Are There Cost Savings from Bank Mergers?

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The frequency and scale of U.S. bank mergers are rising. During the past year alone, more than 500 banks announced plans to merge. The total value of transactions completed in 1991 exceeded $20 billion and was nearly five times the $4.3 billion total in 1990. All indications are that this trend will continue and may be a prelude to even more large-scale combinations.

Many policymakers and bankers are viewing mergers as the solution to a number of the problems plaguing U.S. banking: overcapacity, undercapitalization, lack of diversification, and low profitability. Proponents of consolidation argue that during the 1980s banks faced increased competition as deregulation, interest rate volatility, and technological changes in providing financial services diminished the demand for traditional banking products. The nation's banks have had difficulty adjusting to these changes. The industry has failed to contract sufficiently, resulting in growing excess capacity and declining profitability. Consolidation of large banking organizations at the national level is often advocated to reduce excess capacity in banking and to yield cost savings that would enhance banks' profitability.

There is significant evidence that challenges the widely held positive view of consolidation. John H. Boyd and Stanley L. Graham (1991), for example, basing their conclusion on their own analysis as well as other studies, find that big banks in and of themselves are neither more efficient nor safer than moderate-sized banks. Their study concludes that government policies—specifically, the policy of not allowing very large banks to fail—are the driving force behind consolidation. In the same vein, a recent paper by Gary Gorton and Richard Rosen (1991) examines the issue of whether mergers during the 1980s resulted in reduced excess capacity in banking, as measured by total assets. The authors conclude that corporate control problems prevented mergers from serving as an exit mechanism and that

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entrenched management leaves failure as the only way assets can be taken from the industry.

The issue of cost savings is important because potential savings are held out to regulators and shareholders alike as justification for recent megamergers. The Federal Reserve System has statutory responsibility to evaluate the likely effects of bank holding company mergers on competition, the financial and managerial resources and future prospects of the firms involved, the convenience and needs of the communities to be served, and Community Reinvestment Act (CRA) requirements.[1] For policy purposes it is important to distinguish between cost savings and improvements in efficiency. Some postmerger cost differences could be simply a function of shrinkage in the resulting firm's size rather than any real improvement in efficiency. However, only those cost savings that result from improved efficiency would create a more competitive institution and constitute a public benefit. Moreover, as Aruna Srinivasan and Larry D. Wall (1992) note, if significant efficiency gains from mergers are available, then blocking mergers because of antitrust concerns, safety and soundness reasons, or CRA considerations could have the negative result of further eroding the competitive position of domestic banks vis-a-vis nonbank firms and foreign banks. If the claimed cost savings can be shown to occur in the typical merger, shareholders should encourage further consolidation and be willing to pay a higher price for a target bank, with the expectation of higher profits from cost savings in the future. On the other hand, if bankers are overestimating the cost savings from mergers, they could risk overpaying for acquisitions because they rely too heavily on cost savings to produce a higher return.

The purpose of this article is to review studies that investigate the question of cost savings associated with bank mergers and to present additional evidence on pre- and postmerger changes in bank efficiency. In particular, it reports findings of recent research suggesting that bank mergers do not necessarily achieve significant economies. This research tests the proposition that bank mergers produced significant savings in cases in which costs are measured as noninterest expenses divided by the sum of net interest revenue and noninterest revenue. The before-and-after performances of all bank mergers completed between 1982 and 1986 are examined, with data analyzed for the full sample and for the fourteen states that make up the Southeast Compact.[2]

The results for the full sample suggest that the median merging banks experienced small but significant decreases in costs during the third and fourth postmerger years. However, when the performance of merged banks is compared with banks that did not merge, the trends in noninterest expenses at sample banks are not found to be significantly different from industrywide trends. Results for the Southeast Compact are similar and indicate decreases in the expense ratio during the second through the fourth postmerger years. As in the full sample, declines in the postmerger expense ratios can be explained by an overall industry decline in expense ratios.

Interesting patterns emerge in the components of noninterest expenses. Both the full sample and Southeast Compact mergers achieved significant reductions in labor costs during the four postmerger years. However, in the case of the full sample, the reduction in salaries was offset by increases in the other-expenses component, suggesting that the banks did not achieve significant economies in consolidating back-office operations. Southeastern banks, on the other hand, were more successful in controlling their postmerger expenses relating to data processing, advertising, product development, sale of branches, and the like.

While the sample of mergers from the 1980s provides the best available data to analyze efficiency gains, two caveats should be added to the conclusions derived in this study. First, the sample is limited to mergers that are much smaller in size than the recently announced megamerger combinations because no comparable mergers occurred during this study's sample period. Second, the acquiring banks' managers may not have intended to reduce costs.

*M*erger-Related Cost Savings

Estimates. Many parties to the current wave of bank mergers claim that there are substantial cost savings involved. Estimates of cost savings at the level of the industry range from $10 billion to $14 billion. The bulk of these savings ($8 billion) would be achieved through consolidation among the 127 largest bank holding companies (see Bill Atkinson 1991; Simon Brady and Caren Chesler-Marsh 1991).[3] These estimates represent a significant proportion of banks' annual noninterest expenses of $100 billion. Similarly, a recent bank survey concludes that consolidation economies are significant. Thirty-four banks ranging in asset size from $6 billion to more than $40 billion reported saving an average of 35 percent of the target bank's data processing and operations expense within

six to nine months after a merger (Keefe, Bruyette, and Woods Inc. 1990). The study also concluded that it was more difficult to achieve cost savings in a merger of banks of near-equal size. Other estimates by banking industry security analysts suggest that intramarket mergers can reduce expenses of target banks by as much as 40 percent and that intramarket mergers "represent the best hope for sustainable, higher profits in the [banking] industry" (Mark Alpert and Mark Lynch 1991). Savings following out-of-market acquisitions are estimated at 15 percent of the target banks' premerger noninterest expenses.

At the level of individual mergers, the estimates for cost savings range from 23 percent for NationsBank to 32 percent for the proposed merger of BankAmerica and Security Pacific.[4] Some bank analysts believe that bankers are being conservative about potential cost savings and that greater cost savings should eventually translate into higher profits (Gordon Matthews 1991).

Previous Evidence. What does the literature say to expect in terms of cost savings from bank mergers? A number of research papers have investigated issues relating to bank size, consolidation, and efficiency. Most such studies have sought to determine whether larger banking organizations exhibit lower average costs than smaller banks. In general, these studies find significant scale economies at small- to medium-sized banks. The cost advantages for large firms are not as clear. Some studies find that significant scale economies can be realized for banks having as much as $25 billion in assets (William C. Hunter and Stephen G. Timme 1991) while others find diseconomies at institutions with assets beyond about $500 million.[5]

Two recent studies use the cost function methodology to simulate mergers among large banks and estimate the resultant cost savings. Sherrill Shaffer (1991) simulates mergers between banks with more than $1 billion in assets. His results suggest that significant declines in costs occur in only 5 percent of the cases analyzed. Another study of hypothetical mergers among forty-one large banking organizations with substantial branch overlap estimates that even with branch closings the ratio of noninterest expenses to assets would increase (Donald T. Savage 1991). Thus, this line of research has not provided strong evidence suggesting that large mergers in general can be counted on to achieve substantial cost savings.

Another strand of research has attempted to discover whether individual past mergers have resulted in cost savings. While such studies typically focus on the change in noninterest expenses before and after the merger, changes in profitability and market share are also sometimes examined.[6] Stephen A. Rhoades (1986) examines pre- and postmerger performance using data from the 1970s. The results provide no indication that the performance of the average acquired firm improved after the merger. However, Rhoades's results have limited relevance for recent mergers because during the 1970s deposit-rate ceilings were in effect and banks did not face strong incentives to control noninterest expenses.

Dwight Crane and Jane Linder (1991) estimate changes in noninterest expenses in New England banks during the years from 1982 to 1987. They do not find evidence of substantial cost savings beyond those associated with postmerger shrinkage of the firms in question. Srinivasan and Wall (1992) note a number of limitations with the Crane and Linder study, including the failure to separate intra–holding company mergers from mergers of unaffiliated banks, a restricted sample size, and the failure to include holding company acquisitions.

Srinivasan and Wall examine the changes in noninterest expenses of mergers during the period from 1982 to 1986. The analysis focuses on the merging banks two years before and four years after the merger. The results, which are derived using a combination of univariate and multivariate analysis, indicate that noninterest expenses as a percent of total assets increase after the merger but that the increase can be explained by an overall industry increase in expense ratios and by changes in the composition of the merging banks' balance sheets. There is no evidence that mergers significantly lower expenses.

The univariate analysis compares the ratio of premerger noninterest expenses to total assets with the postmerger ratios. The results suggest that the noninterest-expense ratio increases significantly after the merger. This finding holds regardless of the premerger benchmark used (acquirer financial data or combined acquirer and target institutions' financial data). The median percentage change was found to be highest for large banks (those with more than $10 billion in assets). Midsize banks (between $1 billion and $10 billion in assets) experienced lower-than-average cost increases. The sample was also split in quartiles based on the premerger extent of overlap between acquiring and target banks. The results do not support the hypothesis that intramarket mergers produce significant cost savings. Finally, the data were adjusted for time trends by comparing the pre- and postmerger cost ratios with similar data for banks that did not engage in mergers. After the data were adjusted for industrywide

changes, the merging banks did not display statistically significant increases in their expense ratios.

A regression model is also estimated to control for other potential determinants of noninterest expense such as product mix. The dependent variable in the regression is the dollar value of the combined organization's noninterest expenses during years −2 and −1 and the acquirer's noninterest expenses during years +1, +2, +3, and +4. The independent variables include items that generate noninterest expenses such as loans, deposits, and noninterest revenues (used as proxies for fee-based and off-balance-sheet activities). Annual binary variables for the four postmerger years are proxies for the change in costs. In addition, a market overlap variable, time trend variable, and the number of targets the acquirer purchased in year 0 are included.

The regression results do not support the hypothesis that significant cost reductions result from bank mergers. Specifically, the coefficients on the postmerger binary variables are negative and insignificant for the most part. The coefficients on the proxy variables for product-mix and balance-sheet changes are significant with the correct sign. Banks that made multiple acquisitions in the same year were less likely to reduce postmerger costs. While there is some support for the common belief that intramarket mergers produce greater cost savings, the coefficients for the market-overlap variable and the multiple-acquisitions variable offset each other at the mean values of the sample.

Additional Evidence about Cost Savings

This study examines three issues not addressed in Srinivasan and Wall (1992). First, the regression results derived in Srinivasan and Wall's research suggest that product-mix changes are an important determinant of changes in noninterest expenses. However, the univariate results reported in that study do not take into account the effect of product-mix changes. During the 1980s banks increased their reliance on nontraditional, fee-based activities such as data processing, currency trading, and issuance of standby letters of credit, options, and forward contracts. Devoting resources to such activities generates income but does not create financial assets. By contrast, financial intermediation generates both income and financial assets. Consequently, other things being equal, one would expect a bank that is increasing its reliance on off-balance-sheet, fee-based activities simultaneously to increase its ratio of noninterest expense to total assets. In fact, the sample banks did increase their reliance on nontraditional activities between 1982 and 1986. The rate of growth of noninterest revenue exceeded the rates of growth in total assets and noninterest expenses during the sample period. To allow for the effects of changes in product mix on noninterest expenses this study uses an alternative measure of efficiency, representing the portion of operating income used up in noninterest expenses. Specifically, the ratio equals noninterest expenses divided by the sum of net interest income and noninterest income. Larger numbers reflect inefficiency.

Second, the results are analyzed separately for the full sample and for the fourteen states that make up the Southeast Compact to examine whether southeastern banks displayed different cost-cutting trends following mergers. The formation of the Southeast Compact was based partly on the presumption that interstate mergers would result in cost savings and greater efficiency of the firms involved (see, for example, Larry A. Frieder 1984). The sample period covers the three years preceding and roughly two years following enactment of interstate banking laws in the Southeast.

Third, this study decomposes noninterest expenses into its three components—salaries, premises, and other expenses—to examine whether mergers have a differential impact on the subcategories of expenses.

Data. All bank and bank holding company mergers between 1982 and 1986 were identified using Cates *MergerWatch*; the *Federal Reserve Bulletin*; *Merger Decisions*, published by the Federal Deposit Insurance Corporation; and *Quarterly Reports*, published by the Office of the Comptroller of the Currency (OCC). The sample period was selected to incorporate the effects of deregulation of deposit rates. It was necessary to end the study with mergers completed in 1986 so that there would be four years of data for performance evaluation after the last set of mergers. In order to better capture the effects of larger mergers, the sample includes only those transactions between acquiring and target banks that each exceed $100 million in assets. The data were organized according to the highest-level holding company in a banking organization. Intra–holding company transactions and acquisitions by foreign bank holding companies were excluded from the sample.

Many banks merged often during the sample period, necessitating a number of adjustments to the primary data. First, because year-end financial data were used, multiple acquisitions by a bank holding company during a single year were treated as one transaction. Second, the year the merger actually took place was excluded from the analysis because of insufficient information about whether the purchase method or

pooling-of-interest approach was used to account for the merger.[7] Finally, all transactions in which the acquirer was purchased within two years of the original merger were eliminated from the sample.

The ratio of noninterest expenses to operating income (defined as interest income minus interest expense plus noninterest income) was used to measure efficiency gains (cost savings) from bank mergers. Noninterest expenses were defined as the sum of salaries, premises, and other expenses. Other expenses include net losses from the sale of assets such as branches, the cost of data processing performed for the bank by outside vendors, advertising expenses, directors' fees, deposit insurance premiums, legal fees, and so forth. The financial data were taken from the year-end *Reports of Income and Condition* for the banks and the FR Y-9 Report for the bank holding companies.

To assess the impact of bank mergers, cost ratios were computed for the acquirer and target banks on a pro forma basis, as if they were a single institution during the two years before the merger (years −2 and −1).[8] Another set of cost ratios was computed for the merged bank or bank holding company for the four years after the merger (years +1, +2, +3, and +4).

Table 1 provides summary statistics for the acquirer and target bank holding companies in the full sample as well as the Southeast. Total assets of the southeastern acquiring banks were nearly 55 percent lower than those for the overall sample. The relative size variable (defined as the ratio of the target's assets to the acquirer's assets) was computed to determine whether mergers were among banks of equal size or small banks were being absorbed by larger ones. The mean value of the relative size variable, 0.32 for the full sample (0.30 for the Southeast), suggests that the effects of the merger would not necessarily be hidden among other changes in the acquirer's cost structure.

Table 1
Summary Statistics for Merger Partners
(Averages in the two years prior to the merger)

		Mean		Median		Standard Deviation	
	Variable	Full Sample	Southeast	Full Sample	Southeast	Full Sample	Southeast
Total Assets (Millions of dollars)	Acquirer	5,895.06	3,794.54	2,512.17	2,670.81		
	Target	988.21	1,042.67	312.73	388.82		
Noninterest Expenses (Millions of dollars)	Acquirer	167.60	122.32	76.62	90.06		
	Target	32.18	37.44	9.48	12.92		
Operating Income[a] (Millions of dollars)	Acquirer	232.21	176.16	116.93	129.85		
	Target	47.03	49.70	17.59	17.40		
Relative Size[b]		0.32	0.30	0.18	0.17	0.56	0.31
Market Overlap		0.27	0.25	0.09	0.15	0.35	0.30
Noninterest Expense/ Operating Income	Acquirer	0.69	0.69	0.70	0.72	0.07	0.07
	Target	0.74	0.76	0.73	0.73	0.16	0.21
Salaries/ Operating Income	Acquirer	0.36	0.36	0.37	0.37	0.05	0.04
	Target	0.38	0.39	0.38	0.38	0.08	0.11
Premises/ Operating Income	Acquirer	0.11	0.11	0.11	0.11	0.02	0.02
	Target	0.12	0.13	0.12	0.12	0.04	0.04
Other Expense/ Operating Income	Acquirer	0.22	0.21	0.21	0.21	0.04	0.03
	Target	0.24	0.25	0.22	0.23	0.08	0.09

[a] *Defined as net interest income plus noninterest revenue*
[b] *The ratio of the target's assets to the acquirer's assets*

Bank analysts typically assert that potential cost savings from intramarket mergers far exceed those from out-of-market acquisitions (Alpert and Lynch 1991; Matthews 1992). In this study banking markets were defined as metropolitan statistical areas (MSAs) for urban markets and counties for rural markets. The market overlap variable reflects the extent of premerger deposit overlap between the merger partners and is measured by the share of pro forma deposits derived from overlapping markets. In the full sample the market overlap variable has a mean of 0.27, suggesting that, on average, 27 percent of the combined organization's deposits were derived from markets in which both the acquirer and target banks were operating during the year before the merger.

The ratio of noninterest expense to the sum of net interest income and noninterest revenue indicates how efficiently banks spend money to make money. For example, the average acquiring bank spent $.69 cents to produce $1.00 of total net interest and noninterest revenue. According to this measure, target banks are not as efficient as acquiring banks, on average. Salaries are the most important component of noninterest expenses, followed by other expenses and premises. Any economies of scale in marketing and back-office operations would show up as declines in noninterest expenses and its components. Hereafter, the ratio of noninterest expense to the sum of net interest income and noninterest income is referred to as the noninterest expense ratio, or simply expense ratio.

Results. Table 2 presents the mean percentage change in the noninterest expense ratio and its components for the full sample and the Southeast. The results for the full sample suggest that the merging banks

Table 2
Mean Percentage Change in Noninterest Expense Ratio (and Its Components) of Merged Banks
(t-ratios in parentheses)

Expense Ratio	Year +1 Change	Year +2 Change	Year +3 Change	Year +4 Change
Noninterest Expense				
Full Sample	0.04	−0.75	−1.60	−1.14
	(0.06)	(−0.88)	(−1.53)	(−0.83)
Southeast	−1.30	−3.18	−3.49	−4.39
	(−1.08)	(−2.48)*	(−2.05)*	(−2.98)**
Salaries				
Full Sample	−2.49	−4.41	−6.52	−7.01
	(−3.78)**	(−5.86)**	(−7.92)**	(−7.36)**
Southeast	−4.19	−5.92	−6.73	−7.37
	(−5.15)**	(−5.54)**	(−5.13)**	(−5.80)**
Premises				
Full Sample	0.48	0.11	−0.48	0.45
	(0.26)	(0.05)	(−0.22)	(0.18)
Southeast	−5.93	−4.59	−4.70	−4.85
	(−2.57)*	(−1.95)	(−1.82)	(−1.64)
Other Expenses				
Full Sample	6.06	7.23	8.02	9.27
	(3.95)**	(3.98)**	(4.13)**	(4.54)**
Southeast	6.45	3.08	4.42	3.00
	(2.10)*	(1.04)	(1.21)	(1.41)

Note: *The denominator is defined as interest income minus interest expense plus noninterest income. The premerger benchmark is the combined noninterest expenses for the merger partners averaged over years −2 and −1. Number of observations: full sample = 240; Southeast = 77.*

* *Indicates significance at the 5 percent level*

** *Indicates significance at the 1 percent level*

experienced small, insignificant declines in their noninterest expense ratio during years +2 through +4. On the other hand, banks in the Southeast managed to reduce their noninterest expense ratio by nearly 5 percent relative to the premerger period. Virtually all of the decline in the noninterest expense ratio can be attributed to declines in the salaries component, which was statistically significant for both the full sample and the Southeast. The ratio of premises expenses to operating income showed declines in the Southeast but was not statistically significant. Finally, other expenses, the second-largest component of noninterest expenses, showed significant increases growing from 6.06 percent (year +1) to 9.27 percent (year +4) in the full sample. Merging banks in the Southeast experienced statistically insignificant increases in the other-expenses component. Splitting the sample by asset size class reveals that large banks (exceeding $10 billion in assets) displayed statistically insignificant increases in expense ratios while medium-sized banks ($1 billion to $10 billion in assets) experienced significant reductions in expense ratios during the first four postmerger years.

From a statistical point of view, it is important to compute changes using the sample median in addition to the mean because mean values could be influenced by unusually high or low values.[9] Furthermore, testing the significance of means requires assumptions about the distribution of the underlying population—for example, that the population is normally distributed. This assumption may not be valid in the case of small samples.

Table 3 reports median percentage changes in the noninterest expense ratio and its components for the first four postmerger years. The Wilcoxon signed rank statistic was used to test for the significance of the percentage changes.[10] Declines in the noninterest expenses and salaries ratios are greater in magnitude than those reported in Table 2 and are statistically significant for the most part. Increases in other expenses are statistically significant but are of smaller magnitude than those reported in Table 2.

The results presented in Tables 2 and 3 suggest that the merging banks were successful in reducing the salaries component of noninterest expenses. However, that reduction was at least partially offset by rapid increases in the other-expenses component, resulting in unchanged or slightly lower noninterest expenses for the overall sample. Southeastern banks, on the

Table 3
Median Percentage Change in Noninterest Expense Ratio (and Its Components) of Merged Banks

Expense Ratio	Year +1 Change[a]	Year +2 Change[a]	Year +3 Change[a]	Year +4 Change[a]
Noninterest Expense				
Full Sample	−0.30	−1.87	−3.96*	−4.84*
Southeast	−1.14	−3.40**	−5.12**	−5.18**
Salaries				
Full Sample	−3.73**	−5.83**	−7.99**	−9.32**
Southeast	−4.26**	−5.98**	−7.36**	−9.18**
Premises				
Full Sample	−1.48	−4.25	−5.31	−5.32
Southeast	−4.31*	−5.93	−6.71	−7.81
Other Expenses				
Full Sample	4.60**	3.32**	3.04**	3.48*
Southeast	2.96	0.77	−0.28	1.01

Note: *The denominator is defined as interest income minus interest expense plus noninterest income. The premerger benchmark is the combined noninterest expenses for the merger partners averaged over years −2 and −1.*

[a] *Significance levels are based on two-tailed Wilcoxon signed rank tests.*

* *Indicates significance at the 5 percent level*

** *Indicates significance at the 1 percent level*

other hand, controlled growth in the other-expenses component and, consequently, experienced statistically significant reductions in noninterest expenses. The results imply that, while banks in the full sample eliminated redundant management positions and reduced staff, they realized limited if any economies from consolidating information systems (computer hardware, software, and facilities) and in marketing activities such as product development and advertising.

A potential problem for evaluating the pre- and postmerger changes is that some of the differences could be accounted for by industrywide factors. One way to isolate merger-specific changes is to compare the sample of merging banks with a relevant industry group. In this case the relevant industry group includes all banks that did not merge. The industry-adjusted data for the full sample are reported in Table 4.[11] The first column in Table 4 reports the premerger noninterest expenses ratio (and its components), averaged over years −2 and −1. The *t* statistic tests the null hypothesis that the sample and industry banks are not significantly different before merger. For the most part, there are no significant differences in the premerger expense ratios across the sample and industry in years −2 and −1. The only exception is the average for other expenses, which is significantly lower at the merging banks. Columns 2 through 5 report the postmerger changes in noninterest expenses and its components. The *t* statistic tests the hypothesis that the postmerger changes in noninterest expenses at the sample banks are not significantly different from industrywide trends in noninterest expenses during the same period. The null hypothesis cannot be rejected for any of the postmerger years, suggesting that the merging banks were no more efficient than the industry.[12]

The sample banks achieved significantly larger salary reductions than the comparison group. Changes

Table 4
Performance of Merged Banks Compared with the Industry

Expense Ratio[a]	Averages over Years −2 and −1	Year +1 Change[b]	Year +2 Change[b]	Year +3 Change[b]	Year +4 Change[b]
Noninterest Expenses					
Sample	0.70	0.0004	−0.0075	−0.0160	−0.0114
Industry	0.71	0.0036	0.0022	0.0007	0.0080
t-Test of Mean Differences	1.36	0.47	1.03	1.47	1.25
Salaries					
Sample	0.37	−0.0249	−0.0441	−0.0652	−0.0701
Industry	0.36	−0.0189	−0.0259	−0.0317	−0.0297
t-Test of Mean Differences	−1.82	0.81	2.16*	3.62**	3.81**
Premises					
Sample	0.11	0.0048	0.0011	0.0048	0.0045
Industry	0.11	0.0421	0.0493	0.0423	0.0424
t-Test of Mean Differences	0.64	1.82	2.14*	1.94	1.41
Other Expenses					
Sample	0.22	0.0606	0.0723	0.0802	0.0947
Industry	0.23	0.0512	0.0607	0.0710	0.0940
t-Test of Mean Differences	4.19**	−0.53	−0.56	−0.43	0.05

[a] *The denominator is defined as net interest income plus noninterest income.*
[b] *These numbers represent actual changes in noninterest expenses and its components (not percentage changes).*
* *Indicates significance at the 5 percent level*
** *Indicates significance at the 1 percent level*

in premises and other expenses at sample banks did not differ significantly from the industry. Overall the data suggest that merging banks did not improve their noninterest expenses relative to the industry.

The results of testing the view that intramarket mergers can result in significant cost savings are presented in Table 5.[13] The sample is split by quartile of the market overlap variable.[14] The first quartile includes merger observations in which there was no market overlap. The second quartile includes observations with overlap greater than zero but less than the median and so on for the third and fourth quartiles. A value of 100 indicates perfect overlap. In general, the results for the full sample do not support the claim that a higher degree of market overlap is associated with greater cost savings. Southeastern banks in the first and third quartiles displayed significant reductions in noninterest expenses.

There are several possible explanations for this result. First, market overlap as measured here may overestimate the actual branch overlap. Savage (1991) estimates that only 2.7 percent of U.S. bank deposits are in "duplicative" branches of large banks.[15] Second, branch operating costs may be low, and any efficiency gains from closing overlapping branches may be small in relation to the overall banking system. Third, controlling for other potential determinants of noninterest expenses, Srinivasan and Wall (1992) find that opportunities for cost-cutting are greater when the merger partners operate in the same deposit market. This relationship may not be apparent in the univariate analysis because the market overlap variable

Table 5
Mean Percentage Change in the Noninterest Expense Ratio of Merged Banks by Market Overlap Quartile
(t-ratios in parentheses)

Market Overlap Quartile	Year +1 Change	Year +2 Change	Year +3 Change	Year +4 Change
First Quartile				
Full Sample	0.39	−0.39	−2.65	−0.30
(No Overlap)	(0.46)	(−0.23)	(−1.99)	(−0.15)
Southeast	−2.57	−5.37	−6.03	−4.73
(No Overlap)	(−2.09)*	(−4.11)**	(−3.53)**	(−2.33)*
Second Quartile				
Full Sample	−0.74	−1.96	−3.84	3.70
(0−8.83)	(−0.63)	(−1.50)	(−2.43)**	(0.87)
Southeast	2.20	0.35	0.97	−4.15
(0−15.12)	(0.48)	(0.08)	(0.15)	(−1.22)
Third Quartile				
Full Sample	−0.02	−1.21	−0.57	−2.94
(8.83−53.37)	(−0.01)	(−0.85)	(−0.25)	(−1.37)
Southeast	−2.95	−5.38	−5.55	−7.03
(15.12−37.24)	(−1.36)	(−2.54)**	(−2.44)**	(−3.06)**
Fourth Quartile				
Full Sample	0.02	−0.01	0.00	−3.18
(53.37−100)	(0.01)	(−0.06)	(0.00)	(−0.98)
Southeast	−0.94	−1.19	−2.11	−1.35
(37.24−100)	(−0.49)	(−0.41)	(−0.62)	(−0.33)

Note: *The denominator is defined as net interest income plus noninterest income. The premerger benchmark is the combined noninterest expenses for the merger partners averaged over years −2 and −1.*
* *Indicates significance at the 1 percent level*
** *Indicates significance at the 1 percent level*

is correlated with other variables such as noninterest revenue or total assets.

Bank surveys typically disclose that in a merger of equals neither bank has the capacity to absorb the data-processing and back-office operations of the other. In addition, political considerations often make prompt action difficult (Keefe, Bruyette, and Woods Inc. 1990; Brady and Chesler-Marsh 1991).[16] Table 6 splits the sample by relative size of the merger partners to examine how successful mergers of equals have been in reducing costs. Relative size is measured by the ratio of the target's premerger assets to the acquirer's premerger assets. Thus, the first quartile in Table 6 includes merger observations in which the target's assets amounted to less than 9 percent of the acquirer's, whereas the fourth quartile includes transactions in which the target's assets exceeded 40 percent of the acquirer's premerger assets. Contrary to popular notion, there are significant reductions in costs in the third and fourth quartiles, both for the full sample and for institutions in the Southeast Compact. One possible explanation is that mergers of equals generally involved small and medium-sized banks (less than $5 billion in assets) during the sample period. The economies of scale literature has consistently found significant cost savings opportunities for banks in this size category.

Conclusion

This study examines the noninterest expenses of bank merger partners for the two years prior to the

Table 6
Mean Percentage Change in the Noninterest Expense Ratio of Merged Banks by Relative Size Quartile
(t-ratios in parentheses)

Relative Size Quartile	Year +1 Change	Year +2 Change	Year +3 Change	Year +4 Change
First Quartile				
Full Sample	1.23	0.55	2.25	5.25
(0−8.12)	(1.16)	(0.38)	(0.88)	(1.53)
Southeast	−2.08	−2.98	0.31	−2.39
(0−7.71)	(−1.42)	(−1.01)	(0.06)	(−0.81)
Second Quartile				
Full Sample	0.49	−0.33	0.70	−1.02
(8.12−20.27)	(0.53)	(−0.26)	(0.31)	(−0.41)
Southeast	0.33	0.25	−1.01	−1.00
(7.71−19.23)	(0.21)	(0.10)	(−0.39)	(−0.27)
Third Quartile				
Full Sample	−0.31	0.22	−3.20	−1.68
(20.27−43.40)	(−0.21)	(0.10)	(−2.43)**	(−0.67)
Southeast	−0.77	−4.50	−6.33	−8.05
(19.23−39.40)	(−0.19)	(−1.60)	(−2.41)**	(−3.26)**
Fourth Quartile				
Full Sample	0.17	−2.20	−4.95	−6.30
(43.45−1.50)	(0.12)	(−1.23)	(−2.46)**	(−3.26)**
Southeast	−1.79	−4.61	−5.65	−5.26
(39.40−1.22)	(−1.10)	(−2.07)*	(−2.79)**	(−2.03)*

Note: *Relative size = target's premerger assets/acquirer's premerger assets. The denominator is defined as net interest income plus noninterest income.*
* *Indicates significance at the 5 percent level*
** *Indicates significance at the 1 percent level*

merger and four years after the merger. The sample consists of all mergers between 1982 and 1986 involving participants that had total assets of at least $100 million. Efficiency gains (cost savings) are measured relative to the sum of net interest income and noninterest revenue. Merger data for Southeast banking organizations are analyzed to determine whether relaxation of interstate banking laws in this region contributed to significant efficiency gains at merging banks.

The results generated by comparing the pre- and postmerger expense ratios suggest that the average bank merger produced small but significant declines in the ratio of noninterest expense to the sum of net interest income and noninterest income. For example, the median merging bank in the full sample reduced costs by 4.84 percent (in the Southeast, by 5.18 percent) by the fourth postmerger year. The decline in expenses for the average (mean) merging bank in the full sample was statistically insignificant. The magnitude of decline in noninterest expenses four years after the merger was well below the projected declines of 23 percent to 32 percent for recent megamergers. The components of noninterest expenses display interesting patterns and suggest that, while acquiring banks in the full sample and the Southeast have been successful in reducing the salaries component, these savings have been largely offset for the full sample by increases in the other-expenses component; southeastern banks, on the other hand, controlled growth in this component.

The data were adjusted for time trends using an industry comparison group. Changes in noninterest expenses at the merging banks were not significantly different from industrywide trends during the same period. The univariate analysis did not find substantial cost reductions in past intramarket mergers, although the effect may be masked because of correlation between the market overlap variable and other potential determinants of noninterest expenses. Mergers of equal size were found to show greater-than-average reductions in costs.

The analysis presented in this paper suggests the need to control for changes in product mix when measuring operational efficiency. The univariate results derived in this study allow for differences in product mix at the sample banks. The choice of denominator (total assets or net interest income plus noninterest revenue) affects the pre- and postmerger univariate results. At the same time, the results are consistent with those derived in Srinivasan and Wall (1992) because adjusting for industrywide trends reveals that the typical merging bank performs no better than the industry. Further, the regression analysis in Srinivasan and Wall controls for changes in product mix over time and concludes that the typical bank merger does not reduce operating costs significantly.

An analysis of past bank mergers indicates that significant cost savings are far from automatic. Researchers, bankers, and bank analysts all agree that regardless of size there are wide variations in banks' efficiency, so the potential for cost savings may be greater in some mergers than in others. While this study does not conclude that cost savings are impossible to achieve, its findings suggest that regulators and shareholders should give even more careful consideration to claims of cost savings on a case-by-case basis.

Notes

1. The Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency also observe similar standards in evaluating bank mergers.
2. The Southeast Compact includes the following states: Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. See Goudreau and Wall (1990) for a description of interstate banking trends in the Southeast.
3. Of the $10 billion in cost savings mentioned in the Treasury proposal, $8 billion would be achieved through consolidation among the 127 largest bank holding companies in the United States, and $2 billion would be saved through repeal of the McFadden Act. McKinsey and Company adds $4 billion in savings from small bank consolidations to the Treasury estimate.
4. Srinivasan and Wall (1992) derive these estimates by taking management's projected savings and dividing by Value-Line's projection of the target banks' noninterest expenses for 1991.
5. A recent review of the evidence is in Humphrey (1990).
6. Spindt and Tarhan (1991) examine the issue of synergistic gains from bank mergers. Using data on 300 mergers that occurred in 1986, they find that prior to mergers target banks tended to be underperformers, and acquiring banks generally were normal performers. The combined institution tended to increase its return on equity after the merger. Spindt and Tarhan interpret their results as being consistent

with an efficiently operating market for corporate control. Their results have limited relevance for current merger trends because the median independent target bank in their sample had only $26 million in assets.

7. Some mergers are accounted for using the purchase method, by which accounts are consolidated after the merger, while others use a pooling-of-interest approach that consolidates accounts from the beginning of the year. Results for year 0 are therefore not comparable across banks.
8. This benchmark indicates the extent to which the acquirer transferred its management style and efficiency skills to the target bank.
9. While the mean is the average value of the sample, the median is the value such that half of the numbers in a list are above it and half are below it.
10. The Wilcoxon signed rank statistic was constructed in the following manner (Hollander and Wolfe 1973). First, the absolute values of the percentage changes were ranked. Then the sums of the ranks were calculated for the positive differences and negative differences, giving T_+ and T_-. If T is the smaller of T_+ and T_- and the sample size N is large, then T is a normal random variable with parameters: mean $\mu_T = [N(N + 1)]/4$ and standard deviation $\sigma_T = [N(N + 1)(2N + 1)]/24$. The statistic $(T - \mu_T)/\sigma_T$ is a standard normal variable that can be compared with a standard normal table to decide whether to accept the null hypothesis, that the percentage changes are not significant.
11. The analysis was also carried out for merging banks in the Southeast. The relevant comparison group included banks in the Southeast Compact that did not engage in mergers. The results are consistent with those derived using the full sample.
12. Although the changes in the expense ratios for the sample and industry groups have opposite signs during years +2, +3, and +4, there was a great deal of variability within the industry, so the claim that the industry and sample bank expense changes are identical could not be rejected.
13. The results using medians were very similar and are not reported here.
14. There are unequal numbers of observations in the quartiles because the controlling variable used to create the quartiles is market overlap.
15. Savage (1991) measures branch overlap within five-digit postal zip code areas.
16. The sheer size of the mergers creates concerns about employee morale, turnover, and balance of power. Many of these issues paralyze banks and prevent them from taking prompt, decisive actions.

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