GEORGE J. BENSTON
WILLIAM C. HUNTER
LARRY D. WALL

Motivations for Bank Mergers and Acquisitions: Enhancing the Deposit Insurance Put Option versus Earnings Diversification

THE PACE OF MERGERS AND ACQUISITIONS among U.S. commercial banks has increased dramatically over the past several years. From an annual average of 170 mergers during the 1960 to 1979 period, the annual average increased to about 498 during the 1980 to 1989 period.[1] Of the many factors leading to this increase in merger activity, the weakening of regulatory restrictions against interstate banking was a significant contributing factor. Prior to the 1980s, the prohibition against interstate banking and state-level restrictions on branch banking and multiple bank ownership largely limited where and how banks could compete. With the weakening of these geographic restrictions, mergers and acquisitions were a means for banks to penetrate new markets, realize potential economies, and acquire financial power and prestige associated with larger size.

An important issue is whether banks used their increased freedom to merge in a way intended to increase the value to them of deposit insurance. An acquisition policy designed to maximize the value of deposit insurance may be shareholder-wealth

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1. For a review of recent U.S. bank merger and acquisition activity, see Rhoades (1985) or LaWare (1991). Hereafter, the terms mergers and acquisitions are used synonymously. Our model and empirical tests do not distinguish takeovers where the target is merged into the acquirer from those where the target retains a separate banking charter.

GEORGE J. BENSTON *is John H. Harland Professor of Finance, Accounting, and Economics, Emory Business School, Emory University.* WILLIAM C. HUNTER *is Senior Vice President and Director of Research, Federal Reserve Bank of Chicago.* LARRY D. WALL *is research officer, Federal Reserve Bank of Atlanta, and adjunct professor of finance at Emory University.*

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maximizing if an increase in the value of deposit insurance increases shareholder wealth. Hunter and Wall (1989) and Boyd and Graham (1991) raise the possibility that banks seek to become larger to increase the probability that the FDIC will cover 100 percent of the bank's deposits (that is, become "too big or too important to fail"). This "deposit insurance put-option-enhancing" hypothesis is not the only hypothesis to suggest that banks might pursue growth even if it is socially suboptimal. Bank managers may also be interested in pursuing growth to enhance their salary, perquisites, and personal prestige. However, the deposit insurance put-option-enhancing hypothesis differs in one important way from hypotheses related to managerial interests. The deposit-insurance hypothesis also suggests that acquirers would be willing to pay more for riskier, more profitable organizations whose returns are highly correlated with the acquirer's returns.[2,3] The managerial-interest hypothesis would be consistent with no relationship (or possibly a negative relationship) between purchase price and ex post risk.

Alternatively, banks may find that maximizing risk does not maximize shareholder wealth. The regulators may not permit increased risk exposure, or the increased risk of failure may impose costs that exceed the value of the deposit insurance put option.[4] In this case, shareholder wealth may be maximized by mergers that diversify earnings. This "earnings diversification" hypothesis posits that acquiring banks seek earnings diversification in an effort to generate higher levels of cash flow for the same levels of total risk. That is, reductions in business risk are offset by increases in financial risk. Kim and McConnell (1977) suggest that acquiring firms can offset the reduction in equity value by issuing additional debt, returning the probability of bankruptcy to original levels. They and Asquith and Kim (1983) provide strong empirical evidence showing that leverage indeed is increased following mergers between nonfinancial firms. Indirect empirical support for banks' offsetting the risk reduction associated with merger-induced earnings diversification appears in the literature that examines the performance of acquired banks. Heggestad and Mingo (1975), Piper (1971), and Piper and Weiss (1971) find that banks acquired by bank holding companies tend to reduce their capital ratios significantly after acquisition. This increased leverage increases the tax shield due to

2. The deposit insurance put-option hypothesis differs from the other hypotheses in another way as well. The deposit insurance put-option hypothesis, while consistent with management's maximizing shareholder wealth, may not be optimal from society's perspective. The other hypotheses, for example, the maximization of salaries, perquisites, and personal prestige, while serving to maximize management's utility, do not necessarily maximize shareholder wealth or society's welfare.

3. This does not necessarily mean that all acquirers will pay more for risky targets than for less-risky targets of the same size. This will depend on the extent to which the acquirer seeks to maximize the value of the deposit insurance put option. That is, once an acquirer becomes too big to fail, there may still be an incentive to further maximize the value of the deposit insurance put option by acquiring riskier banks. Both actions, that is, acquiring targets to become too big to fail and paying more for more-risky targets, are consistent with the "deposit insurance put-option-enhancing hypothesis."

4. For example, banks and their customers make long-lived investments in areas such as lending relationships, information processing technologies, and off-balance-sheet activities that would not be positive net present value projects if the bank had a high probability of failure.

debt (see Lewellen 1971) and, hence, after-tax net cash flow. Beatty, Santomero, and Smirlock (1987), Hobson, Maston, and Severiens (1978), Rose (1975), Talley (1972), and Ware (1973) find that acquired banks tend to reduce significantly their holdings of low-risk securities while simultaneously increasing their holdings of loans, thereby raising earnings. Similarly, Cornett and Tehranian (1992) find that both interstate and intrastate bank mergers produce significant increases in the cash flow returns to stockholders. Thus, there is evidence that diversification of a bank's net earnings through merger increases the cash flow available to stockholders. A merger also might increase net cash flows from savings due to economies of scale and scope and from efficiencies resulting from more effective management.[5]

An empirical evaluation of these competing hypotheses should be of interest to both bank managers and policymakers. Empirical evidence on which factors are most highly valued by acquiring banks should allow target bank managements to assess merger proposals better and to structure themselves to maximize their acquisition value. Similarly, such evidence can provide policymakers with a better understanding of the effects that fixed rate deposit insurance had on bank merger motivations during the merger wave of the 1980s and can provide additional evidence useful in evaluating the potential benefits of relaxing restrictions on geographic expansion by banks.[6]

We test these alternative hypotheses by developing and estimating a simple model of the price bid by banks for banks. Although several studies of bank mergers examine key determinants of the prices paid in bank mergers (see, for example, Varaiya, Hempel, and Lam 1984; Beatty, Santomero, and Smirlock 1987; Gup, Cheng, and Wall 1989; Rhoades 1987; Rogowski and Simonson 1987; Liang and Rhoades 1988; Adkisson and Fraser 1990; and Rose and Wolken 1990), surprisingly none explicitly examines the impact of the target bank's earnings diversification potential on acquisition premiums or purchase prices.[7]

Our tests are conducted using a sample of bids made by U.S. commercial banking organizations during the period from December 1981 through July 1986. In the following section we present our empirical model and outline our data sources and definitions. The empirical results are discussed in section 2. A conclusion follows in section 3.

5. Recent research examining scale and scope economies in banking [see Berger, Hunter, and Timme (1993) for a comprehensive review] suggests that the potential gains resulting from scale and scope economies are dominated by those available through the elimination of managerial X-inefficiencies. For example, research to date suggests that differences in managerial ability to control costs or maximize revenues account for as much as 20 percent of costs in banking, while scale and scope inefficiencies account for only about 5 percent of costs.

6. Proponents of changes in federal interstate branching laws argue that the risk of bank failure would decrease if existing restrictions were relaxed. Implicit in this argument is the belief that acquiring banking organizations attempt to engage in risk-reducing mergers because they are unable to diversify adequately in their existing geographic markets.

7. Liang and Rhoades (1988) study the impact of geographic diversification on bank risk. They find that, while geographic diversification (intrastate) can reduce composite measures of bank risk, the variance of individual components of these measures may actually increase.

1. THE EMPIRICAL MODEL AND DATA

The price bid for any asset should be positively related to and no more than the present value of the change in the bidder's expected net cash flows. As postulated, a bank merger may increase the net cash flows expected from operations or from higher-valued deposit insurance. Because, at a minimum, the price bid should reflect the stand-alone value of the net assets acquired, we reduce the purchase price and expected net cash flows by the market value of the target bank before the consolidation was known to the market. Thus,

$$PP_T = f(CNCF, CDIP) , \tag{1}$$

where

PP_T = the purchase premium of a target bank (purchase price less preconsolidation market value),
$CNCF$ = change in the net cash flows of the combined (target plus acquirer) organization, and
$CDIP$ = change in deposit insurance put-option value to the combined organization.

1a. Change in Net Cash Flows

This section develops proxies for the impact of a merger on the riskiness of the post-merger banks and, thus, indirectly proxying for the increase in net cash flow. The combined organization might be less risky than the acquirer prior to portfolio changes, both because of diversification gains from less-than-perfectly correlated returns at the two banks and because the target is low risk. We measure the covariance of the target's and acquirer's returns using their respective returns on assets over the four years prior to the merger, COV_{AT}.[8] Similarly, the variance of the target's earnings is proxied by the variance in its return on assets over the four years prior to the merger, VAR_T. If acquirers seek to exploit diversification gains, both COV_{AT} and VAR_T should be inversely related to PP_T. If the owners of the target bank were not adequately diversified, their reservation price might be inversely related to

8. The choice of a four-year horizon reflects a compromise between using a longer time period to obtain more data and using a shorter time period to estimate more accurately the current value of the variance. The choice of return on assets instead of variance in net income eliminates the scale factor of the acquirer's total assets. The importance of eliminating this scale factor may be demonstrated by an example. Consider two targets (A and B) that have the same asset size and distribution of returns and two acquirers (C and D) that are also identical except that the assets and distribution of returns of acquirer C are five times larger than those of acquirer D. If covariances are calculated using return on assets, the covariance of A and C is identical to the covariance of B and D. Thus, using return on assets suggests that the two potential mergers will produce approximately equal changes in the target's asset portfolio to fully exploit the diversification or deposit insurance put-option gains. However, if covariances are calculated using net income, the covariance of A and C is five times that of B and D. Thus, use of net income produces the anomalous result that the diversification or put-option gains from a merger of A and C are five times the gains from a merger of B and D. (We recognize that the use of ratios, including *ROA*, fails to account for differences in the relative size of the targets, and adjust the variables appropriately below.)

VAR_T. Hence, a negative sign on the coefficient of this variable also would be consistent with this situation.[9]

The value of *CNCF* also might depend in part on the acquirer's ability to reduce the costs of producing the combined organization's existing product mix by achieving economies of scale. We measure this possibility with the relative asset ratio, TA_T/TA_A, where *TA* is total asset size and the subscript identifies the target (*T*) or acquiring (*A*) banks. We hypothesize that the larger is the relative asset ratio, the greater is the opportunity for merger-related efficiencies to be realized. Hence, if the mergers were expected to produce economies of scale, TA_T/TA_A should be significantly positively related to PP_T.

An alternative hypothesis is that the short-run costs of merging two banks are a positive function of their relative size. According to organization theorists, melding cultures in a merger is more difficult and costly when the target is more equal in size to the acquirer. If short-run costs are a positive function of size and these costs outweigh the present value of economies of scale, an inverse relationship between relative size and purchase premium is expected.

An inverse relationship also is suggested by Rogowski and Simonson (1987). They hypothesize that relatively large targets offer acquirers fewer opportunities to introduce new and presumably more profitable products, as the target would already be offering products similar to those offered by the acquirers.[10] Hence, in these situations, acquirers would offer less to the targets' owners, other things equal.

Managers of acquiring banks may be superior to managers of target banks in producing shareholder value. This superiority may be manifest in lower costs or greater revenues.[11] We proxy the efficiency of the acquirer with the ratio of its market to book value of equity (a variant of Tobin's *Q*), MV_A/BV_A, on the assumption that the stock market values a bank at more or less than its book (presumed replacement) value if the bank's managers are better or worse than normal. Similarly, the efficiency of the target is proxied by the ratio MV_T/BV_T. If acquiring banks typically possess the superior management (as would be predicted by models of the market for corporate control), MV_A/BV_A is expected to be positively related to the bid premiums. MV_T/BV_T is expected to have a negative sign because bad target management implies greater opportunities for the acquiring bank to improve the target's efficiency, ceteris paribus.[12]

9. The covariance and variances of the target's and acquirer's returns are also measured using the rate of return on equity and the net interest margin. The results obtained using these alternative measures are noted in footnote 14 below.

10. Ideally, a direct measure of these new product opportunities would be employed. However, the financial statements of banks lack sufficient detail for the calculation of a direct measure. For example, all types of commercial lending appear under the single heading of commercial and industrial loans.

11. Several studies suggest the potential for lower costs, including Berger and Humphrey (1991), Elyasiani and Mehdian (1990), Evanoff, Israilevich, and Merris (1990), and Ferrier and Lovell (1990). However, Srinivasan and Wall (1992) suggest that mergers of larger organizations between 1982 and 1986 did not produce lower noninterest expenses, ex post.

12. Since market-to-book value ratios might be affected significantly by geographic location, we include regional dummy variables in the empirical model to control for the possibility of regional differences in the ratio.

Finally, the market in which a prospective target bank operates may enhance its value to an acquirer. Such market conditions might include the size of the market, expected market growth, and the degree of concentration. These variables were included in a large-scale study of the determinants of bank mergers between 1978 and 1983. Amel and Rhoades (1989) found that rapid growth of the target bank was not a determinant. They found that high market share reduces the probability of a bank's being acquired in a horizontal merger, but increases its acquisition probability in a market-extension merger. Market concentration also reduces the probability of a horizontal acquisition and is not a significant determinant of market extension mergers. Although we do not include market share and concentration variables in our model, from the Amel-Rhoades (1989) study, we expect that the omission of these variables tends to bias the results weakly against the earnings diversification hypothesis.

1b. Change in the Value of the Deposit Insurance Put Option

A merger may increase the value of deposit insurance in two ways: (1) by increasing the size of the banking organization so it may be considered too big or too important to fail, and (2) by increasing the variance of the acquiring organization's returns. Risky acquirers may bid more than low-risk acquirers for targets because the value of becoming too-big-to-fail is greater for banks that are more likely to fail. We measure this risk by the variance in acquirer's return on assets, VAR_A, and by its book-value capital-to-asset ratio, BV_A/TA_A. Under the deposit insurance put-option hypothesis, VAR_A should have a positive relationship and BV_A/TA_A an inverse relationship to PP_T. The hypothesis also predicts a positive relationship between VAR_T and COV_{AT} to PP_T.

However, the regulatory agencies may reject mergers that pose too great a risk to the FDIC. Should this have occurred and if acquirers do not seek mergers to reduce risk, the signs of the coefficients of VAR_T, COV_{AT}, VAR_A, and BV_A/TA_A should be insignificant.

1c. The Empirical Model

The expected relationship between each of the variables and the price bid for the target is summarized in Table 1. One problem remains before we can develop an empirically estimable model: the dependent variable, purchase price premium, is stated in dollar terms, but all of the explanatory variables are ratios. Therefore, to scale all of the independent variables, we multiply each by the target's total assets, TA_T. To account for possible regional differences in purchase premiums paid in mergers, we also include regional dummy variables based on FDIC regions in the empirical specification. The estimation model is then written as

$$\begin{aligned} PP_T &= b_0 + b_1\, VAR_T{*}TA_T + b_2\, COV_{AT}{*}TA_T + b_3\, VAR_A{*}TA_T \\ &\quad + b_4\,(BV_A/TA_A){*}TA_T + b_5\,(TA_T/TA_A){*}TA_T + b_6\,(MV_A/BV_A){*}TA_T \\ &\quad + b_7\,(MV_T/BV_T){*}TA_T + \sum_{j=8}^{12} b_j{*}RD_j + e, \end{aligned} \tag{2}$$

TABLE 1

RELATIONSHIPS EXPECTED BETWEEN EXPLANATORY VARIABLES AND PURCHASE PREMIUM (PP_T) BY THE ALTERNATIVE HYPOTHESES

Explanatory Variable	Earnings Diversification Hypothesis	Deposit Insurance Put-Option Hypothesis
VAR_T	−	+
COV_{AT}	−	+
VAR_A	not significant	+
BV_A/TA_A	not significant	−
TA_T/TA_A	+ if economies of scale − if merger cost dominates or if fewer opportunities for new products	not significant
MV_A/BV_A	+	not significant
MV_T/BV_T	−	not significant

A = acquiring bank
T = target bank
TA = total assets
VAR = variance or return on assets
COV = covariance or returns on assets
BV = book value of equity
MV = market value of equity

where

PP_T = purchase premium paid for the target bank measured as the difference between the price paid for the target bank less the market price of the target approximately one month prior to the announcement of the merger,
TA = total assets of target (T) or acquiring (A) bank,
VAR = variance of return on assets,
COV = covariance of target and acquirer's return on assets,
BV = book value of equity,
MV = market value of equity,
RD = regional dummy variables, that is,
RD_8 = total target assets for Northeast, 0 otherwise
RD_9 = total target assets for Southeast, 0 otherwise
RD_{10} = total target assets for Midwest, 0 otherwise
RD_{11} = total target assets for Southwest, 0 otherwise
RD_{12} = total target assets for West, 0 otherwise, and
e = zero mean error term.

In equation (2) the dummy variables measure differences in the purchase premium paid relative to targets located in the Central region of the United States. Table 1 shows the relationship between the explanatory variables and the purchase premium expected by the alternative hypotheses.

1d. The Data

The observations included in the sample were obtained from the *Cates Merger Watch* for the period from December 1981 through July 1986. To be included in this data base the acquiring bank's total assets must exceed $100 million and the target bank's assets must exceed $25 million. The data include bids made for targets and

TABLE 2

SAMPLE SUMMARY STATISTICS

Variable	Mean	Standard Deviation
Purchase premium (PP_T) (millions)	$21.397	32.373
Acquirer total assets (TA_A) (millions)	$5,337,100,000	10,348
Target market value (MV_T) (millions)	$53.948	100.060
Target total assets (TA_T) (millions)	$748	1,310
Target variance of return on assets (VAR_T)	.00000391	.00001283
Covariance of returns on assets (COV_{AT})	−.00000651	.00001408
Acquirer variance of return on assets (VAR_A)	.00000058	.00000110
Acquirer book-value of equity-to-total assets (BV_A/TA_A)	.065	.014
Target TA to acquirer TA (TA_T/TA_A)	.213	.237
Acquirer market-value-to-book-value of equity (MV_A/BV_A)	1.051	.387
Target market-value-to-book-value of equity (MV_T/BV_T)	.964	.432

are not restricted to mergers that were consummated. Our study requires stock price information, which also is available from *Cates*. The final sample contains 302 mergers.[13]

All of the financial statement variables were obtained from the Report of Condition and Report of Income filed by banks with their respective federal bank regulator and the Bank Holding Company Financial Supplement (FR Y-9) filed by bank holding companies with the Federal Reserve. The merger price, premerger market price, and premerger market-to-book ratios were obtained from *Cates Merger Watch*. Summary sample statistics are presented in Table 2.

2. EMPIRICAL FINDINGS

Table 3 reports the results obtained using return on assets (*ROA*) to measure returns.[14] As can be seen in this table, the empirical model is statistically significant and 81 percent (adjusted R^2) of the variation in the purchase premium is explained by the model. Excluding the regional dummy variables, five of the seven estimated coefficients are statistically significant. A comparison of the actual signs of the estimated coefficients with their expected signs under alternative hypotheses (see Table 1) shows that the data are strongly consistent with the earnings diversification hypothesis, marginally consistent with the managerial interest hypothesis, and inconsistent with the deposit insurance put-option hypothesis.[15]

13. Our initial sample consisted of 340 merger cases. However, in 4 of these cases the acquiring bank was a foreign bank, in 8 cases multiple changes in the merger terms were observed, in 1 case the merger was a federally assisted transaction, 19 cases presented incomplete financial data, and the predecessor bank (for purposes of computing variances and covariances) could not be identified in 6 cases.

14. The model also was estimated using the return on equity and the net interest margin to calculate the variances and the covariance measures. The empirical results obtained using these alternative measures of return were not significantly different from those presented in Table 3.

15. It should be noted that even though the first public confirmation of the too-big-to-fail doctrine was

TABLE 3

ESTIMATION OF PURCHASE PRICE BID PREMIUM (PP_T)
All Explanatory Variables (except Regional Dummies) Multiplied by the Target's Total Assets (TA_T)

Independent Variable	Coefficient	White's Standard Error	Explanatory Power[a]
VAR_T	−580.5	141.4***	−0.538
COV_{AT}	−331.2	228.6	−0.122
VAR_A	−2764.3	1378.0*	−0.118
BV_A/TA_A	.421600	.09613***	−0.967
TA_T/TA_A	−.025400	.00349***	−0.907
MV_A/BV_A	.012500	.00521**	−0.669
MV_T/BV_T	−.000854	.005921	−0.042
Northeast	−.004500	.003087	−0.105
Southeast	.001930	.005120	0.049
Midwest	.015083	.003676***	0.099
Southwest	.003508	.002589	0.051
West	.011489	.007930	0.219
Intercept	2189.0	812.1**	
F-Statistic	109.15		
R-Square	.81		

White's test for model specification 150.13
(Under the null hypothesis, the errors are homoscedastic. The test statistic follows a chi-square distribution with 79 degrees of freedom; its probability value is .0001.)
*** = coefficient significant at 1 percent level, two-tail test
** = coefficient significant at 5 percent level, two-tail test
* = coefficient significant at 10 percent level, two-tail test
[a]Explanatory power equals the estimated coefficient multiplied by a one-standard-deviation change in the explanatory variable divided by the purchase price bid premium.

The significantly negative sign on the coefficient of the variance of the target's return on assets, VAR_T, is consistent with the diversification/managerial interest explanation for mergers and inconsistent with the deposit insurance put-option hypothesis. Similarly, the negative sign on the covariance term, COV_{AT}, is consistent with the diversification/managerial interest explanation for mergers, although it is of marginal significance. The significantly negative coefficient of the variance of the acquirers' returns, VAR_A, and significantly positive coefficient of the acquirers' book value equity to assets ratio, BV_A/TA_A, are also inconsistent with the deposit insurance put-option hypothesis. However, to the extent that these variables are indicators of the quality of management, the results are consistent with the joint hypothesis that higher-quality managements can benefit more from acquisitions and hence will tend to bid more than lower-quality managements. For example, banks with lower variances may serve more stable markets or are better able to manage

made by the Comptroller of the Currency for the largest banks in the country in 1984, there were widespread perceptions prior to 1984 that certain banks would not be allowed to fail. For example, in his 1986 book, *Bailout: An Insider's Account of Bank Failures and Rescues*, Irvine Sprague describes four bailouts which he handled while Chairman and Director of the FDIC. These bailouts were (1) Unity Bank (Roxbury, Mass.) in 1971, (2) Bank of the Commonwealth (Detroit) in 1972, (3) First Pennsylvania Bank (Philadelphia) in 1980, and (4) Continental Illinois (Chicago) in 1984. At the time of their bailouts, these institutions had total assets of $11.4 million, $1.26 billion, $8.4 billion, and $41 billion, respectively. Thus, a bailout could result from a bank being deemed too important to its community as well as from being too big to fail. While we have no way of assessing the subjective probabilities assigned by market participants that a given bank would receive government protection if it became insolvent and the exact form this protection would take, the collapse of Continental Illinois and the comptroller's subsequent public statements in 1984 made the doctrine explicit. An analysis of the 1981–83 and 1984–86 subperiods indicate that the earnings diversification motive became dominant during the post-1983 period.

their earnings. Banks with higher capital ratios may have been more profitable in the past and expect to have more profitable future opportunities and, hence, retain more earnings. An alternative explanation is that the regulators were effective in blocking takeovers by financially weak acquirers.

The coefficient of relative size, TA_T/TA_A, is significantly negative. This finding is consistent with the hypothesis that the cost of consummating the merger exceeds the potential savings due to economies of scale and with the notion that large targets offer fewer opportunities for new product introduction. The coefficient on the proxy for the efficiency of the acquirer's management, MV_A/BV_A, is positive and statistically significant. The positive sign is consistent with more efficient acquirers' bidding higher premiums for targets. Although the negative sign on the target bank's management efficiency proxy, MV_T/BV_T, indicates that acquirers bid less for more efficient targets, the coefficient is not statistically significant. These results are consistent with the predictions of the "market for corporate control" hypothesis.

The only regional dummy variable with a statistically significant coefficient is that representing the Midwest region. Thus, target banks located in the Midwest region commanded a higher purchase premium than did targets located in the Central regions of the United States, ceteris paribus.

A measure of the relative explanatory power of the different variables is provided in the last column of Table 3. This measure is the estimated coefficient multiplied by a one-standard-deviation change in the explanatory variable divided by the purchase price bid premium. By this measure, four variables stand out. The two most important explanatory variables by this measure are the acquirer's book value capital-to-asset ratio, BV_A/TA_A, and relative size, TA_T/TA_A. The quantitative importance of the covariance of the two banks' return on assets and the variance of the acquiring bank's return on assets, COV_{AT} and VAR_A, appear small by this measure of explanatory power. However, the variance of the target bank's return on assets, VAR_T, is the fourth most important variable. The measure of the quality of the acquiring bank's management, MV_A/BV_A, is in third place.

3. CONCLUSION

This study examines the prices bid to acquire target banks in the early to mid-1980s. In particular, the study examines two contrasting hypotheses on the pricing of risk considerations in these mergers. The earnings diversification hypothesis holds that banks would bid more for merger partners that offered the potential for cash flow enhancements as a result of earnings diversification, whereas the deposit insurance put-option hypothesis holds that acquirers would bid more for targets that offered opportunities to increase risk and/or to become too big or important to fail. The empirical results are consistent with the earnings diversification hypothesis and inconsistent with the deposit insurance put-option hypothesis. The signs and relative importance of the variables are consistent with mergers having net-cash-flow advantages. Contrary to the predictions of the deposit insurance put-option hypothesis, the coefficient on the variance of the target's return on assets is

negative and the coefficient on the acquirers' book value equity to assets ratio is positive. Moreover, the coefficient on the variable measuring the relative size of the target to the acquirer is negative, which is consistent with the desire of the acquirer to increase its risk and/or enhancing the target's operations by adding new products.

These results should not be interpreted to imply that no mergers have been undertaken in an attempt to increase the value of deposit insurance. As suggested by Hunter and Wall (1989) and Boyd and Graham (1991), deposit insurance considerations may have been important in some recent mergers, including some of the megamergers of the early 1990s. However, our results strongly suggest that most of the mergers between publicly traded banks in the early and mid-1980s were not due to attempts to exploit deposit insurance.

LITERATURE CITED

Adkisson, J. Amanda, and Donald R. Fraser. "The Effect of Geographical Deregulation on Bank Acquisition Premiums." *Journal of Financial Services Research* (July 1990), 145–55.

Amel, Dean F., and Stephen A. Rhoades. "Empirical Evidence on the Motives for Bank Mergers." *Eastern Economic Journal* 15 (January–March 1989), 17–27.

Asquith, P., and H. Kim. "The Impact of Merger Bids on the Participating Firm's Security Holders." *Journal of Finance* (June 1983), 813–26.

Beatty, Randolph P., Anthony Santomero, and Michael Smirlock. "Bank Merger Premiums: Analysis and Evidence." Salomon Brothers Center for the Study of Financial Institutions Monograph Series in Finance and Economics, Monograph 1987-3 (1987).

Berger, Allen N., and David B. Humphrey. "The Dominance of Inefficiencies over Scale and Product Mix Economies." *Journal of Monetary Economics* 28 (1991), 117–48.

Berger, Allen N., William C. Hunter, and Stephen G. Timme. "The Efficiency of Financial Institutions: A Review and Preview of Research Past, Present, and Future." *Journal of Banking and Finance* 17 (April 1993), 221–49.

Boyd, John H., and Stanley L. Graham. "Investigating the Bank Consolidation Trend." Federal Reserve Bank of Minneapolis *Quarterly Review* (Spring 1991), 3–15.

Cornett, Marsha M., and Hassan Tehranian. "Changes in Corporate Performance Associated with Bank Acquisitions." *Journal of Financial Economics* (April 1992), 211–34.

Elyasiani, Elyas, and Seyed M. Mehdian. "A Nonparametric Approach to Measurement of Efficiency and Technical Change: The Case of Large U.S. Commercial Banks." *Journal of Financial Services Research* 4 (July 1990), 157–68.

Evanoff, Douglas D., Philip Israilevich, and Randall Merris. "Relative Efficiency, Technical Change, and Economies of Scale for Large Commercial Banks." *Journal of Regulatory Economics* 2 (1990), 281–98.

Ferrier, Gary D., and C. A. Knox Lovell. "Measuring Cost Efficiency in Banking: Econometric and Linear Programming Evidence." *Journal of Econometrics* 46 (1990), 229–45.

Gup, Benton, David Cheng, and Larry Wall. "Financial Determinants of Bank Takeovers." *Journal of Money, Credit, and Banking* (November 1989), 524–36.

Heggestad, Arnold, and John Mingo. "Capital Management by Holding Company Banks." *Journal of Business* (October 1975), 500–505.

Hobson, H. A., J. T. Maston, and J. T. Severiens. "Holding Company Acquisitions and Bank Performance: A Comparative Study." *Journal of Bank Research* (Summer 1978), 116–20.

Hunter, William C., and Larry D. Wall. "Bank Merger Motivations: A Review of the Evidence and an Examination of Key Target Bank Characteristics." Federal Reserve Bank of Atlanta *Economic Review* (September 1989), 2–19.

Kim, Han, and John McConnell. "Conglomerate Mergers and the Co-Insurance of Corporate Debt." *Journal of Finance* (March 1977), 349–65.

LaWare, John P. Testimony before the Committee on Banking, Finance, and Urban Affairs of the U.S. House of Representatives, September 24, 1991. Reprinted in *Federal Reserve Bulletin* 77 (November 1991), 932–48.

Lewellen, Wilbur. "A Pure Financial Rationale for the Conglomerate Merger." *Journal of Finance* (May 1971), 521–45.

Liang, Nellie, and Stephen A. Rhoades. "Geographic Diversification and Risk in Banking." *Journal of Economics and Business* (August 1988), 271–84.

Piper, Thomas R. "The Economies of Bank Acquisition by Registered Bank Holding Companies." Federal Reserve Bank of Boston Research Report no. 48 (March 1971).

Piper, Thomas R., and S. Weiss. "The Profitability of Bank Acquisitions by Multibank Holding Companies." Federal Reserve Bank of Boston *New England Economic Review* (September–October 1971), 2–12.

Rhoades, Stephen A. "Mergers and Acquisitions by Commercial Banks, 1960–1983." Board of Governors, Federal Reserve System, Staff Study #142, January 1985.

———. "Determinants of Premiums Paid in Bank Acquisitions." *Atlantic Economic Journal* (March 1987), 20–30.

Rogowski, Robert J., and Donald G. Simonson. "Bank Merger Pricing Premiums and Interstate Bidding." Paper presented at the 1987 Financial Management Association Meeting, Las Vegas, Nevada (October 1987).

Rose, Peter. "Bank Holding Company Affiliation and Bank Performance." Paper presented at the Eastern Finance Association (April 1975).

Rose, John T., and John D. Wolken. "Geographic Diversification in Banking, Market Share Changes, and the Viability of Small Independent Banks." *Journal of Financial Services Research* (March 1990), 5–20.

Sprague, Irvine H. *Bailout: An Insiders Account of Bank Failures and Rescues*. New York: Basic Books, 1986.

Srinivasan, Aruna, and Larry D. Wall. "Cost Savings Associated with Bank Mergers." Federal Reserve Bank of Atlanta Working paper 92-2 (1992).

Talley, Samuel. "The Effect of Holding Company Acquisitions on Bank Performance." Washington, D.C.: Board of Governors of the Federal Reserve System, Staff Economic Study no. 69 (1972).

Varaiya, N., G. Hempel, and C. Lam. "Determinants of Bank Merger Premiums." Paper presented at the Financial Management Association meetings, Toronto (1984).

Ware, Robert F. "Performance of Banks Acquired by Multi-Bank Holding Companies in Ohio." Federal Reserve Bank of Cleveland *Economic Review* (March–April 1973), 19–28.