Determinants of Cost Efficiencies in Bank Mergers

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Abstract: A thick cost frontier methodology is used to estimate pre- and postmerger cost inefficiency in 348 mergers approved by the OCC in 1987 and 1988. The results are not consistent with the traditional "market for corporate control" story in which well-managed acquirers improve the performance of poorly managed targets. Cost efficiency improved in the majority of mergers, but gains were small and were not related to the acquiring bank's efficiency advantage over its target. Efficiency improved most often when both merger partners were relatively cost inefficient, suggesting that cost savings depend more on the opportunities facing management than the quality of that management. Banks that made acquisitions frequently were relatively successful at capturing postmerger efficiencies, suggesting a role for experience effects.

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I. Introduction

Banks acquire other banks for a variety of reasons -- for example, market power, diversification, external growth, and managers' preferences -- but the most frequently cited reason for recent bank mergers is cost savings. There is considerable confusion, however, about whether and how bank mergers generate cost savings. In theory, pruning fixed expenses (e.g., by eliminating overlapping branch offices or duplicate back office systems) can create scale economies by allocating the overhead of a single bank across the activities of two previously independent banks. But the empirical literature on banking costs finds that scale economies are limited to the smallest banks, and as such are not available in many bank mergers.

Recently, banking cost studies have identified a potential for merger-induced cost savings that is independent of scale. These studies find substantial cost inefficiencies -- sometimes referred to as X-inefficiencies -- in banks of all sizes.[1] The primary cause of these inefficiencies appears to be technical inefficiency, i.e., employing excess inputs. Bank mergers may be able to exploit this potential for cost savings by transferring efficient management practices to poorly managed target banks. This paper tests whether the pattern of pre- and postmerger cost inefficiency observed in banks is consistent with an efficient "market for corporate control" and attempts to identify the merger characteristics that are most conducive to converting premerger cost inefficiency into postmerger cost savings.

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[1] Referring to a bank's distance from the efficient frontier as "X-inefficiency" is a misnomer. Leibenstein (1966) coined this term to describe cost overruns attributable to management laxity at firms with market power. The more general wording "cost inefficiencies" refers to the failure of management--for whatever reason--to operate the firm on the production frontier.

This study examines the costs of 348 single-target bank mergers approved by the Office of the Comptroller of the Currency in 1987 and 1988. Estimates of pre and postmerger cost inefficiencies are generated by comparing the costs incurred by merging banks to a "thick" cost frontier, estimated using a multiproduct, translog cost specification. Previous studies using frontier-efficient techniques have focussed on mergers of banks with more than $1 billion in assets; this study expands the literature by applying these techniques to bank mergers of all sizes.

In general, the results are not consistent with the traditional market for corporate control story in which a well-managed acquirer improves the performance of a poorly managed target. Although 58 percent of the mergers studied did make efficiency gains, these gains tended to be statistically insignificant, and were not related to the size of the efficiency advantage held by an acquiring bank over its merger target. Cost efficiency improved most when *both* merger partners were relatively inefficient, an indication that postmerger efficiencies may depend more on the opportunities facing management than the quality of that management. Mergers in which the acquiring bank made repeated acquisitions over time generated efficiency gains 50 percent more often than acquisitions by banks entering the market less frequently, suggesting that experience effects may exist. There was also weak evidence of efficiency gains in mergers between banks of disparate sizes, and mergers between affiliates of the same bank holding company (BHC).

Section II discusses the sources of efficiencies from bank mergers and summarizes the results of other bank merger efficiency studies. Section III presents the statistical model and data sets used to generate estimates of cost inefficiency. Section IV outlines the hypotheses to be tested and methods by which they are tested. Section V reports the results of these tests. Section VI contains concluding remarks.

II. Bank Mergers and Cost Savings

Many banking experts advocate bank mergers on the grounds that they will produce substantial cost savings. Projected savings equal to 15 percent of noninterest expense at target banks in intermarket mergers, and 40 percent in intramarket mergers, are not uncommon.[2] But pronouncements like these can be misleading. Berger and Humphrey (1992) point out that expressing savings as a percentage of the operating costs at the target, rather than as a percentage of the total costs of the combined banks, can vastly overstate savings. And aside from such misrepresentations, realized savings can simply fall short of projections.

Although a merger can help a bank grow larger or become more diversified, the majority of banking cost studies suggest that neither transformation will significantly reduce costs at most banks.[3] Most studies of scale economies find only modest savings that are fully exploited by the time a bank has $100 to $200 million in assets, followed eventually by slight scale diseconomies as the bank grows larger.[4] Studies of scope economies find little evidence that offering a wide range of products gives a bank a cost advantage over its less diversified rivals.

From the scale and scope evidence alone, then, most bank mergers would seem to have no

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[2] See Srinivasan (1992).

[3] See Evanoff and Israilevich (1991), Humphrey (1990), Clark (1988), and Mester (1987) for reviews of the banking scale and scope economy literature.

[4] Although the vast majority of studies come to this conclusion, these results are not universal. McAllister and McManus (1993), Ferrier and Lovell (1990), and Hunter and Timme (1986) find scale economies for banks over $1 billion in assets. Evanoff and Israilevich (1991) show that estimates of inefficiency from suboptimal scale vary widely among studies, ranging from less than 3 percent to almost 40 percent.

cost savings potential. However, a third stream of research suggests that bank mergers might deliver cost savings by replacing inefficient managers with efficient ones. These studies find that banks of similar size and product mix often incur widely divergent costs that vary by amounts far larger than the savings available from scale and scope economies.[5] If management quality is the source of these cost disparities, a merger in which a cost-efficient bank purchases a cost *in*efficient bank might generate significant cost savings.

Studies typically measure cost inefficiency by computing the distance between a bank's actual costs and a "frontier-efficient" or "best practices" cost function representing the lower bound of costs attainable only by the most efficiently managed banks. The resulting estimate of cost inefficiency is controlled for cost differences due to scale and product mix and is often decomposed into components that measure technical and allocative inefficiency. A variety of techniques have been used, and although each has its particular strengths and weaknesses, each tends to find cost inefficiencies that dominate scale and scope economies in most banks.[6]

The "thick frontier" method uses *a priori* information to select an efficient quartile of banks, then uses standard econometric techniques to estimate a "thick" lower bound (as opposed to a discrete edge) of costs. Using the thick frontier method, Berger and Humphrey (1991) found that the average bank had unit costs around 25 percent greater than the efficient lower bound. McAllister and McManus (1993) found that banks in the lower quartile operated at over 80 percent of their

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[5] See Evanoff and Israilevich (1991) for a relatively recent review of studies of productive efficiencies in banking.

[6] Each of the papers cited in the text that follows includes discussions of comparative strengths and weaknesses. The most frequently criticized features of each method are: the thick frontier approach uses an ad hoc procedure to select the best practices banks; the stochastic frontier approach requires an equally ad hoc choice of a functional form for the error process; and the DEA approach includes unexplained disturbances in the inefficiency measure. Each of these methods is superior to using a traditional econometric cost function as an efficiency benchmark, which makes the unrealistic assumption that all banks are cost minimizers.

efficiency potential, compared to only about 30 percent for banks in an upper cost quartile.

"Stochastic cost frontier" methods separate the error term in an econometric cost function into two components: a symmetric, random disturbance, and a one-sided, nonrandom component that is assumed to be related to inefficiencies. Using stochastic cost frontier methods, Ferrier and Lovell (1990) found that costs at the average bank were about 26 percent greater than the frontier.

"Data envelopment analysis" uses a nonparametric (linear programming) method to generate a lower envelope of the production function. Ferrier and Lovell (1990) found that the average bank uses 21 percent more inputs than necessary. Aly, Grabowski, Pasurka, and Rangan (1990) found that the banks in their sample could have employed 35 percent fewer inputs without reducing output. Elyasiani and Mehdian (1990), who measured technical but not allocative efficiencies, found that banks overemployed inputs by about 12 percent.

Most studies of bank mergers and cost inefficiency have studied "megamergers" in which both banks have over $1 billion in assets. Shaffer (1993) used thick frontier techniques to simulate megamergers between actual banks under various assumptions about the postmerger transfer of efficiency. In scenarios that paired cost-efficient banks with cost-inefficient banks, significant savings resulted when it was assumed that 100 percent of the cost efficiency difference was eliminated after the merger.

Although Shaffer's results suggest that some bank mergers have the *potential* to reduce cost inefficiency, studies of actual mergers find that such potential does not guarantee actual cost savings. In a study of 57 megamergers, Berger and Humphrey (1992) used regression residuals to rank the cost efficiency of merging banks against all nonmerging megabanks. Most of these mergers showed the potential for efficiency gains (i.e., acquiring banks were more X-efficient than their targets);

however, this potential was not systematically exploited after the merger. Fixler and Zieschang (1993) used index numbers to compare the productivity (output as a ratio of inputs) of banks that merged to the productivity of hypothetical "reference" banks having similar characteristics and found results similar to those of Berger and Humphrey.

The number of studies testing bank mergers for overall (scale plus scope plus cost efficiency) efficiency gains has increased greatly in recent years. Srinivasan (1992), Rhoades (1993), Linder and Crane (1992), O'Keefe (1992), Spindt and Tarhan (1991), and others compare pre- and postmerger financial ratios. With a few exceptions, these studies conclude that bank mergers do not systematically reduce postmerger costs.[7] Benston, Hunter, and Wall (1992) found that the acquisition price premium in bank mergers was positively related to acquiring bank efficiency (proxied by the ratio of market to book value) and negatively related to target bank efficiency. This suggests that the market for corporate control of banks expected efficient managers to be able to improve the performance of targets previously run by inefficient managers. Results from stock market event studies of bank mergers have been mixed; depending on the sample of mergers tested, the studies have found either positive, negative, or insignificant abnormal returns.[8]

III. Estimating Cost Inefficiency

This study uses a modified thick cost frontier method to estimate efficiency benchmarks. The benchmarks are expressed in terms of unit costs (total costs divided by assets). Unit costs from a

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[7] Berger and Humphrey (1992) discuss this literature at length.

[8] Baradwaj, Dubofsky, and Fraser (1992) review this literature.

sample of 348 mergers approved by the OCC in either 1987 or 1988 are compared to these benchmarks. Premerger cost inefficiency is estimated for acquiring and target banks by comparing unit costs to the cost frontier in the year before the merger (either 1986 or 1987). Postmerger cost inefficiency is estimated for merged banks by comparing unit costs to the cost frontier three years after the merger (either 1990 or 1991).

An identical series of tasks was performed to estimate the thick cost frontier for each of these years (1986, 1987, 1990, and 1991). A multiproduct translog cost function was estimated for the population of all commercial banks, and the residuals were saved. The banks were placed in order by asset size, and this ordering was partitioned into asset deciles. The banks in each of these asset deciles were then placed in order by size of residual. The banks in the lowest quartile of each asset decile (i.e., the 25 percent of the banks with the most negative residual values) were assumed to be the most cost efficient or "best practices" banks.[9] The translog cost model was then estimated again, this time using data from the best practices banks only, producing an efficient cost frontier for each of the four years.

III.A Multiproduct Translog Cost Model

The following translog cost function and associated factor share equations were estimated

[9] The original thick cost frontier method of Berger and Humphrey (1991) used average cost to define the set of cost-efficient banks. The residual-based procedure used here is superior, because it selects the set of best practices banks after controlling for the impact of product mix, input prices, branching restrictions, and organizational form on costs.

using seemingly unrelated regression techniques:[10]

$$lnC = \alpha_0 + \sum_{i}^{5} \alpha_i lnY_i + \frac{1}{2}\sum_{i}^{5}\sum_{j}^{5} \beta_{ij} lnY_i lnY_j + \frac{1}{2}\sum_{m}^{4}\sum_{n}^{4} \delta_{mn} lnW_m lnW_n \qquad (1)$$

$$+ \sum_{m}^{4} \gamma_m lnW_m + \sum_{i}^{5}\sum_{m}^{4} \theta_{im} lnY_i lnW_m + \lambda_L * LIMIT + \lambda_U * UNIT + \lambda_B * BHC + \varepsilon$$

$$S_m = \gamma_m + \sum_{n}^{4} \delta_{mn} lnW_n + \sum_{i}^{5} \theta_{im} lnY_i + \eta \qquad (2)$$

where:

C = interest expense plus noninterest expense.

Y_i = output vector; i,j = 1,2,3,4,5 (commercial and industrial loans, real estate loans, consumer loans, securities, and transactions deposits)

W_m = input price vector; m,n = 1,2,3,4 (wage rate, price of physical capital, price of deposited funds, price of purchased funds)

LIMIT = dummy equal to 1 in limited branching states.

UNIT = dummy equal to 1 in unit banking states.

BHC = dummy equal to 1 if bank is a member of a bank holding company.

S_m = the share of C generated by expenditures on input m.

ϵ,η = error terms assumed to capture random cost fluctuations.

All variables were constructed from year-end Reports of Condition and Income (call report) data except for LIMIT and UNIT, which were constructed using information from Amel (1991). The wage rate equals salaries and benefits divided by the number of full-time equivalent workers (FTEs);

[10] The factor share equations were generated by differentiating the cost function with respect to W_m and invoking Shepard's lemma. The resulting share equations sum to one, so the physical capital equation was omitted from the estimation to avoid singularity in the variance-covariance matrix. The standard symmetry and homogeneity restrictions were imposed on the model. See Johnston (1984), pp. 335-336.

the price of physical capital equals depreciation expense divided by the original price of physical assets; the price of deposited funds equals interest expense on transactions, savings, and time deposits (excluding CDs > $100,000) divided by these balances; and the price of purchased funds equals interest expense on large CDs, Fed funds, foreign deposits, and other borrowed funds divided by these balances. Transactions deposits equal demand deposits, NOW accounts, and other nonsavings and nontime deposits.[11] Securities are included as an output because of their unprecedented increase on bank balance sheets in the early 1990s. BHC controls for cost differences due to organizational form. LIMIT and UNIT are included to control for the impact of branching restrictions on costs. The number of branches operated by each bank is purposefully excluded so that the costs of overbranching can appear as cost inefficiency.[12]

More than 10,000 observations of commercial banks in each of the four years were used. Because the natural log of zero is undefined, output variables with values of zero were set equal to one. A small number of banks were dropped in each year due to reported costs of zero.

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[11] Deposits appear as both inputs and outputs in the model. Treating deposits as inputs is consistent with a model in which banks "purchase" deposits in order to intermediate between savers (deposits) and investors (loans). Banks might also use these inputs, along with physical capital and labor, to "produce" payment and liquidity services. Transactions deposits are included in the vector of output variables to proxy the amount of these services produced by the bank. Lawrence (1986) and Berger and Humphrey (1991) make similar distinctions between purchased and produced deposits in translog cost models.

[12] For example, imagine a bank with nine branches, but for which seven branches would minimize costs. If a "number of branches" variable was included in the efficiency benchmark, the procedure would calculate cost inefficiency by comparing this bank's costs to the costs of a hypothetical benchmark bank for which nine branches is optimal. Thus, cost inefficiency for the bank in question would be underestimated by ignoring the excess costs of operating two extra branches. (Note: this logic assumes that the banks in the best practice subsample employ the efficient number of branches.)

III.B Merging Banks

The sample of 348 mergers from 1987 and 1988 was selected from the approved merger applications in the *OCC Quarterly Journal*. All mergers appearing in this source were included unless: (a) data for all the variables in the model were not available, (b) the merger target was not a commercial bank, or (c) multiple target banks were acquired in the same merger application.

The absolute and relative asset sizes of the 696 merging banks are shown in Tables 1a and 1b. Acquiring banks were distributed somewhat uniformly by asset size, but their targets were skewed toward smaller institutions. The acquiring bank was larger than its target in 88 percent of the mergers. Both banks had less than $100 million in assets in about 35 percent of the mergers, and less than 3 percent of the transactions were megamergers. Relative to conventional estimates of efficient scale in banking (see above), the median acquirer ($143 million) had exhausted opportunities for scale economies, but the median target ($38 million) was operating at suboptimal scale.

About 31 percent of the mergers were purchase and assumption transactions (P&As) involving insolvent target banks. About 43 percent were mergers that consolidated two affiliates in the same holding company organization. About 39 percent were mergers in which the acquiring bank purchased additional banks within a window starting two years before, and ending three years after, the merger in question. (Some mergers belong to more than one of these categories.) There are reasons to believe that comparisons of pre- and postmerger costs in these three categories could be biased. First, the FDIC often removes the assets that are most expensive to manage (e.g., repossessed real estate) from target banks during P&A transactions, which might bias results toward finding postmerger efficiency gains. Second, lead banks in bank holding companies often provide services (e.g., data processing) for affiliate banks. Costs will be overstated at the lead bank and understated at affiliates if only the variable costs of producing those services are passed along. Third, costs may be elevated at banks that make repeated acquisitions due to merger transition costs. Because of these potential biases, most other studies exclude these types of mergers. In order to test interesting hypotheses, however, they are included here. Care is taken to report the results from these mergers separately whenever possible.

III.C Estimates of Cost Inefficiency

Cost inefficiency per dollar of assets was estimated by:

$$XIN_{it} = [C_{it} - \hat{C}(x_{it})]/A_{it} \qquad (3)$$

where C_{it} is actual total cost for bank i in year t, x_{it} is the vector of exogenous variables from equation (1), C^( ) is the cost that the bank would have incurred had it employed best practices management techniques, and A_{it} is the total assets held by the bank. Normalizing the difference between actual and predicted costs by assets yields two benefits. First, measuring cost inefficiency as a percentage of assets allows comparisons to standard performance measures such as return on assets (ROA). Second, normalizing by assets controls for asset growth or asset run-off during the four intervening years.

An ordinal measure of cost inefficiency was also constructed in order to control for changes in interest rates, technology, etc. that could bias intertemporal comparisons of XIN. The entire population of banks was divided into nine asset classes of at least 200 banks each.[13] Within each class, banks were ranked by XIN from 1 (most efficient) to N (most inefficient). The following index was then constructed:

$$XIND_{i,t,\alpha} = 1 - [(rank_{i,t,\alpha} - 1)/(N_\alpha - 1)] \quad (4)$$

XIND ranges from zero for the least efficient bank, to one for the most efficient bank, in each asset class α.[14]

Note that neither XIN or XIND is adjusted for the effects of scale economies or diseconomies that may result from the merger. Merger-induced savings that drive XIND closer to 1.0 are independent from merger-induced increases in size that move banks closer to efficient scale -- in the former, costs approach the efficient cost frontier, whereas in the latter, a lower portion of the efficient cost frontier becomes available to the bank.[15]

IV. Tests of Merger-Induced Efficiencies

An efficient market for corporate control reallocates assets from poorly managed, inefficient firms to well-managed, more efficient firms. If an acquiring bank is managed more efficiently than

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[13] The nine asset classes were separated at the following points: $25, $50, $75, $100, $200, $300, $500, and $1,000 million of assets.

[14] Berger and Humphrey (1992) construct a similar index to rank OLS residuals, but their index does not differentiate between asset classes.

[15] Because both require the discarding of unnecessary fixed inputs, it can be difficult to disentangle merger-induced scale economies from merger-induced management efficiencies. If the discarded inputs were not necessary to operate the premerger target bank, their elimination represents an improvement in management efficiency. If the discarded inputs were necessary to operate the premerger target, but became redundant in the combined postmerger bank, their elimination represents a scale economy.

its target, we would expect the following expression to hold:

$$XIND_{T,t-1,\alpha} < XIND_{A,t-1,\alpha} \qquad (5)$$

where the subscripts A and T refer to the acquiring and the target banks that merge at time t. Mergers for which this inequality holds might be said to have "potential" for inducing gains in cost efficiency. If the merger causes some of this potential to be realized, we would expect the following expression to hold:

$$w_T * XIND_{T,t-1,\alpha} + w_A * XIND_{A,t-1,\alpha} < XIND_{t+s,\alpha} \qquad (6)$$

where w_i is the percentage of total assets brought to the merger by bank i, and s years is a reasonably long enough time for target assets to be digested. Mergers for which this inequality holds might be said to have "captured" X-efficiencies.

If the inequality in (6) holds, the conventional explanation is that efficient practices were transferred from the acquiring bank to the target. There are at least three other (non-mutually exclusive) possibilities. First, efficient practices may have flowed in the other direction, from target to acquirer. Second, the process of combining two banks may have revealed previously unrecognized inefficiencies at the acquiring bank, which were subsequently corrected. Third, the upheaval and reorganization associated with the merger may have provided acquiring bank managers "cover" to make changes that were too personally distasteful otherwise.

The potential for gains in cost efficiency may vary across different types of mergers. For example, mergers between banks in the same holding company may have less potential for cost efficiency gains. If the holding company structure allows affiliates to share best management practices prior to the merger, merging banks will have smaller premerger differences in efficiency, and hence less potential for postmerger efficiency gains.[16] On the other hand, acquisitions of insolvent banks may have larger than average potential for gains in cost efficiency. Undercapitalized banks often have low earnings and/or nonperforming assets, both of which might be related to cost inefficiency: excess costs depress earnings, and problem assets often require additional labor inputs (for example, repossessed real estate must be managed by the bank).

The degree to which potential efficiency gains are converted into actual, postmerger cost efficiencies may also vary across different types of mergers. For instance, banks that make repeated acquisitions may be more likely to capture cost efficiencies. This could be true if "learning by doing" occurs, if fixed expenditures incurred during earlier mergers can be spread over future acquisitions, or if banks with core competencies in capturing efficiencies use acquisitions as part of their competitive strategy. Conversely, mergers between firms of similar size might generate fewer efficiencies.[17] In such mergers, the acquiring bank may not have the capacity to absorb the other's data processing requirements or back office operations, and target management may be able to use its relatively equal political footing with the acquiring firm to retard change.

V. Results

[16] For example, Banc One puts heavy emphasis on circulating the best practices of its most successful affiliates throughout its system and encouraging other affiliates to employ these practices. See Stalk, Evans, and Shulman (1992).

[17] Srinivasan (1992) tests and rejects this hypothesis.

On average, acquiring banks were more cost-efficient than their targets. The average (mean) acquiring bank ranked in the 46th efficiency percentile (XIND), compared to the 41st efficiency percentile for the average target.[18] Cost inefficiency was 1.24 cents per dollar of assets (XIN) at the average acquiring bank and 1.62 cents at the average target. Unit costs at the best practices banks averaged 5.66 cents per dollar of assets in 1986-87, making costs at acquirers and targets, respectively, about 22 percent and 29 percent higher than the efficient cost frontier. These results are consistent with the 20 to 30 percent range found in other studies. (Parameter estimates from the four cost frontiers appear in the appendix.)

These results imply that target bank ROA would increase by about 0.25 cents on the dollar if cost efficiency at the target improved to the level of the average acquiring bank, and that acquring bank ROA would increase by about 0.82 cents on the dollar if acquiring banks could operate as efficiently as their best practices peers.[19] Considering that ROA at commercial banks has been approximately one cent on the dollar over the past ten years, either of these increases would be an impressive gain; however, note that the potential for internally generated cost efficiencies is several times greater than the apparent potential for efficiency transfers from acquirer to target.

Figure 1 shows the relationship between XIN, a bank's absolute amount of cost inefficiency, and XIND, a zero-to-one ranking of a bank's cost inefficiency relative to its peers. The following equation was fitted to the data in Figure 1 using ordinary least squares:

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[18] The distribution of cost efficiency among merger targets appears to be skewed slightly downward. The median target ranked in the 37th efficiency percentile, while the median acquirer was in the 45th efficiency percentile.

[19] Assuming a marginal tax rate of 34 percent, $(XIN_T-XIN_A)*(1-t)$ yields the first result, and $XIN_A*(1-t)$ yields the second.

$$XIN = .0426 - \underset{(.0069)}{.1739} *XIND + \underset{(.0173)}{.3088} *XIND^2 - \underset{(.0119)}{.1902} *XIND^3 \quad (7)$$

Standard errors appear below the coefficient estimates, all of which are statistically significant. R^2 equals .8278. Equation 7 can be used to show that small changes in efficiency rank can have profound effects on *pre-tax* ROA (by definition, a change in XIN is identical to a change in pre-tax ROA in the opposite direction).[20] For example, an increase in efficiency rank from the midpoint of the first efficiency quartile (XIND = .125) to the midpoint of the second efficiency quartile (XIND = .375) would yield an increase of .0145 in pre-tax ROA. Similar movements from the second to the third, and from the third to the fourth, efficiency quartiles would yield changes in pre-tax ROA of .0027 and .0086, respectively.

Table 2 reports premerger XIND for various subsets of mergers. Also included is the difference in efficiency ranks between the average acquiring and target banks, as well as the implied difference in pre-tax ROA (estimated using equation (7)). P&A mergers exhibited the largest potential for merger-induced efficiency gains. Acquiring banks were more efficient than their targets in about 69 percent of these mergers (significantly different from 50 percent at the 1 percent level). The average P&A target was only in the 22nd efficiency percentile -- not surprising given that failing banks suffer from a variety of financial problems that may be related to efficiency. Unexpected, however, was the low 39th percentile efficiency rank of the average P&A acquirer. Inspection of the data reveals the likely reason: three-quarters of these mergers were in Texas, Oklahoma, and Louisiana, where even relatively cost-efficient banks held repossessed real estate that was costly to

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[20] Multiplying the change in pre-tax ROA by one minus the marginal corporate tax rate yields change in after-tax ROA.

manage. Still, the 17-point difference in XIND translates into a potential improvement in the target bank's pre-tax ROA of over a half cent ($.0065) per dollar of assets.

Aside from P&A mergers, little systematic potential for efficiency transfers from acquirer to target was revealed. Acquiring banks were more cost-efficient than their targets in only about 51 percent of the non-P&A mergers. Although these banks exhibited plentiful potential for internally generated cost efficiencies, there was virtually no difference in cost efficiency between the partners (XIN_A = 1.12 and XIN_T = 1.19). On average, both acquirers and targets were in the 49th efficiency percentile.

Acquisitions of solvent targets are categorized in Table 2 by two defining characteristics. First, did the acquiring bank make other purchases during a window beginning two years before, and ending three years after, the merger in question? And second, did the merger consolidate two affiliates of the same bank holding company, or were the merger partners unrelated? "Active" participants in the merger market were more cost efficient than their targets only about 48 percent of the time, compared to about 53 percent for the banks that made only one acquisition during the five-year window. Neither of these results is statistically different from 50 percent. Furthermore, because cost estimates for active mergers may reflect the costs of other mergers in various stages of completion, these results should be interpreted with caution.

Acquirers in mergers between holding company affiliates were more efficient than their targets only 42 percent of time. "Targets" ranked higher than their "acquirers" (the 53rd vs. the 45th percentile) in these mergers. Although both of these results are statistically significant, they may simply reflect the cost accounting associated with lead banks providing costly services for their affiliate-targets prior to the merger.

Acquirers in mergers of unrelated banks were more cost efficient than their targets about 64 percent of the time and outranked their acquisitions by 10 percentiles (54th vs. 44th). Both of these results are statistically significant. Of all the subgroups in Table 2, this category describes most closely the traditional "market for corporate control" story, in which a relatively efficient bank acquires a solvent, unrelated, and relatively inefficient bank. The 10-point difference in XIND translates into a potential pre-tax ROA improvement of almost one tenth of a cent per dollar of assets.

Because it either failed or became a merger target itself, the acquiring bank in 75 of the 1987-88 mergers no longer existed in 1990-91. Table 3 compares premerger ($XIND_{t-1}$) and postmerger ($XIND_{t+3}$) efficiency ranks for the surviving 273 mergers. The results should be interpreted with caution due to two potential methodological biases. First, self-selection in the data may overstate efficiency gains. Roughly a third of the 75 nonsurviving mergers failed, and because insolvent banks are relatively inefficient (see Table 2), the 273 merged banks that survived could be biased toward banks that are good at capturing efficiencies. (Regardless of this potential bias, the results in Table 3 still reveal which types of mergers are *relatively* good at capturing efficiencies.) Second, the magnitude (but not the sign) of the changes in XIND and XIN tends to understate overall efficiency gains and is sensitive to the relative sizes of the merging banks. For example, in a merger that improves cost efficiency at the target bank by 10 percentiles, XIND will increase by 5.0 percentiles, 3.3 percentiles, or 2.5 percentiles, respectively, if the target is the same size, half the size, or a third the size of its acquirer.

As shown in Table 3, the majority of bank mergers generated cost efficiencies, but the corresponding improvements in cost efficiency were small. XIND increased in about 58 percent of surviving mergers (significantly different from 50 percent at the 1 percent level). However, the efficiency rank increased by only a statistically nonsignificant 4 percentiles for the average merger, for an approximate $.0004 reduction in costs per dollar of assets. Despite the large premerger potential for efficiency gains in P&A mergers, these mergers did not generate significant gains. In contrast, about 61 percent of the acquisitions of solvent targets generated efficiency gains (significant at the 1 percent level). The remainder of the analysis focuses on these 180 mergers.

Cost efficiency increased in about 64 percent of the non-P&A mergers between holding company affiliates, though the average increase was not statistically significant. This result is not consistent with the expectation that intra-holding company mergers would deliver efficiency gains less often than mergers of unrelated banks. Perhaps BHC affiliates, which share many of the same office systems and management styles, encounter fewer postmerger surprises. In comparison, only about 54 percent of the non-P&A mergers between unrelated banks generated efficiency gains. Although these mergers exhibited a large premerger potential for efficiencies (see Table 2), they posted only a nonsignificant 2 percentile increase in efficiency rank.

Cost efficiency improved in about three-quarters of the non-P&A purchases made by "active" acquirers. XIND increased by a statistically significant 12 percentiles in these mergers, even though: (1) these banks showed little premerger efficiency potential, and (2) acquirers in these mergers were simultaneously incurring transition costs from other mergers. In contrast, only about half of the "one-time" mergers posted efficiency gains, and this measure fell to only 43 percent in one-time mergers of unrelated banks (where the cost data is arguably of better quality). These results are consistent with the expectation that banks making repeated acquisitions may benefit from learning effects, spreading fixed merger-related costs over multiple acquisitions, or some other intrinsic comparative advantage.

Mergers between banks of relatively equal size generated cost efficiencies less often. The 180 acquisitions of solvent targets were split into three groups according to the relative size of the merger partners.[21] Only half of the mergers of similar-sized banks generated efficiencies, compared to about 73 percent for the mergers of more disparate-sized banks (significant at the 1 percent level). This result is consistent with the hypothesis that political intransigence and capacity limitations might hinder the performance of mergers of relative equals.

The 86 mergers in which the target was more efficient than its acquirer generated larger gains in XIND (about 9 percentiles vs. about 2 percentiles), and generated them more often (about 66 percent vs. about 55 percent of the time), than did the 94 mergers in which the acquirer was the more efficient of the two banks. This result, along with earlier results, runs counter to the expectation that postmerger efficiencies flow from buyers to targets. With this traditional "market for corporate control" story seemingly rejected, we are left to explain how else mergers might result in cost efficiencies. The data suggest that the amount of cost inefficiency present in *both* merging banks, combined with the process of merging two organizations, may be more important than the difference in the quality of target and acquiring bank managers.

Melding two banks -- choosing between back office systems, eliminating duplicative branch offices, etc. -- requires management to evaluate not only the procedures and performances at the target bank, but also at the acquiring bank. The more inefficiency that exists at *both* banks, the more potential for cost savings the merger holds. The merger might also allow acquiring bank managers

[21] The relative size of the merging banks was measured by dividing the absolute value of $(A_A - A_T)$ by the maximum value of (A_A, A_T). The resulting variable ranges from zero (most equal) to one (least equal).

to take actions at their own offices that are personally distasteful under normal circumstances, such as firing workers. Absent the investigations and opportunities made possible by the *process* of merger, inefficiencies might continue to exist unnoticed. When both banks were relatively inefficient banks (both with XIND < .50), over 80 percent of the mergers resulted in cost efficiencies. On average, XIND increased by over 15 percentiles (significant at the 1 percent level) in these mergers, and the estimated improvement in pre-tax ROA was $.0054 per dollar of assets. In comparison, only about 47 percent of the mergers between two relatively efficient banks (both with XIND > .50) generated cost efficiencies.

These results do not appear to be the result of a statistical reversion to the median (XIND = .50) over time, i.e., if costs were temporarily increased or decreased by a one-time event at time t-1, they would tend to revert back to their "normal" level after t-1.[22] If reversion to the median is present, there should be a symmetry to the results, i.e., efficiency would apparently increase in mergers between two relatively cost inefficient banks, and apparently decrease in mergers between two relatively cost efficient banks, by roughly similar magnitudes. Note that the results in Table 3 are not symmetric -- the reduction in XIND is statistically insignificant for mergers between two relatively efficient banks.

If the merger process is a catalyst for identifying and correcting cost inefficiency, merging banks should exhibit an upward drift in the efficiency rankings relative to nonmerging banks. Table 4 provides evidence to this effect. In the general population of commercial banks, about 28 percent

[22] Other merger efficiency studies have partially controlled for this possibility by calculating premerger efficiency measures as averages over two or three years worth of data. Though the extent of this problem ultimately depends on the sample of banks being studied, Berger and Humphrey (1991) found that cost inefficiency in banks exhibits a reasonable amount of intertemporal stability.

of the banks ranked below the median in 1986-87 moved above the median in 1990-91, and about 29 percent of the banks ranked above the median in 1986-87 were below the median three years later. The results for the 180 banks that acquired solvent targets were less symmetric. Acquiring banks below the median prior to merging moved above the median after the merger more often (about 39 percent), and acquiring banks above the median prior to merging moved below the median after the merger less often (24 percent), than banks in the general population. Mergers between two efficient banks appear to be better able to maintain or increase their cost advantage than their nonmerging peers, while mergers between two inefficient banks appear to be better able to cut costs relative to their nonmerging peers.

VI. Conclusions

The objective of this study was to test whether the pattern of pre- and postmerger cost inefficiency in banks is consistent with the traditional market for corporate control explanation of mergers, and whether some types of mergers are more successful than others at capturing cost savings. A sample of 348 single-target bank mergers approved by the Office of the Comptroller of the Currency in 1987 and 1988 was examined. Pre- and postmerger cost inefficiency in these mergers was estimated using a thick frontier methodology and a multiproduct translog cost function.

Although both target banks and their acquirers exhibited large amounts of cost inefficiency, the potential for internally generated cost efficiencies appeared to be much greater than the potential for efficiency transfers from acquirer to target. Consistent with earlier studies, the merging banks exhibited costs that were 22 percent to 29 percent higher than their "best practices" peers. Aside from purchase and assumption transactions, however, cost inefficiencies were virtually the same in target and acquiring banks. Only about half of the non-P&A mergers reallocated assets from less efficient to more efficient banks.

Cost efficiency improved in about 61 percent of non-P&A mergers that survived for three years, but the magnitude of the average gain was not statistically significant. Contrary to expectation, a merger's ability to generate cost efficiencies does not appear to be related to the efficiency advantage that the acquirer holds over its target. Rather, efficiency potential appears to be related to the amount of inefficiency present in either or both partners prior to the merger. Over 80 percent of the mergers in which both banks were relatively cost inefficient generated efficiency gains. This suggests that the *process* of combining two organizations--and revealing pre-existing efficiencies that were unknown prior to the merger--may be as important as the quality of the managers overseeing the merger. The possibility that this result is due to a statistical reversion to the median was investigated and dismissed.

In general, the results found here imply that motivations other than cost savings contribute to most banks' decisions to merge. Likely motivations include increasing market power, diversifying loan portfolios, or achieving growth when local possibilities have been exhausted. Certain types of mergers, however, appear to have a higher probability than others of generating cost efficiencies. Efficiency gains were present in about three-quarters of the acquisitions by banks that repeatedly entered the merger market, compared to only about 50 percent for the acquisitions by banks that made only a single purchase during the sample period. These results suggest that some banks may have an experiential or comparative advantage at mergers, though this conclusion is somewhat tentative given the uncertain nature of the cost data for repeat acquirers. There was weak evidence that mergers between affiliates of the same holding company were more likely to make efficiency gains, and that mergers between banks of relatively equal size were less likely to make efficiency gains.

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Appendix

Best practices parameter estimates for equation (1).

	1986	1987	1990	1991
α_0	0.3992	0.0009	1.0588**	0.8565**
	(0.2178)	(0.2443)	(0.2426)	(0.2284)
α_1	-0.0830**	0.1631**	0.0616*	-0.0149
	(0.0266)	(0.0243)	(0.0256)	(0.0303)
α_2	0.2260**	0.2555**	0.4404**	0.0731**
	(0.0271)	(0.0258)	(0.0263)	(0.0236)
α_3	0.2698**	0.2118**	0.0817**	0.6326**
	(0.0253)	(0.0293)	(0.0262)	(0.0415)
α_4	0.1311**	0.1534**	0.0568*	-0.0064
	(0.0151)	(0.0206)	(0.0275)	(0.0271)
α_5	0.3348**	0.1817**	0.2597**	0.0889
	(0.0402)	(0.0447)	(0.0420)	(0.0481)
β_{11}	0.0333**	0.0338**	0.0286**	0.0259**
	(0.0009)	(0.0008)	(0.0007)	(0.0007)
β_{22}	0.0309**	0.0407**	0.0337**	0.0323**
	(0.0010)	(0.0013)	(0.0009)	(0.0009)
β_{33}	0.0482**	0.0543**	0.0676**	0.0603**
	(0.0012)	(0.0013)	(0.0011)	(0.0009)
β_{44}	0.0378**	0.0376**	0.0471**	0.0591**
	(0.0007)	(0.0007)	(0.0007)	(0.0009)
β_{55}	0.1520**	0.1095**	0.0637**	0.0771**
	(0.0057)	(0.0039)	(0.0021)	(0.0019)
β_{12}	-0.0083**	-0.0018	-0.0004	0.0012
	(0.0014)	(0.0011)	(0.0007)	(0.0008)

Best practices parameter estimates for equation (1), cont.

	1986	1987	1990	1991
β_{13}	0.0064**	-0.0112**	-0.0093**	-0.0033**
	(0.0012)	(0.0009)	(0.0007)	(0.0007)
β_{14}	0.0027*	0.0014	-0.0049**	-0.0073**
	(0.0012)	(0.0012)	(0.0011)	(0.0011)
β_{15}	-0.0356**	-0.0200**	-0.0139**	-0.0145**
	(0.0028)	(0.0014)	(0.0018)	(0.0013)
β_{23}	-0.0010	-0.0091**	-0.0131**	-0.0151**
	(0.0011)	(0.0009)	(0.0006)	(0.0007)
β_{24}	-0.0126**	-0.0166**	-0.0181**	-0.0033**
	(0.0011)	(0.0010)	(0.0010)	(0.0007)
β_{25}	-0.0126**	-0.0190**	-0.0096**	-0.0060**
	(0.0024)	(0.0025)	(0.0013)	(0.0013)
β_{34}	0.0054**	-0.0000	-0.0165**	-0.0109**
	(0.0009)	(0.0013)	(0.0008)	(0.0007)
β_{35}	-0.0523**	-0.0187**	-0.0120**	-0.0093**
	(0.0026)	(0.0021)	(0.0014)	(0.0014)
β_{45}	-0.0219**	-0.0230**	-0.0042**	-0.0453**
	(0.0019)	(0.0019)	(0.0014)	(0.0018)
γ_1	0.5286**	0.4845**	0.2260**	0.4969**
	(0.0509)	(0.0599)	(0.0585)	(0.0504)
γ_2	0.9862**	0.6851**	0.7508**	1.0806**
	(0.0330)	(0.0353)	(0.0347)	(0.0350)
γ_3	-0.4265**	-0.1325**	0.0151	-0.2469**
	(0.0369)	(0.0437)	(0.0500)	(0.0389)
γ_4	-0.0884**	-0.0370	0.0081	-0.3305**
	(0.0339)	(0.0384)	(0.0373)	(0.0365)

Best practices parameter estimates for equation (1), cont.

	1986	1987	1990	1991
δ_{11}	0.0261**	0.0441**	0.0688**	-0.0326**
	(0.0074)	(0.0093)	(0.0091)	(0.0079)
δ_{22}	0.2508**	0.1654**	0.1736**	0.1651**
	(0.0050)	(0.0040)	(0.0038)	(0.0041)
δ_{33}	-0.0074	0.0239**	0.0245**	-0.0205**
	(0.0040)	(0.0045)	(0.0056)	(0.0048)
δ_{44}	0.0054	0.0026	0.0052*	0.0084**
	(0.0032)	(0.0025)	(0.0022)	(0.0023)
δ_{12}	-0.1144**	-0.0892**	-0.0840**	-0.0484**
	(0.0031)	(0.0032)	(0.0034)	(0.0035)
δ_{13}	0.0749**	0.0361**	0.0175*	0.0325**
	(0.0054)	(0.0068)	(0.0076)	(0.0059)
δ_{14}	0.0133*	0.0089	-0.0024	0.0485**
	(0.0054)	(0.0056)	(0.0056)	(0.0058)
δ_{23}	-0.0709**	-0.0356**	-0.0448**	-0.0234**
	(0.0036)	(0.0038)	(0.0037)	(0.0037)
δ_{24}	-0.0220**	0.0129**	-0.0056	-0.0683**
	(0.0042)	(0.0047)	(0.0051)	(0.0052)
δ_{34}	0.0034	-0.0245**	0.0028	0.0114*
	(0.0040)	(0.0042)	(0.0037)	(0.0047)
θ_{11}	0.0438**	-0.0012	0.0160**	0.0232**
	(0.0044)	(0.0033)	(0.0038)	(0.0045)
θ_{12}	-0.0382**	-0.0090**	0.0007	-0.0359**
	(0.0027)	(0.0027)	(0.0035)	(0.0030)
θ_{13}	-0.0088**	0.0147**	-0.0143**	0.0201**
	(0.0032)	(0.0023)	(0.0023)	(0.0035)

Best practices parameter estimates for equation (1), cont.

	1986	1987	1990	1991
θ_{14}	0.0033	-0.0045**	-0.0025	-0.0075**
	(0.0021)	(0.0015)	(0.0016)	(0.0019)
θ_{21}	-0.0095*	-0.0149**	-0.0362**	-0.0057
	(0.0045)	(0.0036)	(0.0041)	(0.0036)
θ_{22}	-0.0084**	0.0059**	0.0283**	0.0063**
	(0.0020)	(0.0016)	(0.0026)	(0.0018)
θ_{23}	0.0259**	-0.0055	0.0033	-0.0099**
	(0.0037)	(0.0030)	(0.0027)	(0.0036)
θ_{24}	-0.0079**	0.0145**	0.0046*	0.0094**
	(0.0020)	(0.0024)	(0.0018)	(0.0016)
θ_{31}	-0.0245**	-0.0296**	-0.0040	-0.0969**
	(0.0039)	(0.0041)	(0.0042)	(0.0063)
θ_{32}	-0.0037	-0.0053	0.0141**	0.0635**
	(0.0030)	(0.0027)	(0.0033)	(0.0037)
θ_{33}	0.0119**	0.0244**	-0.0075**	0.0341**
	(0.0026)	(0.0032)	(0.0025)	(0.0040)
θ_{34}	0.0163**	0.0105**	-0.0026	-0.0007
	(0.0021)	(0.0024)	(0.0021)	(0.0024)
θ_{41}	-0.0141**	0.0021	0.0152**	0.0402**
	(0.0021)	(0.0029)	(0.0040)	(0.0040)
θ_{42}	0.0059**	0.0165**	0.0307**	-0.0679**
	(0.0020)	(0.0018)	(0.0028)	(0.0031)
θ_{43}	0.0035	-0.0135**	-0.0453**	0.0232**
	(0.0020)	(0.0020)	(0.0038)	(0.0035)
θ_{44}	0.0048**	-0.0052**	-0.0006	0.0045**
	(0.0014)	(0.0016)	(0.0015)	(0.0015)

Best practices parameter estimates for equation (1), cont.

	1986	1987	1990	1991
θ_{51}	-0.0525**	-0.0217**	-0.0400**	0.0264**
	(0.0069)	(0.0066)	(0.0070)	(0.0065)
θ_{52}	0.0959**	0.0534**	-0.0159**	0.0335**
	(0.0048)	(0.0032)	(0.0043)	(0.0054)
θ_{53}	-0.0281**	-0.0178**	0.0534**	-0.0551**
	(0.0060)	(0.0051)	(0.0046)	(0.0062)
θ_{54}	-0.0152**	-0.0139**	0.0025	-0.0048
	(0.0036)	(0.0039)	(0.0038)	(0.0038)
λ_B	0.0116**	0.0088*	0.0140**	0.0052
	(0.0034)	(0.0034)	(0.0033)	(0.0034)
λ_U	-0.0100	-0.0456**	-0.0549**	-0.0435**
	(0.0053)	(0.0062)	(0.0077)	(0.0087)
λ_L	-0.0172**	-0.0159**	-0.0248**	-0.0115**
	(0.0046)	(0.0042)	(0.0030)	(0.0030)
R^2	.9842	.9845	.9898	.9880
N	3499	3374	3309	2939

Table 1a

Distribution of acquiring and target banks by asset size.
Dollars are in millions.

Asset size	Acquirers	Targets
$ 0 to $100 million	37.5%	76.5%
$ 100 to $1,000 million	34.4%	20.8%
$1,000 million and above	28.1%	2.7%
median assets	$ 143	$ 38
mean assets	$2,027	$ 140

Table 1b

Distribution of mergers by asset size of acquiring and target banks.
Dollars are in millions.

	Target		
Acquirer	$0-$100	$100-$1,000	$1,000+
$0-$100	35.3%	1.7%	0%
$100-$1,000	26.2%	8.1%	0%
$1,000+	14.7%	0.9%	2.6%

Figure 1

Mapping premerger XIND into premerger XIN. Data from 696 merging banks.

Figure 1 is not available via download.
If you need to see Figure 1, use the land mail option and request Working Paper 93-1.

Table 2

Premerger efficiency comparisons. XIN measured in basis points.

	#	%$XIND_A$ >$XIND_T$	mean $XIND_A$	mean $XIND_T$	$XIND_A$- $XIND_T$	XIN_T- XIN_A
All Mergers						
All	348	56.9%**	.463	.412	.051†	.0007
Target Insolvent						
All P&As	107	69.2%**	.393	.226	.167††	.0065
Target Solvent						
All	241	51.4%	.494	.495	-.001	-.0000
Active	87	48.3%	.515	.540	-.025	-.0002
Not active	154	53.3%	.482	.469	+.013	.0000
Holding company	138	42.0%**	.454	.532	-.078†	-.0007
Unrelated	103	64.1%**	.547	.445	+.102†	.0009

** and * denote a difference from 50.0% at the 1 percent and 5 percent significance levels, respectively. †† and † denote a difference from zero at the 1 percent and 5 percent significance levels, respectively. Both tests are two-tailed and use a uniform approximation to the standard normal distribution.

Table 3

Postmerger efficiency comparisons. XIN measured in basis points.

	#	$\%XIND_{t+3} > XIND_{t-1}$	mean $XIND_{t-1}$	mean $XIND_{t+3}$	$XIND_{t+3} - XIND_{t-1}$	$XIN_{t-1} - XIN_{t+3}$
All Mergers						
All	273	57.9%**	.458	.497	+.039	.0004
Target Insolvent						
All	93	52.7%	.358	.375	+.017	.0004
Target Solvent						
All	180	60.6%**	.509	.561	+.052	.0004
Holding co.:	109	64.2%**	.497	.569	+.072	.0005
Active	48	75.0%**	.516	.655	+.139†	.0012
Nonactive	61	55.7%	.483	.502	+.019	.0002
$XIND_A > XIND_T$	45	53.3%	.573	.599	+.026	.0002
$XIND_A < XIND_T$	64	71.9%**	.444	.548	+.104†	.0009
Unrelated:	71	54.9%	.527	.547	+.020	.0001
Active	27	74.1%**	.502	.609	+.107	.0007
Nonactive	44	43.2%	.542	.510	-.032	-.0002
$XIND_A > XIND_T$	49	57.1%	.554	.566	+.012	.0000
$XIND_A < XIND_T$	22	50.0%	.466	.505	+.039	.0003
Active	75	74.7%**	.519	.638	+.119†	.0010
Nonactive	105	50.5%	.508	.505	-.003	-.0000
$XIND_A > XIND_T$	94	55.3%	.563	.582	+.019	.0001
$XIND_A < XIND_T$	86	66.3%**	.449	.537	+.088†	.0007
$XIND_{A,T} > .500$	55	47.3%	.751	.711	-.040	.0011
$XIND_{A,T} < .500$	53	81.1%**	.247	.403	+.156††	.0054
⅓ most equal	60	50.0%	.576	.574	-.002	-.0000
⅓ least equal	60	73.3%**	.497	.596	+.099	.0007

** and * denote a difference from 50.0% at the 1 percent and 5 percent significance levels. †† and † denote a difference from zero at the 1 percent and 5 percent significance levels. Both tests are two-tailed and use the uniform approximation to the standard normal distribution.

Table 4

Pre- and Postmerger Stability of XIND

All Surviving Acquirers of Solvent Targets (180)

Premerger	Postmerger $XIND_{A,T}<.50$	Postmerger $XIND_{A,T}>.50$
$XIND_{A,T}<.50$	60.7%	39.3%
$XIND_{A,T}>.50$	24.0%	76.0%

All Surviving Banks, 1986-1990 (10,955)

Premerger	Postmerger $XIND_{A,T}<.50$	Postmerger $XIND_{A,T}>.50$
$XIND_{A,T}<.50$	71.3%	28.7%
$XIND_{A,T}>.50$	30.0%	70.0%

All Surviving Banks, 1987-1991 (10,679)

Premerger	Postmerger $XIND_{A,T}<.50$	Postmerger $XIND_{A,T}>.50$
$XIND_{A,T}<.50$	72.6%	27.4%
$XIND_{A,T}>.50$	28.5%	72.5%