

# An overview and analysis of community bank mergers

Joe Van Wallegghem and Paul Willis

Joe Van Wallegghem and Paul Willis are economists in the Division of Bank Supervision and Structure of the Federal Reserve Bank of Kansas City. The views expressed in this article are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of Kansas City or the Federal Reserve System.

## Introduction

With some of the largest mergers in history now taking place in the financial services industry, it is easy to overlook the fact that industry consolidation involves small institution mergers as well as megamergers. The factors that are promoting consolidation among larger banks are also relevant for the smallest banks: the liberalization of bank branching and interstate banking rules; the need to spread the cost of technological and administrative overhead; and the desire to maintain earnings growth. In the region covered by the Tenth Federal Reserve District, smaller banks, particularly those in rural areas, are subject to many of these pressures to an even greater degree than larger banks and banks in metropolitan areas.<sup>1</sup>

Small banks in the region face a range of challenges. Improvements in data processing technology give bankers better tools for managing operations but require increased processing volume to yield efficiencies. The fixed cost of regulatory overhead has increased over the years as well. These changes in cost structure have no doubt increased the cost advantages that are available when very small banks increase their asset size. Many of the rural areas in the region are growing slowly.<sup>2</sup> Banks in low growth areas have poor prospects for significant internal growth and have few prospects for external growth other than by participating in mergers.

This article focuses on how banks in nonmetropolitan areas in the region are participating in the consolidation movement.<sup>3</sup> Data from the early 1990s indicates that smaller banks in nonmetropolitan areas were most likely to merge with other banks within the same geographic area. Using a case study approach that focuses on nineteen nonmetropolitan banks that participated in in-market mergers, we examine whether community banks that followed this strategy realized efficiency gains. The case studies involved interviews with management of the subject banks and reviews of financial statements and other information.

The reviews indicate that smaller banks in nonmetropolitan areas that participate in mergers with other banks in their trade territories typically realize an improvement in their return on stockholder equity relative to peers. Much of the improvement in performance is related to cost efficiencies that followed the mergers. For smaller banks, these findings tend to support the belief held by many bankers that mergers of banks with market overlap have high potential to result in cost savings and improved profitability.

## Background

Rapid consolidation in the banking industry has been occurring nationwide and in the region covered by the Tenth Federal Reserve District since the mid-1980s. Across the nation, bank consolidation is a function of

<sup>1</sup> See Forest Myers and JinWoo Park, "Tenth District Community Banks: Who is at Risk?," **Financial Industry Perspectives**, Federal Reserve Bank of Kansas City, (October 1994): 21-28.

<sup>2</sup> See Laura Pavlenko Lutton, "Rural Banks Feeling Shaky as Population Erodes," **American Banker**, (September 11, 1998).

<sup>3</sup> For this article, nonmetropolitan areas are those that are outside Metropolitan Statistical Areas (MSAs) that are defined and published by the U.S. Office of Management and Budget.

Table 1

### Banks in metropolitan and nonmetropolitan areas Tenth District states, 1987–1997

Number of banks by asset size

Size Category	Non MSA			MSA		
	1987	1997	% Change	1987	MSA 1997	% Change
\$ Millions						
<10	334	76	-77	88	21	-76
10 - 25	650	325	-50	238	67	-72
25 - 50	471	364	-23	215	112	-48
50 - 100	265	316	19	193	120	-38
100 - 200	69	115	67	94	105	12
200 - 500	8	38	375	44	72	64
500 - 1,000	0	8		10	11	10
1,000	0	2		22	22	0
	1,797	1,244	-31	904	530	-41

processing and communications technology, branch networks, managerial resources and other overhead (see box on page 6). Academic studies differ in their estimates of the most efficient bank size but agree that the smallest banks are not as cost efficient as larger banks.<sup>6</sup> One recent study estimated that a typical bank could realize strong efficiency gains by increasing size up to about \$500 million in assets.<sup>7</sup>

As illustrated in Panel A of Chart 1 on the facing page, banks in nonmetropolitan areas make up over two thirds of the total number of banks in the region. Panel B shows that the vast majority of nonmetropolitan banks are under \$100 million in assets, and most of those are under \$50 million. By increasing assets, many of these rural banks should be able to operate more efficiently by spreading fixed overhead costs over a larger revenue base.

The consolidation in banking that is occurring is just one element of a consolidation process in many rural areas in the region that also affects agriculture and support businesses and retail firms. For banks in these areas, mergers represent their only opportunity for significant asset growth. The issue of low growth represents one of the most significant challenges facing many areas in the region. For example, the overall population of nonmetropolitan counties in Kansas and Nebraska declined in the 1990-1997 period, and the rate of growth of nonmetropolitan counties in Oklahoma was less than one-half the growth rate of metropolitan areas in that state. There are also pockets of low growth areas in Missouri where more than one-quarter of nonmetropolitan counties had negative growth rates during the 1990-1997 period. This type of growth environment is common in areas throughout the upper Midwest.

<sup>4</sup> The banking data reviewed in this article covers the seven states that are wholly or partially located within the Tenth Federal Reserve District. The Tenth District covers western Missouri, all of Nebraska, Kansas, Oklahoma, Wyoming and Colorado, and northern New Mexico.

<sup>5</sup> During the late 1980s through 1997, branching restrictions were progressively liberalized across the region and some form of statewide branching is currently an option in each of the states. For a detailed chronology of changes in bank branching, multibank holding company and interstate banking laws for each of the states, see: Dean Amel, "State Laws Affecting Geographic Expansion of Commercial Banks," Unpublished Working Paper, Board of Governors of the Federal Reserve System (1993). For a

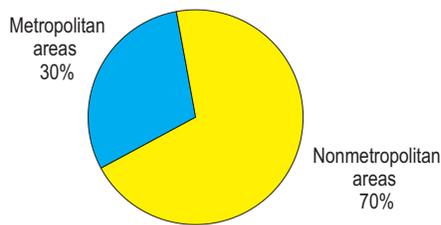
changing technology and the relaxation of branching and interstate banking restrictions. The same forces are at work in this region as well. As shown in Table 1, the number of banks with main offices in the seven midwestern and western states in the region had fallen from 2,701 at the end of 1987 to 1,774 by year-end 1997, a decline of over 30 percent.<sup>4</sup> Not surprisingly, the number of small banks is declining much more rapidly than the number of larger banks. The large number of small banks is a product of traditional restrictions on branch banking that were in effect until recent years and the predominantly rural makeup of the region. The rapid consolidation of small banks in large part represents a transition from unit banking to branch banking systems.<sup>5</sup>

Conventional wisdom and academic literature generally conclude that, below a certain scale, a bank is at a cost disadvantage because its asset base is not large enough to make efficient use of investments in data

Chart 1

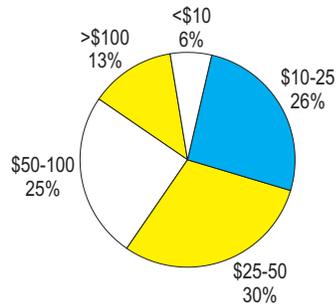
Panel A

Distribution of banks by location  
Tenth District States



Panel B

Nonmetropolitan banks by asset size  
Tenth District States  
(millions)



To cope with low growth and increased costs, many banks are participating in mergers. A review of actual merger activity suggests that the opportunities for rural banks to consolidate are typically limited to institutions in rural communities operating within the same market or trade territory. Table 2 provides information on bank mergers that took place in the region during the 1992-1994 period. Of the 135 rural banks involved in mergers between 1992 and 1994 (the merger period covered by this study), 101 merged with other rural banks. Of those mergers, 83 involved banks operating within roughly 50 miles of each other. The banks acquired in these mergers were generally small, ranging in asset size from less than \$5 million to no more than \$65 million.

In contrast, only 34 rural banks merged with banks located in metropolitan areas. Unlike rural banks involved in in-market mergers, nearly all of these banks had two characteristics that made them attractive targets

for larger acquirers—size and location. Rural banks acquired by metropolitan institutions were typically much larger than those that merged with other rural banks, ranging in asset size from \$15 million to as large as \$263 million. Additionally, these banks were also in growing markets that were either situated near metropolitan areas or serving as trade centers for surrounding rural counties.

The question of whether common merger strategies pursued by smaller banks in rural markets can result in the type of asset growth that is conducive to efficiency gains is important for bankers and from a public policy perspective. As one banker said to the authors on this subject, a merger not structured to take advantage of efficiencies is usually just a matter of “trading dollars.” The research described in this article is designed to examine the most common merger strategy followed by rural banks and whether these mergers result in improvements in operating performance.

detailed review of the consolidation movement in the Tenth District, see Kenneth Spong and James Harvey, “The Changing Structure of Banking: A Look at Traditional and New Ways of Delivering Banking Services,”

**Financial Industry Perspectives**, Federal Reserve Bank of Kansas City (May 1998).

<sup>6</sup> A.N. Berger, W.C. Hunter and Stephen G. Timme, “The Efficiency of Financial Institutions: A review and preview of research past, present and future,” **Journal of Banking and Finance** 17 (1993): 221-249.

<sup>7</sup> P. H. McAllister and D. McManus, “Resolving the Scale Efficiency Puzzle in Banking,” **Journal of Banking and Finance** 17 (1993):389-405.

Table 2

**Tenth District bank mergers by location of merging banks**

	1992	1993	1994	Totals
All Mergers	117	118	121	356
Both Banks Located in Metro Area	80	76	65	221
Banks in Metro and Nonmetro Areas Merge	4	15	15	34
Both Banks in Nonmetro Area	33	27	41	101
Both Banks in Nonmetro Area and Within 50 Miles	24	24	35	83

**Case study**

The large number of small banks still based in nonmetropolitan areas suggests that consolidation will continue in this segment of the industry. Thus, the effect of small bank mergers on bank profitability and efficiency will continue to be of interest for purposes of regulatory policy and business strategy. A case study approach was chosen to look at this issue because of the importance of considering unique factors at work in individual situations.<sup>8</sup> This approach accommodates consideration of a variety of financial and nonfinancial variables, interviews with managers, and information contained in examination reports to gain insight into individual mergers chosen for review. The success of individual mergers was assessed in light of improvement in profitability measures. We also looked at whether any observed improvement in profitability was related to improvement in operating efficiency or cost efficiency.

**Characteristics of mergers studied**

The merger sample chosen for review was tailored to be reflective of the most common merger strategy followed

by small banks in nonmetropolitan areas in Tenth District states. The sample was selected from records of bank mergers drawn from the Federal Reserve's National Information Center database. Mergers chosen for review were required to be between banks that were close enough to one another to permit managers to commute easily to the locations of both banks. Proximity was often cited by bankers as an important consideration in small bank mergers. The majority of the mergers chosen involved banks that were within 20 miles of one another. Only two mergers involved banks that were as much as 40 miles apart, and these were both in sparsely populated areas where commutes of that distance are normal.<sup>9</sup>

To permit the review of three years of financial information following the year of a merger, the most recent year from which mergers could be drawn was 1994. We also selected mergers that occurred in 1992 and 1993. With 356 mergers in the seven states in the region during 1992-1994, this was a period of fairly rapid consolidation. The final sample selected was of 19 mergers. More details concerning the sample selection and analysis are included in the appendix.

**Financial analysis**

The merger sample selected between 1992 and 1994 permitted evaluation of each bank's financial performance for a three-year period prior to the merger and for a three-year period following the merger. Reviewed for each sample merger was a set of core financial ratios typically selected to evaluate factors influencing profitability. The core ratios reviewed were: return on equity (ROE); return on assets (ROA); net income to total revenue; total revenue to assets; net interest margin and the leverage ratio. Cost efficiency

<sup>8</sup> The case study approach followed in this study in many respects follows the method used in the case studies of large bank mergers summarized by Rhoades (1998). See Box on page 6.

<sup>9</sup> The sample criteria in this study differ from that used in previous cross-sectional statistical studies that looked at mergers of banks with office overlap. These earlier studies usually required that offices be in the same county or metropolitan area as a proxy for office overlap. The case study approach used here permitted individual judgement on each merger to determine whether it met the proximity criteria.

was evaluated using the ratios of non-interest expense to operating revenue, noninterest expense to total revenue, and noninterest expense to assets. These ratios were then compared to those of a peer group selected for each state represented in the sample, and the results averaged over each three-year period.

### *Results*

From a stockholder standpoint, these mergers were largely successful. In terms of return on equity, all but three of the banks improved their performance relative to peer. Two of the three banks which didn't improve relative to peer had returns on equity significantly higher than peer prior to merging and were simply unable to maintain above-normal returns over the long period of time examined. Many of the banks that improved their rates of return on capital did so by reducing their capital to assets ratio, though all remained adequately capitalized for regulatory purposes.

Return on assets in some respects gives a more accurate picture of profitability because assets are much less subject to management discretion than is the level of capitalization. In terms of return on assets, eleven of the nineteen institutions showed improved performance relative to peer. With one exception, we required that a merger result in an improvement in ROE and ROA relative to peer to be considered a success in improving the bank's performance relative to its peers. The exception we included in the success category had large extraordinary earnings in the year preceding the merger which resulted in reported ROA overstating continuing earnings for the pre-merger period. After adjusting reported income to account for the noncontinuing component, the bank's ROA relative to peer

showed improvement over the test period. Based on these criteria, we concluded that twelve of the nineteen mergers were solidly successful in improving the profitability of the merged banks relative to similarly situated banks.

Improvement in earnings performance can result from a variety of factors. One concern of regulators is that a given merger may create a more favorable cost and revenue environment in the market for the bank by reducing competition between banks in the market for deposits and loans. If this effect is primarily responsible for improved earnings, the bank would likely have a stronger net interest margin and may show little or no improvement in cost efficiency.

To assess the source of earnings improvement for the banks in our study, we evaluated trends in net interest margin and in efficiency or overhead measures, including noninterest expense to operating revenue, noninterest expense to total revenue and noninterest expense to average assets. Our evaluation found no consistent pattern of improvement in net interest margin among banks in our sample that improved earnings. In contrast, most banks with improved earnings did show strong gains in cost efficiency. Only one of these banks showed a weakening in efficiency measures, and that was attributed to increased administrative costs related to low quality assets that were acquired in the merger. Another bank in the sample showed a very minor improvement in cost efficiency.

This information suggests that improved earnings among the banks in the sample did not result from anticompetitive behavior or lessened competition. Rather, the significant improvement in cost efficiency measures

### Box: Research on Efficiencies Related to Bank Mergers

Despite market perceptions that bank mergers typically generate cost savings and improvements in profitability, studies by bank researchers have often failed to document such efficiency gains. A comprehensive survey that reviewed the results of 39 studies of bank mergers completed during the 1980s and early 1990s found little support for claims of merger related efficiencies.<sup>1</sup> The studies that examined the operating performance of banks following mergers point strongly to a lack of improvement in profitability or cost efficiency. Seven of the studies looked specifically at mergers of banks with market overlap—those that should present the greatest potential for efficiency gains. None of the studies that looked at in-market mergers found consistent evidence of improved operating performance resulting from the mergers.

A 1998 Federal Reserve Board staff study examined mergers of large banks that had substantial market overlap.<sup>2</sup> This case study looked at mergers where the acquiring bank had over \$10 billion in assets and the target firm had at least \$5 billion in assets. Overall, this study found that the in-market mergers reviewed did not produce consistent improvements in profitability resulting from efficiency gains.

Since it is accepted that the cost structure of smaller banks is such that they can realize efficiencies by increasing assets, another recent study examined a sample of small bank mergers. This study found that mergers that took place in the early 1990s were likely to produce efficiencies where the survivor had assets below \$400 million.<sup>3</sup> The study of small bank mergers is consistent with evidence on efficiencies related to bank size and lends credence to claims of efficiency gains for smaller institution mergers. The current article attempts to extend the research on small bank mergers. A case study approach is used to identify whether the most common small bank merger strategy of pursuing in-market mergers typically leads to improvements in profitability that are related to cost efficiency gains.

<sup>1</sup> Stephen A. Rhoades, "A Summary of Merger Performance Studies in Banking, 1980-93, and an Assessment of the "Operating Performance" and "Event Study" Methodologies," Board of Governors of the Federal Reserve System, Staff Study 167 (1994).

<sup>2</sup> The case studies were summarized in: Rhoades, "The Efficiency Effects of Bank Mergers: An Overview of Case Studies of Nine Mergers," *Journal of Banking and Finance* 22 (1998): 273-291.

<sup>3</sup> John H. Boyd and Stanley L. Graham, "Consolidation in U.S. Banking: Implications for Efficiency and Risk," Federal Reserve Bank of Minneapolis, Working Paper 572 (1996).

appears to have been the driving force behind earnings improvement for the banks.

### *Interviews*

To gain more insight into the transactions, interviews were conducted with managers who were involved with merged banks in the sample. The circumstances leading to negotiations for each merger were quite varied, though there were common themes. For these small institutions, personal contact between the parties and familiarity with the trade territory of potential merger partners were always pivotal in decisions to merge. In one instance, two bankers struck up a conversation at the local barber shop that led to negotiations for the merger of their institutions. As is typical of small communities, word that a banker wants to sell his bank quickly spreads to other bankers in the area. Brokers are rarely involved.

In every interview, the key manager of the acquiring bank indicated that he was familiar with the community served by the target bank and had some customers in the area already. Bankers indicated that knowledge of the territory permits the buyer to better control the risks inherent in the merger, especially the quality of the loans being acquired. Knowing first-hand the land values, crop yields, business conditions, and growth potential in the target community, bankers said, puts them in a far better position to make sure that the merger makes sense for both organizations.

This familiarity is largely a function of proximity, which in turn bears directly on decisions about how to manage the bank after the merger. Nearly every banker interviewed indicated that a reasonable commute to the target/proposed branch office was

necessary in order to efficiently manage that office. Bankers indicated that their ability to meet often with branch loan officers and managers and review credit and other decisions was vital to establishing confidence in those individuals and delegating more authority to them. This delegation of authority reduces managerial overlap and related costs.

For those bankers who indicated that they were considering other opportunities for expansion by merger, most indicated that they were looking for partners in the same or adjacent counties. In more sparsely populated areas, bankers said they were looking for merger partners within roughly 50 miles.

All bankers interviewed indicated that combining back-office and data processing operations saved money. Many of the bankers indicated that their data processing systems were able to meet the processing requirements of the target bank without additional system or staff costs. In fact, spreading a bank's investment in technology over more assets was typically cited as one of the important benefits of merging.

Also mentioned by most bankers were savings available from reductions in personnel costs, ranging from senior management to clerical staff. These savings were greatest for those merging banks within roughly 20 miles of each other. Those mergers achieved significantly greater reductions in employee expenses than mergers between banks farther apart. Even in those instances where all employees were retained in the merger, savings were often realized as management determined not to replace staff who subsequently retired or resigned.

Other advantages following mergers were less expected. Most of those interviewed indicated that savings were realized on blanket bond insurance. Bankers also were able to more fully meet the needs of some larger customers and to attract new customers. By combining their capital bases, the merged banks had increased loan limits. The increased loan limits allowed the merged banks to increase loan volume without significantly increasing costs in situations where the banks could increase loans to borrowers with loan needs beyond the banks' premerger loan limits.

The 1994 merger of Farmers National Bank in Phillipsburg, Kansas (pre-merger assets \$37.3 million), and First National Bank in Kensington, Kansas (pre-merger assets \$11.8 million), is representative of many of the mergers that take place among rural banks in the region. Located in north central Kansas, Phillipsburg (population 2,561) and Kensington (population 435) are located just 15 miles apart in adjacent Phillips and Smith Counties. Farmers National also operated branch offices in the towns of Agra (population 397) and Logan (population 545).

The merger of these two banks has been largely successful. The Kensington branch is now operated with half the staff employed prior to the merger, including a full-time loan officer and four full- and part-time tellers. Farmers National was also able to absorb the Kensington facility's data processing and other back office operations without additional staff or system costs. Mr. Laverne Holle, Chairman and President of Farmers Bank, said that the close proximity of the Kensington office and the bank's other offices is an important factor in the success of the

merger. The proximity of the offices means that management is familiar with customers at all of the offices. It also means that loan and administrative overhead can more easily meet the needs of the bank's customer base, which for its size is spread over a large area.

The success of the Phillipsburg merger is evidenced by the bank's ability to improve profitability and cost efficiency relative to peer without closing any offices. Both the ROE and ROA of Farmers National improved significantly relative to its peer group following the merger. At the same time, Farmers National increased the combined bank's loan volume and reduced its noninterest expense to operating revenue ratio relative to peer. These operating improvements are impressive for a bank with approximately \$50 million in assets which continues to operate branch offices in four communities.

### **Summary**

Several things stand out about the bank consolidation that is taking place in nonmetropolitan areas of the region. Although the number of banks with assets under \$50 million is declining rapidly, there are still over 700 banks in this category in the Tenth District. This suggests that the consolidation trend will continue. Furthermore, for banks in small communities and in low growth areas, consolidation options are usually limited to merging with other local institutions. In most instances, these banks are not merging with larger banks based in metropolitan areas. Expanding organizations that are based in metropolitan areas typically target only the largest banks in the larger, rural communities that are experiencing growth. The smaller banks that are involved in mergers

typically merge with another bank that is located within the same trade area or a neighboring trade area.

Unlike previous studies that have evaluated the efficiency effects of in-market bank mergers, this study focused on the smallest banks. The sample of in-market mergers chosen for this study was tailored to reflect experiences of this prevalent form of merger for small banks. The results show that in-market mergers of small banks have usually been successful from both a profitability and a cost efficiency perspective. Unlike the case for large bank mergers, the in-market mergers of small banks we reviewed were usually not structured to permit the closing of offices. Instead, the mergers reduced costs by permitting the two banks to reduce data processing and administrative overhead and by permitting loan officers to service larger loan portfolios. Increased capital and asset size also permitted the merged banks to make larger loans and better meet customer borrowing needs.

The ability of the smaller banks studied to achieve efficiency gains while keeping most offices open is encouraging. These results suggest that smaller mergers are often successful in two important ways—permitting small banks to become more efficient and profitable, and preserving convenient access to banking services in smaller communities. Both successes are important to bankers as they seek opportunities for consolidation in rural areas. These successes are also important from a public policy perspective and should be carefully considered as regulators evaluate transactions which are part of the overall consolidation of banking in this region and in the nation.

## Appendix: Research Methodology

### *Sample Selection*

A number of considerations went into the sample selection. No minimum size was placed on either merger partner since one of the objects of the study was to examine whether small institutions can achieve efficiency gains by growing their assets through merger. The smallest post-merger bank size in the sample was approximately \$15 million in assets, and the largest was just under \$200 million in assets. So that the effect of the merger would have a measurable impact on the operating results of the merged entity, the acquired bank was required to account for at least 20 percent of the combined assets of the banks involved in the merger. While this figure was somewhat arbitrary, we reasoned that the efficiency effects of transactions where the target bank was very small in relation to the acquirer would be difficult to separate from normal variability in financial performance.

We also eliminated banks from the sample that had participated in other mergers during the three-year period we studied both before and after the merger. This was done in an attempt to isolate the impact of the mergers studied from the effects of other potential transactions. However, two of the case studies were consolidations involving three banks. One of the three-bank mergers took place simultaneously, the other over a two-year period. We also eliminated mergers involving banks in weak financial condition.

### *Ratio Analysis*

A framework of core financial ratios derived from the duPont ROE (return on equity) model was used to evaluate the factors influencing profitability. Under this model, the financial factors which determine a firm's return on equity are its return on assets, leverage ratio, profit margin, and asset utilization. For this study, these ratios were adapted to standard bank ratios. The core ratios used were return on equity, return on assets, net income to total revenue (profit margin), total revenue to assets (asset utilization) and the leverage ratio.

To evaluate changes in profit margin, we first examined changes in net interest margin, defined as net interest income to assets. Cost efficiency was evaluated using the ratios of noninterest expense to operating revenue, noninterest expense to total revenue and noninterest expense to assets. The components of noninterest expense were further broken down into their components of salary and occupancy expense and other expenses to provide further

**Appendix: Research Methodology (continued)**

insight into changes in cost efficiency. Together with the core financial ratios, trends for a total of 31 financial ratios were reviewed relative to peer trends to gain insight into factors that could influence the efficiency ratios. For example, significant changes in asset mix, loan quality, or loan loss provision expenses would not only impact revenues but could signal changes in administrative costs. Changes in funding strategy could also have side effects on overhead costs.

The financial data included in the study spanned a period between 1989 and 1997 depending on when the merger in question occurred. Since the data covered a significant period of time, the financial ratios for the banks in the study were impacted by changes due to the business cycle and other effects in addition to factors related to the merger. It would be difficult to distinguish changes in the financial ratios that occurred due to merger-related effects without normalizing the financial ratios of the banks in the study. In order to do this, the financial ratios reviewed for each bank were normalized by comparing changes in the individual banks' financial ratios from the period prior to the merger to the period after the merger to changes in the ratios for a peer group of similarly situated banks. Separate peer groups were constructed for each state consisting of all banks with assets under \$200 million with headquarters in nonmetropolitan areas of the state.

To normalize the data for the banks in the study, changes in each ratio reviewed were divided by the average ratio for all the banks in the relevant peer group. The financial results for each of the merged banks in study group were then expressed in terms of the ratio of the bank's results to that of its peers. For example, a bank with an ROE of less than the average for the peer group would have a ratio of ROE to peer of less than 100 percent. To estimate the impact of a merger on a bank's financial performance, its average for each ratio in relation to peer for the three years prior to the merger was compared to its average relative to peer for the three years following the merger. Data from the year of the merger were excluded to reduce distortions caused by merger-related expenses. A bank with an ROE equal to 100 percent of peer for the pre-merger period that improved in relation to peer following the merger to 125 percent of peer exhibits a 25 percent improvement over the period. For the years prior to a merger, ratios were calculated for the merged bank by combining the financial statements of the merger partners.

## Appendix: Research Methodology (continued)

*Results*

As reflected in the accompanying table, the peer-adjusted performance variables for each merger pair for the three-year period following the merger were expressed as the ratio of the same variables for the three-year period prior to the merger. Profitability ratios showed improvement if the profitability ratios of the merged bank increased in relation to peer from the period before the merger to the period following the merger. Conversely, cost efficiency ratios showed improvement if they were reduced. Though the data in the table is publicly available, the individual banks studied are not specifically identified in order to avoid the appearance of issuing a judgement on the success of a specific merger. The pre- and post-merger assets for the banks involved in the mergers are presented to provide information concerning the scale of the banks studied.

As discussed in the main text of the article, all but three of the mergers resulted in an improvement in return on equity for the mergers studied when pre- and post-merger returns for the combined bank were compared. Since part of the improvement in ROE for the merged banks was associated with changes in financial leverage, we also evaluated ROA. We considered any merger that resulted in an improvement in ROE as well as an improvement in ROA a successful merger. We considered one merger that did not result in an improvement in ROA a success because the bank showed an improvement in continuing earnings from the pre-merger to the post-merger period. Based on these criteria, we concluded that twelve of the nineteen mergers were successful.

Beyond profitability measures, we also reviewed trends in net interest margin and cost efficiency. Based on the most frequently used measure of cost efficiency-noninterest expense to operating revenue-nearly all of the mergers that we considered successful from a profitability perspective were associated with improvements in cost efficiency relative to peer results. In many of these cases, the banks involved had higher-than-peer noninterest costs per unit of operating revenue and were able to reduce their costs to at or below peer levels following the merger.

Appendix: Table A1

**Comparison of pre- and post-merger financial ratios for merger pairs relative to peer groups**

Pair	Assets merged (\$000s)	Buyer, target more efficient	Net income/Equity	Net income/Avg. assets	Net income/Total revenue	Total revenue/Avg. assets	Capital/Avg. assets	Net interest margin	Interest expense/Avg. assets	Interest expense/Total revenue	Non-interest expense/Operating revenue	Non-interest expense/Total revenue	Non-interest expense/Avg. assets
1	6,066 <u>8,570</u> 14,636	Target	2.41	2.04	1.76	1.11	0.82	0.97	0.97	0.9	0.9	0.95	1.07
2	28,726 <u>15,382</u> 44,108	Buyer	1.2	1.23	1.24	0.99	1.03	1.04	0.98	0.99	0.85	0.9	0.88
3	28,912 6,524 <u>14,955</u> 50,391	Buyer	1.02	0.87	0.78	1.13	0.87	1.06	1.2	1.06	0.93	0.91	1.03
4	38,541 <u>11,760</u> 50,301	Buyer	1.05	1.14	1.03	1.1	1.1	1.17	1.03	0.93	0.92	0.97	1.07
5	53,770 <u>50,266</u> 104,036	Buyer	1.26	1.16	1.32	0.87	0.93	0.94	0.97	1.11	0.81	0.72	0.62
6	26,660 <u>7,077</u> 33,737	Target	1.35	1.09	1.11	0.96	0.8	0.89	0.97	1.01	0.96	0.94	0.9
7	37,303 <u>11,835</u> 49,138	Not clear	1.69	1.27	1.25	1.01	0.75	0.91	1.08	1.08	0.93	0.86	0.87
8	12,159 10,475 <u>14,614</u> 37,248	Buyer	1.68	1.21	0.92	1.25	0.75	1.17	1.27	1.02	0.88	0.85	1.07
9	16,711 <u>31,034</u> 48,015	Not clear	1.37	1.19	1.14	1.03	0.85	0.99	1.1	1.07	1.06	1.03	1.06
10	22,101 <u>8,316</u> 30,417	Buyer	1.49	1.52	1.55	0.98	1.01	1.08	0.9	0.92	0.76	0.83	0.81

Table continued on next page . . .

## Appendix: Table A1 (continued)

## Comparison of pre- and post-merger financial ratios for merger pairs relative to peer groups

Pair	Assets merged (\$000s)	Buyer, target more efficient	Net income/Equity	Net income/Avg. assets	Net income/Total revenue	Total revenue/Avg. assets	Capital/Avg. assets	Net interest margin	Interest expense/Avg. assets	Interest expense/Total revenue	Non-interest expense/Operating revenue	Non-interest expense/Total revenue	Non-interest expense/Avg. assets
11	39,545	Not clear	1.03	1.15	1.17	0.98	1.12	1.01	0.98	0.99	1	0.99	0.97
	<u>24,713</u>												
	64,258												
12	45,319	Not clear	1.18	1.28	1.24	1.03	1.08	1.04	1.01	0.98	0.96	0.98	1.01
	<u>16,325</u>												
	61,644												
13	19,671	Buyer	1.06	0.83	0.80	1.03	0.79	0.95	1.01	0.98	1.12	1.14	1.15
	<u>5,186</u>												
	24,857												
14	103,698	Target	1.25	0.92	0.90	1.03	0.72	0.88	1.08	1.05	1.03	0.99	1.02
	<u>33,065</u>												
	136,763												
15	52,729	Buyer	0.79	0.77	0.67	1.13	0.96	1.02	1.26	1.12	1.18	1.08	1.21
	<u>24,545</u>												
	77,274												
16	68,324	Not clear	0.95	0.9	0.94	0.96	0.96	0.94	0.99	1.03	1.03	1.01	0.96
	<u>47,460</u>												
	115,784												
17	29,868	Buyer	0.8	0.91	0.86	1.01	1.11	0.98	1.04	1.03	1.12	1.08	1.09
	<u>12,733</u>												
	42,601												
18	148,535	Target	1.15	0.89	0.93	0.96	0.77	0.89	1.06	1.11	1.05	0.98	0.95
	<u>44,141</u>												
	192,676												
19	53,135	Target	1.01	1	0.96	1.05	0.96	1.08	1.02	0.97	1.1	1.13	1.18
	<u>36,064</u>												
	89,194												