummy)
+ β_5 * Same SIC (dummy)
+β_6* Post-merger performance acquirer loan loss reserve over grossloan
+ β_7 * Post-merger acquirer net interest margin
+ β_8 * Post-merger acquirer cost-to-income ratio
+ β_9 * Target performance

- *Relative size:* Relative size is measured as the ratio of target to acquirer assets. For domestic mergers, a positive relation with relative size and change in performance will indicate that relatively

larger targets may offer more opportunities to realize post-merger cost efficiencies. But post-merger performance will be weaker in a "merger of equals" because of internal power struggles and conflict in the integration process.

- *Transaction value:* Transaction value is the amount the acquirer paid to acquire the target. If the acquirer assumes the target is more valuable and would like to pay a higher price for it, we would expect a change in performance to be positively related to the transaction value. Conversely, post-merger performance may be weaker because of the increased complexity of the higher values of the merger and acquisition (Akhavein et al, 1997). Here, we use the natural logarithm of transaction value.
- *Same State:* This is a dummy variable to capture the effect of geographic diversification. If both the acquirer and target are from the same state, we assign a value of 1; otherwise, we designate the variable as 0. Banks considering entering a market via acquisition would select the best target banks. Hence, increasing market shares might increase their profitability. However, Berger and DeYoung (2001) found that the greatly increased geographic footprint of US bank holding companies due to industry consolidation can cause managerial difficulties that will reduce efficiency.
- *Same SIC:* This dummy variable captures the effect of product diversification. If a depository institution/non-depository merges with another depository institution/non-depository, it would likely to increase its interest income, which we call product diversification. However, if a depository institution merges with another non-depository institution, we call it product diversification as its income will come from both interest and non-interest income.
- *Acquirer post-merger strategy:* The post-merger performance of the acquirer will mostly depend on the strategy taken by the acquirer. To control for other non-merger-related factors, we use loan loss reserve/gross loan to measure the credit risk of the acquirer, which would be negatively related to performance. We also use the net interest margin (NIM) as an indicator of acquirer lending efficiency and cost-to-income ratio (CI) as an indicator of operating expenses. We expect NIM would be positively related and CI would be negatively related to performance.
- *Target performance:* Finally, to capture the impact of target performance on acquirer performance, we include return of average asset (ROAA) of target and efficiency of target as a control variable. Acquiring more profitable and more efficient targets may lead to increased operating profit. However, acquiring more efficient targets may increase or decrease the efficiency of the acquirer.

4. RESULTS AND MAIN FINDINGS

The descriptive statistics in Table 1 indicate that, in terms of size as measured by total assets, the acquirer banks on average are five and a half times larger than the targets. Operating profits of the acquirer banks on average are 5.36 times, and net income on average is 5.16 times, higher than the target banks. Post-merger acquirer size measured by total assets is on average 1.36 times higher than pre-merger. Also the total profitability on average increases by 1.14 times. The initial results of our descriptive statistics show that mergers increase the size and profitability of the acquirer.

Table 1. Descriptive Statistics of merger and acquisitions

The descriptive statistics of Table 1, Panel A refer to acquirer pre- and post-merger and target pre-merger total asset, total equity, accounting profitability, and expenses. Panel B shows the relative size of the target at the time of announcement and transaction value. Our sample period contains merger data from the years 1999 to 2009.

Descriptive Statistics	*N*	*Mean*	*Std.*	*Minimum*	*Maximum*
		(thousands)			
Target					
Total Assets	79	10635080	43456415	108345	326563000
Operating Profit	79	194716	732292	-5257	4390000
Equity	79	1021969	3818731	7855	23419000
Net Income	79	132412	520475	-5410	3535000
Net Interest Income	79	319801	1214825	2857	8149000
Non-Interest Expenses	79	368414	1458107	2574	9777000
Personnel Expenses	79	178843	704234	1224	4765000
Pre-merger Acquirer					
Total Assets	79	59186734	175065568	230215	1110457000
Operating Profit	79	1045195	3163862	-5405	21221000
Equity	79	4871808	14112894	22015	99645000
Net Income	79	681097	2119410	-2703	14143000
Net Interest Income	79	1630496	4592780	6936	28797000
Non-Interest Expenses	79	1696815	4781928	6982	27027000
Personnel Expenses	79	868525	2449545	3646	13473000
Post-merger Acquirer					
Total Assets	79	80924147	249135616	378690	1459737000
Operating Profit	79	1194229	4513879	-2687385	30681374
Equity	79	7596313	22699747	31134	135272000
Net Income	79	789769	3102187	-2113000	21133000
Net Interest Income	79	2047382	5837679	13046	34591000
Non-Interest Expenses	79	2279533	6682827	9862	35549000
Personnel Expenses	79	1137116	3419809	5844	18255000
Relative Size	79	0.33	0.43	0.003	3.244
Transaction Value	79	2489.87	9481.15	8.53	58663.15

Mean and median profitability and expense and asset quality ratios of the target and acquirer before and after merger are reported in Table 2. Profitability measured by return on average asset (ROAA), return on average equity (ROAE), and net interest margin (NIM) indicates that, before a merger, acquirers were on average more profitable than their target. The ROAA and ROAE of the acquirer were significantly higher than the industry average before a merger, while the ROAA and ROAE of the target were about the same as the industry average. The NIM of the target and acquirer before the merger were significantly lower than the industry average. However, the ROAA and ROAE of the acquirer after merger were lower than the pre-merger ROAA and ROAE. They were not significantly different from the industry average. Acquirers were more cost efficient than their targets measured by cost-to-income ratios. Acquirer non-interest expenses were a little higher than that of their targets. After a merger, acquirer cost-to-income ratios go up, and non-interest expense-to-average-asset goes down. We can also see that both the acquirer before- and after-merger and target expense ratios were below the industry average.

Table 2. Profitability, Expense, and Asset Quality Ratios

Table 2 shows various profitability expense and asset quality ratios of targets and acquirers from 1998 to 2009. Industry Mean Difference is computed as the difference between the performance of merging banks (target and acquirer) and the industry. Data are for the years 2000 to 2009. We use a non-parametric Pearson sign test to evaluate the significance of median. indicates significance at 10%, ** indicates significance at 5%, and ***indicates significance at 1%.*

Variables	*Median*	*Mean*	*Std.*	*Mean Ind. Difference*
Profitability Ratio				
Target Return on Average Assets (ROAA)	0.908	0.883	0.76	-0.03
Target Return on Average Equity (ROAE)	10.653	9.513	8.84	0.60
Target Net Interest Margin	3.612	3.689	0.83	-0.30***
Pre-merger Acquirer (ROAA)	1.153	1.121	0.46	0.21***
Pre-merger Acquirer (ROAE)	12.031	11.594	5.04	2.68***
Pre-merger Acquirer Net Interest Margin	3.716	3.737	0.76	-0.25***
Post-merger (ROAA)	1.014	0.822	0.88	-0.09
Post-merger (ROAE)	9.145	7.894	9.95	-1.02
Post-merger Acquirer Net Interest Margin	3.596	3.681	0.73	-0.31***
Expense Ratio				
Target Cost-to-Income Ratio	63.56	66.892	16.91	-0.35
Target Non-interest Exp./Avg. Asset	2.7	2.888	1.12	-0.38***
Target Non-interest Exp./Gross Rev.	63.56	66.888	16.91	-0.13
Pre-merger Acquirer Cost-to-Income Ratio	62.216	60.603	13.15	-6.64***
Pre-merger Acquirer Non-interest Exp./Avg. Asset	2.84	2.797	0.82	-0.47***
Pre-merger Acquirer Non-interest Exp./Gross Rev.	62.2	60.602	13.15	-6.42
Post-merger Acquirer Cost-to-Income Ratio	63.355	63.075	16.45	-4.16**
Post-merger Acquirer Non-interest Exp./Avg. Asset	2.77	2.767	0.94	-0.50**
Post-merger Acquirer Non-interest Exp./Gross Rev.	63.36	63.075	16.45	-3.95**
Asset Quality				
Target Net Loans/Total Assets	68.919	67.456	12.99	1.83
Target Loans/Customer Deposits	91.06	94.826	25.31	9.20***
Target Net Loans/Customer & ST Funding	86.111	86.319	21.71	6.55***
Target Loan Loss Reserve/Gross Loans	1.173	1.254	0.69	-0.16**
Pre-merger Acquirer Net Loans/Total Assets	67.966	66.404	11.17	0.77
Pre-merger Acquirer Loans/Customer Deposits	96.8	98.664	18.80	13.04***
Pre-merger Acquirer Net Loans/Customer & ST Funding	85.82	87.994	18.82	8.22***
Pre-merger Acquirer Loan Loss Reserve/Gross Loans	1.249	1.246	0.38	-0.17***
Post-merger Acquirer Net Loans/Total Assets	69.049	67.216	10.04	1.59
Post-merger Acquirer Loans/Customer Deposits	98.41	99.989	16.03	14.37***
Post-merger Acquirer Net Loans/Customer & ST Funding	88.632	88.335	14.18	8.56***
Post-merger Acquirer Loan Loss Reserve/Gross Loans	1.204	1.284	0.45	-0.13**

We report the differences between these various profitability, expense, and asset quality ratios in Table 3. On average, the after-merger ROAA and ROAE decrease more significantly than the combined banks' pre-merger ROAA and ROAE. However, we did not find any evidence that the expense ratio and asset quality of the acquirer bank changes more significantly after a merger than the pre-merger combined banks' expense ratios and asset quality. So far we found that, post-merger, the profitability of the acquirer as measured by ROAA and ROAE decreases more significantly than in a pre-merger combined firm. However, this measure could be manipulated.

Table 4 shows the correlation coefficients between various changes in performance metrics. Interestingly, changes in ROAA, ROAE, and unadjusted operating profit over total average assets are highly positively correlated and significant. When we look at the correlation between changes in industry-adjusted operating profitability, ROAA, and ROAE, they are significantly negatively correlated. We did not find any significant correlation between a change in efficiency and other performance change metrics.

Table 3. Acquirer Changes in Pre- and Post-merger Accounting Ratios

*Table 3 shows the average change in various accounting ratios for the acquirer before and after a merger. Data are for the years 2000 to 2009. * indicates significance at 10%, **indicates significance at 5%, and ***indicates significance at 1%.*

Variable	*Mean*	*Std.*
Change in ROAA	-0.2633***	.8135
Change in ROAE	-3.6053***	9.4621
Change in Net Interest Margin	-.0246	.4431
Change in Cost-to-Income Ratio	1.5808	13.8587
Change in Non-Interest Expense/Average Assets	-.0221	.5671
Change in Net Loans to Total Assets	.8994	5.8895
Change in Loans to Customer Deposits	1.7937	12.0151
Change in Net Loans to Customer/ST Funding	.9320	10.4721
Change in Non-Interest Expense/Gross Revenues	1.5818	13.8589

Table 4. Correlation Coefficient of Various Performance Metrics

*Table 4 shows the correlations between various performance metrics. Data are for the years 2000 to 2009. *indicates significance at 10%, **indicates significance at 5%, and ***indicates significant at 1%.*

	Δ in Eff. Input	*Δ in Eff. Output*	*Δin Ind. Adjusted Eff. Input*	*Δin Ind. Adjusted Eff. output*	*Δ in Unadj. ROAA*	*Δ in Unadj. ROAE*	*Δ in Unadj. in Op. Profit*	*Δ in Ind. Adjusted Op. Profit*
Δin Eff. Input	**1.000**							
Δ in Eff. Output	0.258**	**1.000**						
Δ in Ind. Adj. Eff. Input	0.960***	0.265**	**1.000**					
Δ in Ind. Adj. Eff. Output	0.148	0.968***	0.206*	**1.000**				
Δ in Unadj. ROAA	-0.043	-0.057	0.032	0.002	**1.000**			
Δ in Unadj. ROAE	-0.035	-0.056	0.036	0.003	0.98***	**1.000**		
Δ in Unadj. Op. Profit	-0.020	-0.071	0.057	-0.004	0.95***	0.9134***	**1.000**	
Δ in Ind. Adj. Op. Profit	0.036	0.053	-0.033	-0.004	-0.97***	-0.999***	-0.889***	**1.000**

The performance of the merged banks was computed one year before and one year after the merger. We examine the operating profitability, efficiency, and EVA of the target and acquirer before and after the merger as well as the weighted average of combined banks one year before the merger. The operating cash flow measure is deflated by the book value of the average asset to yield the normalized measure of performance. We also compare the performance based on product- and geographically focused mergers versus diversifying mergers. Changes in pre- and post-merger operating profitability and efficiency are examined on both an unadjusted and industry-adjusted basis. Industry-adjusted comparisons will allow us to examine the performance of merged banks regardless of industry-wide changes that might affect performance. The change in unadjusted performance may reflect some factors other than the bank merger.

Following Cornett et al. (2006), we identify industry banks as all banks that were not involved in a merger in the year before and after the merger in question. However, rather than forming four groups, we form eight groups.

- Group 1 has less than $100 million in assets; as our target filter size is $100 million, we never used this group.
- Group 2 asset size lies between $100 million and $300 million.
- Group 3 asset size is between $300 million and $600 million.
- Group 4 asset size is between $600 million and $1 billion.
- Group 5 asset size encompasses $1billion to $5billion.
- Group 6 asset size comprises $5 billion to $10 billion.
- Group 7 asset size is between $10 billion and $50 billion.
- Group 8 has assets of more than $50 billion.

If the merger bank asset size is $1.5 billion, then industry banks will include all the banks in the group. Matching the merged banks to their respective group will allow us to compare their characteristics with their most similar competitors.

To identify the sources of changes in performance, we also evaluate their other profitability, operating efficiency, and asset quality indicators. There is collinearity between some of the specific ratios, for example, return on asset and return on equity. Hence, change in performance results from common elements. We use t-statistics to test the change in performance by using the following formula:

$$t = \frac{\left(\sum_{t=1}^{n}\left(P_{post} - P_{pre}\right)\right)}{\left(\frac{\sigma}{\sqrt{N}}\right)} \quad (9)$$

where, P_{Post-} means the post-merger performance, and P_{Pre-}means the pro-forma, pre-merger performance of the combined banks. N is the number of merged banks, and σ is the standard deviation of the

distribution. Finally, we run a regression analysis to the find the impact of mergers on change in performance.

Panel A of Table 5 represents the unadjusted operating profitability of the target and acquirer before and after the merger as well as the combined banks' pre-merger profitability. On average, the unadjusted operating profitability of the acquirer was 1.63%, compared to the target's 1.245%. The post-merger operating profitability was 1.178%, compared to pre-merger combined banks' 1.147%. The difference between pre-and post-merger operating profitability is .03%; however, it is not significantly different from zero.

Table 5. Average Change in Pre-and Post-merger Operating Profit

*Table 5, Panel A shows the average change in pre- and post-merger acquirer unadjusted operating profit/average asset. Panel B shows the average change in pre- and post-merger acquirer industry adjusted operating profit/average asset. Mean industry adjusted difference is calculated as the difference between operating profit/average asset of merging banks and their corresponding peers average operating profit/average asset. Data are for the years 2000 to 2009. We use the non-parametric Pearson sign test to evaluate the significance of the median.*indicates significance at 10%, **indicates significance at 5%, and ***indicates significance at 1%.*

Panel A. Average Change in Pre-and Post-merger Acquirer Unadjusted Operating Profit/Average Asset

	Median	Mean	Std.
Target Op. Profit/Avg. Asset	1.2300	1.2453	1.0674
Acquirer Pre-merger Op. Profit/Avg. Asset	1.6600	1.6318	0.7043
Unadjusted Pre-merger Pro-forma Op. Profit/Avg. Asset	1.0504	1.1470	0.5952
Acquirer Post-merger Op. Profit/Avg. Asset	1.3500	1.1775	1.1989
Change in Op. Profit/Avg. Asset	0.3123**	0.03042	1.1516

Panel B. Average Change in Pre-and post-merger Acquirer Unadjusted Operating Profit/Average Asset

	Median	*Mean*	*Std.*
Target Industry Adjusted Op. Profit/Avg. Asset	-0.3200***	-0.3698***	0.9600
Pre-merger Acquirer Ind. Adjusted Op. Profit/Avg. Asset	-0.0800	-0.0581	0.6678
Pre-merger Proforma Ind. Adjusted Op. Profit/Avg. Asset	-0.6721	-0.5933***	0.5301
Post-merger Acquirer Ind. Adjusted Op. Profit/Avg. Asset	-0.0300***	-0.0887	0.9417
Change in Ind. Adjusted Operating profit	0.6442***	0.5046***	0.8610

To account for the contemporaneous effect, we also report the industry-adjusted operating performance in Table 5, Panel B. On average, the acquirer industry-adjusted performance is -0.058%, while the target industry-adjusted operating performance is -0.37%. Both the acquirer and target operating profitability were below their industry-matched performance, but the difference between their performance and the industry did not differ significantly from zero. Moreover, the pre-merger pro-forma performance was also lower than the post-merger performance. On average, a merger increased the industry-adjusted operating performance by 0.50%, an increment not significantly different from zero. So, like Cornett et al. (2006), merged banks perform similar to others in the industry before a merger. However, a merger did not increase the operating profitability of the merged banks.

Table 6 shows the efficiency scores of the merged banks. Panel A reports the unadjusted efficiency of the target, pre-and post-merger acquirer, and pro-forma combined banks. The median of target input-oriented efficiency was about 13% higher than the acquirer, while the mean of the target input efficiency was 12% higher than acquirer pre-merger efficiency scores. However, the median and mean of the target output efficiency were lower than the acquirer by about 1% and 4% respectively. Post-merger input efficiency of the acquirer significantly decreased by 8%; output efficiency significantly increased by 6.7%. The resulting median change in input-oriented efficiency is about -4.0% and is significant at the 1% level, while the median change in output-oriented efficiency is 0.7% and is insignificant.

Panel B, Table 6, shows the industry-adjusted input- and output-oriented efficiency scores. Both the target and acquirer median and mean input-oriented efficiency scores were significantly below the industry. While the median output-oriented efficiency scores of the target and acquirer were not different from their industry, mean output-oriented efficiency was significantly higher than the industry. Consistent with unadjusted efficiency scores, we find that, after a merger, the industry-adjusted mean input-oriented efficiency decreased significantly by 2.7%, which was lower than unadjusted input-oriented efficiency. The mean output-oriented efficiency increased significantly by about 9%, which is more than the unadjusted change in output-oriented efficiency. We can conclude that mergers on average increase efficiency if the efficiency of the acquirer is higher than the target, though many studies have concluded that potential efficiency gains from a merger and acquisition are seldom realized. Peristiani (1997), and Berger (1998) find little or no cost-efficiency improvement in mergers. Apparently, managerial inefficiencies of the acquiring banks or integrating systems have offset the potential gains from consolidation.

Table 6. Average Change in Acquirer Various Pre-and Post-merger Acquirer Efficiency Scores

*Table 6, Panel A shows the average change in pre- and post-merger acquirer unadjusted efficiency scores. Panel B shows the average change in pre- and post-merger acquirer industry-adjusted efficiency scores. Mean industry-adjusted difference is calculated as the difference between efficiency of merging banks and their corresponding peers' average efficiency scores. Data are for the years 2000 to 2009. We use a non-parametric Pearson sign test to test the significance of median.*indicates significance at 10%, ** indicates significance at 5%, and *** indicates significance at 1%.*

Panel A. Unadjusted Values of Efficiency

Variable Name	*Median Eff. Input*	*Mean Eff. Input*	*Median Eff. Output*	*Mean Eff. Output*
Target	0.2108	0.2906	0.0274	0.1435
Acquirer Pre-merger	0.0798	0.1743	0.0359	0.1800
Premerger Pro-forma	0.1044	0.1984	-0.0452	0.0861
Acquirer Post-merger	0.0551	0.1171	0.0297	0.1529
Change in Efficiency	-0.0452***	-0.0812***	-0.0072	0.067**

Panel B. Comparison of Industry-Adjusted Values of Efficiency

Variable Name	*Median Eff. Input*	*Mean Eff. Input*	*Median Eff. Output*	*Mean Eff. Output*
Target Ind. Adjusted	-0.1202**	-0.0338	-0.0159	0.0734***
Acquirer Pre-merger	-0.2353***	-0.1500***	-0.0110	0.1109***
Pre-merger Pro-forma	-0.2002***	-0.1259***	-0.0015	0.0159***
Acquirer Post-merger	-0.2518***	-0.1880	-0.0062	0.1092***
Change in Ind. Adjusted Efficiency	-0.0270***	-0.0620***	-0.0039	0.0933***

Now we examine the product and geographic focus merger versus the product and geographic diversification merger. Theoretically, for a focus merger, improved performance and market value of the combined firm come from economy of scale, while for a diversified merger such improvements come from enhancing the income-generating capacity of the combined institution and lowering the operating costs through operational synergies such as economies of scope. If a specialized bank is already minimizing its costs, it can also improve its performance by economies of scope- a diversified merger. But a diversified merger can incur agency costs due to the complexity of the conglomerate organization. Therefore, it is unclear whether the potential benefits of activity diversification outweigh the costs.

Moreover, from a theoretical perspective it is uncertain which type of merger reduces risk—focused or diversified. Standard portfolio theory predicts that the combined cash flows from non-correlated revenue sources should be more stable than the constituent parts. Securities and insurance activities can decrease conglomerate risk, but the effect largely depends on the type of diversifying activities that bank holding companies undertake (Kwan & Laderman, 1999). Moreover, if the acquirer does not know the true status of the credit risk of the target loan, then after the merger it might increase the credit risk and the allowance for loan loss ratios.

Apart from the activity focus-diversified motive, bank mergers are also motivated by geographic focus and diversification. Because the financial service industry is highly regulated and different locations have different regulatory environments, a bank's location plays a vital role in the market for corporate control, the activities in which the bank may engage, and the bank loan portfolio. The main goal of this paper is to investigate the impact of bank M&A on performance and find what kind of merger significantly affects firm efficiency, value addition, and long-run performance.

Delong (2003) found that mergers between partners that focus their geography and activity enhance value more than any other type. This study is similar in spirit but differs from Delong (2001) in several aspects. First, Delong (2001) looked at the cumulative abnormal returns (CARs) of the stock market. The main reason to rely on abnormal stock market returns is the efficient capital market hypothesis. If the market efficiency incorporates the expected future gains of the firm, there should be no abnormal return in the long term. The capital market studies have not been able to identify whether the gains from M&A are due to market inefficiency or real economic gain (Healy, Palepu, & Ruback, 1992). Stock prices that reveal the market's expectations of future cash flows may differ from actual performance.

Table 7. Average Performance Metrics of Geographic and Product Focus Versus Geographic and Product Diversification

*Table 7, Panel A shows mean performance metrics of geographic and product focus versus geographic and product diversification. If the merging banks' headquarters are in the same state, then the merger is considered a geographically focused merger; otherwise, it is a geographically diversified merger. A product- or activity-focused merger happens when the two-digit SIC code of the merging banks are the same. Mean industry-adjusted difference is calculated as the difference between merging banks and their corresponding peers' average. Data are for the years 2000 to 2009. *indicates significance at Δ10%, **indicates significance at 5%, and ***indicates significance at 1%.*

	Focus		*Diversification*	
Variable Name	**Geographic**	**Product**	**Geographic**	**Product**
Δ in Unadjusted Operating Profit	0.20*	0.04	-0.29	-0.03
Δ in Ind. Adjusted Operating Profit	0.73***	0.49***	0.08	0.64***
Δ in Eff. Input	-0.09***	-0.09***	-0.07**	-0.03**
Δ in Eff. Output	-0.01	0.07**	0.22***	0.06
Δ in Ind. Adjusted Efficiency Input	-0.07***	-0.07***	-0.05	-0.02
Δ in ind. Adjusted Efficiency output	0.01	0.10***	0.25***	0.07

Table 7 reports the results of a focus versus diversification merger. We found significant evidence that a geographically focused merger increases the operating profitability of the banks; there was no significant evidence that a geographically diversified merger has any impact on operating profitability. Compared to the overall industry-adjusted performance, a geographically focused merger increases the operating performance by 0.20%. Both product-focused and product diversification mergers increase operating profitability; however, product diversification increases the operating profitability by 0.15% more than a product-focused merger. Regardless of product or geographic focus and diversification, mergers overall lowered the input efficiency and increased the output efficiency of product-focused and geographically diversified mergers.

So far, we have compared post-acquisition with pre-acquisition measures of operating performance and efficiency like most academic studies. Now we will use the EVA methodology developed by Sirower and O'Byrne (1998) for forecasting and evaluating post-acquisition operating performance, which should be of interest to both corporate practitioners and researchers. The EVA method uses the market values of both acquirer and target before the merger and the merger premium to determine the future levels of annual operating performance that are necessary to justify the investment in the merger. When an acquirer takes over a target, the acquirer pays an up-front price that virtually always includes a substantial premium. These premiums should include the expectation on the part of the acquiring bank that it will successfully make improvements to the target bank's future performance and exploit other synergies between the two banks. To create value for shareholders, the present value of the performance gains of the merging banks must be higher than the stand-alone expectations to recapture the premium.

M&As are complex processes that possess unique features. Just by comparing operating performance one year before and one year after an M&A, we cannot find its true effect. Sirower and O'Byrne (1998) identified some benchmark problems, such as:

1. Acquisitions are a capital investment decision that the shareholders of the acquirer can essentially make on their own—just by buying the shares of other companies—without paying either premiums or integration expenses.

2. Unlike any other capital investment decision, an acquisition requires paying all the money up front, including the acquisition premium, before any improvements can begin.

3. Paying the acquisition premium creates an additional business problem—achieving performance gains above those already reflected in the share prices of the two stand-alone firms.

As we have documented in Table 7, the sample of our merger shows significant improvement in operating profitability and output-oriented efficiency. The following table shows that, before the merger, the acquirer had a negative EVA improvement, and the target had a positive EVA improvement. The pro-forma EVA improvements of the combined firms were also less than zero. However, after the merger, the mean expected EVA improvement of the acquirer was $.76 million, and the acquirer on average improved its expected EVA by $31.09 million, which is significantly different from zero.

Table 8. Changes in Economics Value Added

*Table 8 shows the expected EVA improvement analysis of merging banks. Data are for the years 2000 to 2009. *indicates significance at Δ10%, ** indicates significance at 5%, and *** indicates significance at 1%.*

	Median	***Mean***	***Std.***
Target			
Target EVA	-4555.49	2699.39	248862.33
Target Capitalized EVA	-302528.43	-512099.12	14255298.53
Target Value of Operation	428902.89	13689209.92	44285334.17
Target FGA	254786.39	-1080679.85	13677941.19
Target Expected Return on FGA (FGA*WACC)	3274.15	-25313.23	265266.81
Target $1 EVA Improvement Contributes (1/wacc)	60.84	68.16	47.06
Target EVA Improvement	67.09	-501.43	5247.21
Acquirer Pre-merger			
Acquirer Pre-merger EVA	-15321.50	10578.19	1178333.16
Acquirer Pre-Merger Capitalized EVA	-789619.64	22439055.12	160410187.8
Acquirer Pre-merger Present Value of Operation	8299012.96	93651973.51	270414456.9
Acquirer Pre-merger FGA	-8299012.963	-81157081.22	240579486.8
Acquirer Pre-merger Expected Return on FGA (FGA*WACC)	-100926.27	-889620.60	2366630.46
Acquirer Pre-merger $1 EVA Improvement Contributes (1/wacc)	62.84	66.13	29.94
Acquirer Pre-merger EVA Improvement	-1361.789	-12110.77	30238.19
Acquirer Post-Merger			
Post-merger EVA	-29038.28	-592686.15	2232707.178
Post-merger Capitalized EVA (EVA/WACC)	-1173216.23	-20843341.25	128081665.2
Post-merger Present Value of Operation	3772040.78	81137455.24	243754450.2
Post-merger FGA (Present Value of Expected EVA Improvement)	1776829.63	22178676.18	117092422.3
Post-merger Expected Return on FGA (FGA*WACC)	30159.71	576094.37	2050448.95
Post-merger $1 EVA Improvement Contributes (1/wacc)	55.52	65.00	28.78
Acquirer Post-merger EVA Improvement	698.24	20484.79	76493.32
Change in Performance			
Pre-merger Pro-forma EVA Improvement	-1005.25	-10614.57	27760.04
Change in EVA Improvement	2740.26	31099.36**	91777.07

To identify the factors contributing to the change in performance, we ran a regression analysis. Panel A, Table 9 shows the changes in operating profitability as a function of merger-related variables and other firm-level control variables. Consistent with previous findings, we find that geographically focused mergers increase the unadjusted operating profitability significantly (Regression 1a). A product-focused merger does not significantly affect the change in unadjusted operating profit. Consistent with Cornett et al. (2006), we also find that, the bigger the target bank size relative to the acquirer, the greater the improvement in performance around the merger. We also find that a 1% increase in target input-oriented efficiency and output-oriented efficiency will increase the unadjusted operating profitability significantly by 0.9% and 0.83%, respectively. Panel B shows the relationship between change in industry-adjusted operating profitability around the merger and other variables. Here, only the deal size and geographically focused merger have a significant, positive relationship with change in industry-adjusted operating profitability. However, when we control for other variables, industry-adjusted performance target efficiency has no significant impact on change in operating profitability. The relative size of the target has a significant positive impact on change in operating profitability and has positive but not significant impact on change in unadjusted operating profitability.

Table 9. Results of the Regression Analysis-Accounting Performance

*Table 9 shows the results of the regression analysis. The dependent variable in Panel A is the change in operating profit/average asset. Model A includes Target ROAA as an independent variable while Model B and C include the target's input- and output-oriented efficiency scores. In Panel B, the dependent variable is the change in industry-adjusted operating performance. Data are for the years 2000 to 2009. * indicates significance at 10%, ** indicates significance at 5%, and *** indicates significance at 1%.*

	Panel A: Dependent Variable: Change Unadjusted in Operating Profit		
	A	**B**	**C**
Constant	197.098**	143.104	138.286
Merger Year	-0.098**	-0.071	-0.069
Relative Size	0.369*	0.409**	0.358*
Log (Transaction Value)	0.028	0.092*	0.029
Same-state Dummy	0.356*	0.312	0.326
Same-SIC Dummy	0.006	-0.168	-0.131
Post-Merger Acquirer Loan Loss Reserve/Gross Loans	-0.985***	-1.085***	-1.158***
Post-merger Acquirer Net Interest Margin	0.369***	0.4***	0.408***
Post-merger Acquirer Cost-to-Income Ratio	-0.022***	-0.023***	-0.022***
Target ROAA	0.067	N/A	N/A
Target Efficiency Input	N/A	0.904***	N/A
Target Efficiency Output	N/A	N/A	0.828**
R square	0.651	0.683	0.676
Adj. R-square	0.605	0.641	0.634
	Panel B: Dependent Variable: Change in Ind. Adjusted Operating Profit		
	A	**B**	**C**
Variables	**Coefficients**	**Coefficients**	**Coefficients**
(Constant)	-195.464**	-196.988**	-192.368**
Merger Year	0.098**	0.098**	0.096**
Relative Size	0.231	0.246	0.231
Log (Transaction Value)	0.046	0.086*	0.065
Same-state Dummy	0.511***	0.459**	0.463**
Same SIC Dummy	0.077	-0.008	0.018
Post-Merger Acquirer Loan Loss Reserve/Gross Loans	-0.428**	-0.459**	-0.462**
Post-merger Acquirer Net Interest Margin	0.344***	0.354***	0.351***
Post-merger Acquirer Cost-to-Income Ratio	-0.023***	-0.023***	-0.023***
Target ROAA	0.141	N/A	N/A
Target Ind. Adjusted Eff. Input	N/A	0.302	N/A
Target Ind. Adjusted Eff. Output	N/A	N/A	0.181
R-Square	0.539	0.534	0.53
Adjusted R-Square	0.479	0.473	0.469

Finally, Table 10 shows that the larger the deal, the higher the improvement in efficiency. Geographically focused mergers decrease output-oriented efficiency. This result is consistent with our previous findings and economy of scale hypothesis.

Table 10. Results of the Regression Analysis-Efficiency Scores

*Table 10 shows the results of the regression analysis. Dependent variable is the change in industry adjusted and un adjusted efficiency scores. Change in industry adjusted efficiency scores are calculated as the difference between efficiency scores of merging banks and their corresponding peers average efficiency scores. Data are for the years 2000-2009. * significant at 10%; ** significant at 5%; *** significant at 1%.*

Dependend Variables	***Change in Eff. Input***	***Change in ind. Adjusted Eff. Input***	***Change in Eff. Output***	***Change in ind. Adjusted Eff. Output***
Variables	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
Constant	-47.106**	-35.361**	-46.135**	-11.955
Merger Year	0.023**	0.018**	0.023**	0.006
Relative size	0.032	0.026	-0.071	-0.081*
Log (Transaction Value)	0.018*	0.021**	0.087***	0.087***
Same state Dummy	-0.024	-0.016	-0.099**	-0.083*
Same SIC Dummy	-0.014	-0.014	0.074	0.083
Post-Merger Acquirer Loan Loss Reserve/ Gross Loans	0.026	0.03	0.062	0.074
Post-Merger Acquirer Net Interest Margin	-0.014	-0.021	-0.018	-0.023
Post-Merger Acquirer Loans/Customer Deposits	-0.001	-0.001	0.001	0.001
Post-Merger Acquirer Operating Profit/Average Total Assets	0.024	0.03	0.044	0.046*
Target Eff. Input	-0.107	N/A	N/A	N/A
Target ind. adjusted Eff. Input	N/A	-0.063	N/A	N/A
Target Eff. Output	N/A	N/A	-0.145**	N/A
Target ind. adjusted Eff. Output	N/A	N/A	N/A	-0.12
R-square	0.234	0.217	0.663	0.682
Adjusted R-Square	0.121	0.102	0.614	0.635

5. CONCLUSION

In this paper, we examine bank performance around mergers after the passage of the GLBA. While previous research in this area has examined the performance of banks around a merger and changes in short-term and long-term operating performance, this paper extends the previous research by combining all the previous methodologies used in merger and acquisition studies and adding a new methodology, namely Expected EVA improvement. Our empirical results conclude that the industry-adjusted operating performance of merged banks increases significantly after a merger. This finding is consistent with the recent findings of Cornett et al. (2006). We also find that the acquirer-expected EVA improvement increases significantly after a merger. The revenue enhancement opportunity appears more profitable if there exists more opportunity for cost-cutting, such as geographically focused and diversified mergers. A product diversification merger increases the industry-adjusted performance more than a product-focused merger.

Finally, in the United States, regulation has constrained the ability of banks to expand geographically and increase various product lines. Our paper shows that eliminating these constraints through the adoption of intrastate and interstate banking laws has helped US banks improve their operating performance and efficiency through merger and acquisition.

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