Identifying Targets and Acquirers in Bank Mergers

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John Thomas
Master's Degree Candidate
Department of Economics
East Carolina University

Abstract

      The relationship between the target and acquiring banks in a bank merger is examined to determine if any factors contribute to the likelihood of a bank merger. Logistic models are used in an attempt to model the merger decision of both the target and the acquirer banks. I find some evidence larger banks holding riskier portfolios are more likely to acquire other banks.

Introduction

In the banking industry, there is large room for mergers between firms. This stems from the fact that there are over 10,000 banks and thrifts in the U.S. In fact, there are more banks per citizen in the U.S. than in any other country in the world. There are nearly four times more deposit-taking institutions in the U.S. than in the 15 nations of the European Union, Switzerland, Canada, and Japan combined. This glut of banking institutions in the market makes mergers a viable means for many institutions to expand.

Several economic factors have caused banking institutions to merge over the past several years. Several of these factors are apparent to consumers, and others not as apparent. First, banks merge to achieve greater efficiency. Banks are often able to operate more cost effectively through economies of scale. The costs of many services exhibit less than constant returns to scale. As a result, mergers are an effective way to reduce costs and prices. Second, banks are often led to the introduction of new and expensive technologies. These technologies are expensive to adopt unless the cost is spread over a large number of customers. Mergers allow the banks to leverage their technology in this manner. Another factor responsible for increased bank mergers are changing laws at the state and the federal level. Laws preventing many banks from operating in more than one state have recently been removed or overridden. The foremost example of this is the Riegle-Neal Interstate Banking and Branching Efficiency Act. This act was passed by Congress in September of 1994. This encouraged the consolidation of multibank holding companies into multistate branch networks. Reduced barriers to entry might facilitate mergers between previously unaffiliated banking companies. A good example of this would be the merger of San Francisco-based BankAmerica and Charlotte-based NationsBank. This union provides a nationwide banking entity with the largest presence in the country. Two separate entities that were among the largest regional banks in the west and southeast, combine to form a huge "national" bank that has a presence in 48 states (excluding North and South Dakota), and the largest consumer banking franchise in the country. The combined Bank of America is big enough that it is almost unable to get larger through merger – the government fear of a banking monopoly only allow a bank to have up to 10 percent of all deposits in the country (Bank of America has 9 percent currently).

Previously, banks would seek to buy failed banks in other states to get a foothold in a new state. Now, limits on interstate bank growth, and restrictions on branch density have largely been removed.

Diversification of inherent risk is also a factor leading to increased mergers. Banks develop inherent risk through lending, and they seek to diversify this risk through a larger geographic area and wider customer base. Finally, banks are able to offer a broader array of products through merger. This is possible if the two banks are able to offer different expertise to each other as a result of the merger. This would be advantageous to customers looking for many products under the same roof. A great example of this occurred in the recent merger of First Union and Wachovia. First Union's large Capital Markets group provided an excellent fit in the combined company, while Wachovia's relatively affluent client base helped the combined Wachovia's Private Client Group efforts.

Historically, bank mergers have been looked upon as less than favorable by the government. As a result of the stock market crash in 1929 (and the resulting Depression), the government enacted the Glass-Stegall Act in 1933. This law stipulated that banks and investment banks must remain separate entities. This would force stock brokerages into becoming independent of bank control. The way that banks would try to get around this was to create bank holding companies. These holding companies were technically not banks, but were the parent organizations of the commercial banks. Therefore the bank holding companies could operate a commercial bank and a stock brokerage (but under independent names). An added advantage is that a bank holding company could also operate across state lines, where previously it was illegal for a commercial bank to do so.

Now, as a result of decreased government regulation and increased consumer confidence, the Glass-Stegall Act is eroding. A recent merger by Citibank and Travelers Group created an entity with a commercial bank arm, an insurance arm, a stock brokerage arm, and an investment bank. Only recently have "super-regional" banks come into existence (such as Bank of America, the "new" Wachovia, Bank One, etc.). These large banks operate over several states and maintain huge deposit bases. Because of the sheer size of these companies, their activities are of increased importance to investors, and regulators.

This study draws upon merger activity between January 1990 and December 2000. Merger and consolidation transactions for the period are used to develop financial profiles of participating banks. In turn, these profiles are then used to develop statistical models that predict the likelihood that a bank will become involved in a merger, either as the acquiring firm or as the target. The Riegle-Neal Act is important in that it represents an unprecedented change in the legal environment in which mergers occur.

Empirical merger-prediction models are based on known merger histories and therefore cannot incorporate the effects that changes to the legal or regulatory environment might have on mergers themselves. An understanding of the financial characteristics of acquiring and target firms should be useful in predicting mergers and consolidations in the near term.

The merger models in this paper indicate that target banks and acquiring banks are very different, based on their different characteristics.

Recent Trend in Mergers and Consolidations

The recent legalization of full interstate branch banking could alter banking industry structure in two ways. First, the larger banking organizations used the multibank holding company organizational structure to form interstate banks before the passage of the Riegle -Neal Act. Some of these multibank holding companies might consolidate operations into multi-state branch-bank networks, if such networks offer advantages over existing organizational structures. Second, the ability to enter markets across state lines via branching might be a lower-cost alternative to the chartering of a new bank, as was required before the change in legislation. Consequently, if barriers to market entry are reduced, there might be shifts in merger activity as banks implement their own merger plans.

The removal of legal impediments to interstate banking does not necessarily mean that more interstate banking organizations will develop. Mergers involve changes in ownership, and more importantly, can result in the reallocation of real and financial resources across markets. Such reallocations are motivated by the long-term expected risks and returns on investment capital. The present and expected future profitability of the industry will play an important role in such capital reallocations.

At one time, many banks were clamoring to expand into "super-regional" banks such as the "newly" formed Bank of America, and Bank One. It seems now, that many banks are looking to exploit the segment of the financial market that had been previously off-limits to them. Their model being the newly formed Citigroup, banks are now looking to buy insurance and brokerage arms to compete across the full financial spectrum. It is much easier to buy into an industry than to start from the ground up, as can be seen by the actions of those in the market. The reasons are simple, as companies gain the management expertise of the acquired firm, as well as an established name brand, and customer base.

Incentives for Mergers and Consolidations for Merging Firms

There are two participants in all mergers: the acquiring firm and the target firm. Because of the degree of regulatory oversight of bank mergers, nearly all bank mergers result from the joint decisions of the controlling directors and the shareholders of both of the merging banks. A discussion of the decision on whether to merge should consider both the acquiring and the target bank's perspectives. This section will review the potential motives behind this decision, based on the bank merger studies of Rose (1987).

Merger motives can be classified into two broad categories: shareholder wealth maximization and managerial "well being". The idea that mergers are motivated by shareholder wealth maximization is a fundamental assumption of most theories of firm investment decisions. Under the shareholder wealth-maximization idea, mergers are treated like any other investment decision. Target firms in mergers are priced by bidders, based on the present discounted value of the expected returns from the acquisition, where the discount rate and return expectations consider the assumed firm's performance within the acquirer's portfolio or assets. In mergers, acquirers can snare a portion of expected gains from the transaction with target firm owners to help encourage the merger. Such gains can result from post-merger improvements in the efficiency and profitability of the target bank's franchise or when the merged entity is expected to perform better than both of the individual firms. In either situation, the target bank's owners can be offered more than the current market value of their shares, because the "going concern" value of the target bank will be less than its value when combined with the acquirer's franchise. If the merged firm has greater long-term market value than the simple sum of the parts, merger synergies (in other words, 2+2=5) are said to have occurred. Specific sources of merger synergies are risk diversification in revenues and costs, economies of scale and scope, and market power.

Investment theory shows, that as the number of assets in an investment portfolio (whose returns are positively correlated) increases, the total variance of the portfolio's return decreases and approaches the average covariance between individual asset returns. If bank mergers increase portfolio diversification, the risk-reduction will benefit bank owners. The potential for increased geographic loan exposure diversification is probably the most likely source of benefits from interstate banking and branching. The

regional concentrations of bank failures during the 1980's and 1990's were fueled by many banks' geographic lending concentrations, particularly those in commercial real estate.

Economies of scale refer to the ability to spread fixed operating costs over larger output levels, thereby reducing average total production costs. For example, bank mergers can reduce average costs when overlapping branch offices are closed, or fixed information processing costs and advertising costs are spread over increased revenues. In addition, personnel costs can be reduced when tasks overlap. Acquirers can benefit from applying "fixed" managerial and technical expertise to a larger business operation. Economies of scope are similar in nature, except that the cost savings result from applying fixed resources to a broader range of services, as opposed to simply increasing the level or the current mix of services. In addition, economies of scale can be achieved in financing. The costs of issuing debt and equity include a substantial fixed component. Consequently, larger banking organizations can spread fixed financing costs over larger equity issues, reducing per share issuance costs.

Mergers can also enhance market shares for acquirers for both balance-sheet and off-balance-sheet activities. This can confer some pricing advantages and improve profitability; however, there are limits to the extent to which mergers can be used to garner market power. Federal antitrust laws and regulatory policies restrict merger transactions in banking and other industries and are intended to prevent undue concentrations of market power. The primary federal antitrust laws that restrict merger activity are the Clayton Act of 1914, the Sherman Act of 1980, and the Federal Trade Commission Act of 1914. The Bank Merger Act of 1960, which was amended in 1966, clarifies federal bank regulators' role regarding bank merger policy. The U.S. Department of Justice (DOJ) and the Federal Trade Commission (FTC) are responsible for ensuring that bank merger transactions do not violate federal antitrust laws. The DOJ and the FTC have developed and published horizontal merger guidelines that present their policies and interpretation of appropriate merger practices.

If a bank's owners or equity shareholders are not well represented on the firm's board of directors, the merger decision can be driven by managers' interests, rather than those of the bank's shareholders. For example, managers seeking to protect their employment positions might actively block takeover attempts by many means, such as making preemptive acquisitions to ensure the firm is "too big to be a target". Since the assumed firm's management is often placed at risk or job loss in a merger, there is the potential

for this motive to cause a divergence between shareholders' interests and managers' interests among targeted firms. The fact that managerial compensation usually increases with the revenues and assets of the firm also gives acquiring firms' mangers an empire-building motive. This motive might not translate into increased wealth for their shareholders.

Finally, third-party influences on the merger decision can result in mergers with little or no benefit to either acquirers or target banks. Third parties involved in facilitating the transaction, such as investment bankers and securities dealers and underwriters, can profit from a merger transaction even when it does not produce the expected benefits to the acquiring firm's shareholders. As Rose (1988) points outs, with such a large and diverse array of possible motives for mergers it is not unexpected that empirical studies differ in explaining why mergers occur. One can expect that some combination of the previous factors have influenced bank mergers over the past decade. The empirical analysis of merger motives developed in this study draws upon the motive of shareholder wealth maximization.

Financial Considerations: Identifying Likely Targets and Acquirers

Banks that are actively seeking to expand operations through mergers can have unique characteristics that distinguish them from their peers. Businesses that are in an expansion mode should be perceived to be in sound financial condition and could be expected to be outperforming their peers. An adequate equity capital base and healthy profit rates are necessary to attract the additional capital often needed to finance mergers. Conversely, managements that are not successfully operating an organization could not be expected to do any better with expanded responsibilities and should not be engaged in mergers.

While these traits could be found among banks actively seeking mergers, such banks might not always be able to translate their abilities into action, that is, acquire other banks. One reason for inaction might be the lack of worthwhile merger candidates within a bank's geographic market or targeted new markets. State and federal restrictions on branching and interstate banking might also have limited the scope of merger candidates available to some banks. The federal government's enforcement of the Community Reinvestment Act may have forced SunTrust to forgo its pursuit of Wachovia if Wachovia shareholders didn't via their proxy. The Community Reinvestment Act states that banks with branches in designated low-income census tracts must maintain a certain level of loans (based on their deposits) to lower income

individuals. Therefore, banks in those areas must also lend to the same people that they take deposits from. First Union questioned SunTrust's adherence to this act, in the hostile takeover fight for Wachovia.

Prior to the Riegle-Neal Act, regional banking compacts limited banks' ability to acquire banks in states that did not have reciprocal agreements. Finally, a variety of factors, such as expectations or regional and national economic recessions, or constraints on existing managements' ability to assume new responsibilities can delay merger activity. Thus, while acquirers could have common characteristics, these traits might also be present in banks not active in merger markets.

Similar generalizations might be possible for target banks in mergers. Target banks might be under-performing their peers and could benefit from mergers. Inefficient scale and scope of operations can, at times, only be overcome with difficulty when banks have limited access to capital markets. While target banks might be under-performing peers, one would not expect acquirers to seek out targets with substantial problems or weak franchises. Hence, targets are likely to have deficiencies that can be remedied without substantial cost to acquirers. Deficiencies need not always be present in target banks, however. One commonly cited example is that of owner-managers of closely held banks. These owners can choose takeovers as a means to cash out on their investment at retirement, particularly when leaving the business to family members is not a consideration. Finally, as with acquirers, to be a target bank implies that acquisition mode banks must exist within the target's geographic market or out-of-market acquirers mu st find the potential target's market attractive. While many target banks might have common traits, one can expect these traits also to be present among banks that have not yet become merger targets.

If potential acquirers and targets can be identified within markets, more might be said about the likelihood of future merger activity. One first needs to identify common traits of acquirers and target banks. This section looks at the financial characteristics of both groups in a couple of ways. First, acquirers and target banks' income statement characteristics are reviewed to learn whether certain attributes appear just before mergers occur, or whether they are longstanding. Next, acquirers are compared with their targets to investigate possible motives for mergers such as portfolio diversification and improvements in operating efficiency.

The attractiveness of target banks' franchises to potential acquirers is influenced by market demographics, as well as current and expected future economic conditions in the local and regional

markets. Demographic data and economic activity measures might aid in explaining merger activity. This study relied, however, upon the financial statements of banks, in analyzing merger activity. Both market demographics and business cycles affect financial statements: therefore, these factors are not entirely ignored when relying upon financial statements. Moreover, because the geographic scope of most banks' markets is not well known, relating merger activity to demo graphic and economic activity measures involves uncertainties. For example, high commercial property vacancy rates in a particular market might be expected to reduce the attractiveness of target banks with substantial commercial real-estate loan exposures: however, banks do not report geographic loan exposures to federal bank regulators. Thus, the relevance of local vacancy rates to all potential target banks is uncertain. Banks do report non-performing asset levels that directly show the effect of market conditions upon bank asset quality.

Previous studies

Rhoades (1996) finds that the main motivation for bank mergers were increased potential for geographic expansion created by in state laws regulating branching and a more favorable antitrust climate. Hughes, Lang, Mester and Moon (1999) in a study of the largest bank holding companies, find that economic benefits of consolidation are strongest for those banks engaged in interstate expansion and, in particular, interstate expansion that diversifies banks' macroeconomic risk. Hughes et. al, go on to show that society benefits from the enhanced bank safety that results from mergers

Cheng, Gup, and Wall (1989) note that bank mergers are quite different than nonblank mergers because of the regulatory process involved. Before a bank merger can occur, prior approval from one of the three federal bank regulatory authorities (Comptroller of the Currency, Federal Deposit Insurance Corporation, or the Federal Reserve Board) and approval at the state level are required. If an approval is granted, there is a thirty-day waiting period in which the Justice Department examines the merger. A total of four months may pass before the merger is given the "green light" by the government. Cheng et. al also find that for these reasons, bank managers are less concerned about maximizing shareholder wealth. Their findings also suggest that banks maintain sub-optimal levels of capital in order to achieve higher rates of growth. Rhoades (1987) finds that acquirers were willing to pay for growth potential, but not profitability.

Hannan and Rhoades (1987) find that larger market shares or operations in urban areas (if the acquirer does not have a presence in that area) increase a target bank's attractiveness to an acquiring bank. High capital-asset ratios reduced the attractiveness of the target bank (possibly as a result of holding on to too much cash, and being conservative with lending). They also find that poorly managed banks are no more likely to be acquired than better managed banks.

Model

The Federal Reserve Bank of Chicago has collected quarterly data on banks and bank holding companies from the first quarter of 1990 to the fourth quarter of 2000. This data contains structural characteristics of 6,263 banks in this time period. Using the quarterly data obtained from the Federal Reserve Bank of Chicago on bank and bank holding company merger and acquisition activity, it is possible to draw a model.

A model is needed to relate mergers, either from the acquirers' or target banks' perspective to a number of factors, both endogenous and exogenous to a bank that can affect the incidence of mergers. Because acquirers differ from their target banks, and both groups differ from their peers, separate logistic estimations are used for acquirers and target banks.

Acquirers and their target banks appear to differ from each other in terms of many important financial characteristics. Therefore, logistic models were formed relating the incidence of mergers to the major attributes of banks' financial condition. Broad measures of bank condition were used in order to obtain models that would be robust across time and geographic regions. Therefore, details on loan portfolio composition and other factors likely to be correlated with time or location were excluded from the analysis.

To obtain general measures of condition, bank assets were partitioned into broad groups based on earnings, liquidity, risk, and asset quality. Total assets were partitioned into risk and non-risk assets. Non-risk assets were defined as the sum of cash balances due, securities and federal funds sold plus resale agreements. Risk assets were, therefore, defined as total assets minus non-risk assets. Non-risk assets were further partitioned into two groups: noninterest-bearing non-risk assets (that is, noninterest-bearing cash balances due) and interest-bearing non-risk assets (that is, the sum of interest-bearing cash balances due,

securities, and the federal funds sold plus resale agreements). Risk assets were partitioned into performing and non-performing risk assets. Non-performing risk assets were defined as the sum of loans and leases past due 90 days or more, nonaccrual loans and leases, other real estate owned, and goodwill.

The analysis also indicated that measures of operating expense and profitability would be useful in predicting merger activity. These components of non-interest expense were also considered: expenses on salaries and employee benefits, expenses on fixed assets and premises, and all other noninterest expense. Bank profitability was measured by the return on earning assets (ROEA), which was defined as the ratio of operating income to earning assets. Operating income was measured by income before taxes and extraordinary items, gross of loan-loss provisions. Earning assets were defined as the sum of interest-earning cash balances, securities, federal funds and repurchase agreements sold, net loans and leases, and assets held in trade accounts minus non-performing assets.

Profitability and financial health are ultimately reflected in banks' capital adequacy. Therefore, bank equity capital and loan-loss reserves were included in the models. Further, a bank's deposit franchise appeared to be an important factor in merger decisions. The main deposit measure considered was core deposits: defined as total deposits minus volatile liabilities. Volatile liabilities were defined as the sum of time deposits of $100,000 or more, all foreign-office deposits, federal funds purchased and securities sold under repurchase agreements, demand notes issued to the U.S. Treasury and other borrowed money. Previous studies have also shown core deposit growth rates, as well as growth rates in gross loans and leases, might be important terms in predicting target banks.

Bank performance also varies systematically with bank asset size. It was hypothesized that the influence of asset size upon performance and condition decreases as total assets increase: therefore, the logarithm of bank assets was included as a size measure. Two "ranks" were formed using SAS's PROC RANK procedure. These ranks were determined from the distribution of the proxy for bank size. An added benefit of using the logarithm of bank assets as a proxy for bank size was that it helped to control for the large range between the smallest banks and the largest. Now it would be possible to compare the two size-ranked groups of banks to each other to see if different factors influence the merger decision among the different size groups. A "pooled" model representing all the target banks as well as a pooled model representing all of the acquirer banks was also utilized. The idea was to see if the factors influencing the

merger decision are significant across all banks in the two cohorts. This would also provide an excellent comparison to the size-ranked groups in the earlier models. These size ranked groupings can be seen in Table 2.

De novo or recently established banks often have unusual financial characteristics when compared to established banks. These banks can also be precluded from being targets for a period after establishment by their chartering authority. Consequently, a de novo bank dummy variable, set equal to one for all banks in existence for three years or less (as of the model estimation date) and zero for all other banks was included. De novo banks were excluded from the sample, for these reasons.

Equation 1 presents the most general form of the predictive equation, also referred to as model 1. This model was used to predict the likelihood of being either an acquirer or a target bank. Model 1 was estimated separately for target banks and acquirers, yielding two different sets of coefficient estimates.

A logistic estimation procedure was used in all models. This procedure identifies those terms that have a significant relationship with the likelihood of being an acquirer or target bank. This allowed for the inclusion of several measures of the same attribute in the logit model, allowing the estimation procedure to isolate the most important factors in terms of predicting merger activity.

The sample of banks used in estimating the models consisted of all commercial banks and savings banks reporting financial data at first quarter of 1990 through the fourth quarter of 2000 was drawn from the Federal Reserve of Chicago's database of Bank Holding Companies. This database contains information on over 6,500 Bank Holding Companies in the country. Assisted mergers were not counted as merger events, but were however, left in the population of all other nonmerging banks. The assisted mergers were excluded from the definition of merger events because identification of assisted target banks would yield bank-failure prediction models rather than the type of target–bank prediction models of interest to this study. Therefore, this sample of merger events was defined as all unassisted mergers between unaffiliated banks. Banks involved in consolidations and assisted mergers were left in the population of nonmerging banks. By construction, this sample of merger events will allow for insight into factors increasing the merger decision, and predictions on aspects of industry consolidation from the population of banks.

Because of the sheer size of the database, a decision tree was used to pare down the 4500 income and balance sheet variables of the Federal Reserve database. Once the decision tree was used, the remaining

150 variables were ranked for relevance using SAS's PROC VARCLUS procedure. Finally, models could

be developed with the remaining database variables now in working order. The data itself is not as "clean"

as hoped, since the Federal Reserve relies on the banks themselves to do the quarterly reporting that

comprises the database. A serious concern for modeling the mergers came from the fact that so many

missing values existed for many variables. Therefore, the models employed could only accurately predict

those banks that contained values for most variables. The decision tree also helped identify variables that

maintained their significance despite having missing values in many observations.

Model 1

Likelihood of Merger$_{it, t+1}$=β_0+β_1(Interest earning nonrisk assets)$_{it, 1}$
+β_2(Noninterest-earning nonrisk assets)$_{it, 1}$
+β_3(Performing risk assets)$_{it, 1}$
+β_4(Loan portfolio concentration index)$_{it, 1}$
+β_5(Total loans plus securities with maturities over 5 years)$_{it, 1}$
+β_6(Expenses on salaries and benefits)$_{it, 1}$
+β_7(Expenses on premises and fixed assets)$_{it, 1}$
+β_8(All other noninterest expenses)$_{it, 1}$
+β_9(Return on earning assets)$_{it, 1}$
+β_{10}(Equity Capital)$_{it, 1}$
+β_{11}(Loan-loss allowance)$_{it, 1}$
+β_{12}(Core deposits)$_{it, 1}$
+β_{13}(Core deposit growth)$_{it, 1}$
+β_{14}(Gross loans growth rate)$_{it, 1}$
+β_{15}(De novo bank dummy)$_{it, 1}$
+β_{21}(Logarithm of total assets)$_{it, 1}$+ϵ_{it}

Results

   After reducing the number of variables in the model to contain only the main factors shown to be

significant in the decision tree, the model now contained only 8 variables for both the target and acquirer

groups. Summary statistics are shown in Table 1.

   A drawback of logistic estimation, is that the parameter estimates are often non-sensical. Output from

SAS's PROC LOGISTIC procedure provides parameter estimates that are in the form of log-odds

coefficients. For example, a logit coefficient of .25 tells us that the log-odds increase by .25 for every 1-

unit increase in the explanatory variable. But who knows what a .25 increase in the log-odds means? The

basic problem here is that the logit model assumes a non-linear relationship between the probability and the

explanatory variables. The change in the probability for a 1-unit increase in an independent variable varies

according to where you start. Things are somewhat simpler if you consider Odds Ratios instead. These are

computed from the parameter estimates by computing $(e^?)$ for the respective parameter estimates (the ?'s).

Since these are quantitative variables, we can subtract 1 from the odds ratio and multiply by 100, or take

$$100(e^?-1).$$

This would tell us the percentage change in the odds for each 1-unit increase in the independent variable.

Odds ratios are the easiest way of interpreting coefficients of the logit model, but odds ratios can

sometimes be misleading if the probabilities are near 1 or 0.

   If an interpretation is desired in terms of probabilities, then the simplest approach would be:

$$?p_i/?x_i = ?p_i(1-p_i)$$

 This equation says that change in the probability for a 1-unit increase in x depends on the logistic

regression coefficient for x, as well as on the value of the probability itself. For this to be practically

useful, we have to know what probability we are starting from. If we have to choose one value, the most

natural would be the overall proportion of cases that have the event.

Conclusions

    The estimation of the different models reveals several interesting results (Table 2).   These results are

detailed below for the various different models.

        All models were run containing the same variables (minus the SIZERANK variable for the pooled

groups). After examining the significance level of the variables at a .95 confidence interval, the non-

significant variables were excluded from the model, in an effort to reveal the truly significant variables.

So, some of the models will not contain the same variables as other models.   These results indicate that the

leading influences of the merger decision are total income, volatile liabilities, and non-risky assets (all as a

percentage of assets). Based on the results in Table 2, I find some evidence that larger banks holding

riskier portfolios are more likely to acquire other banks. It is simply not possible to draw conclusions about

the small banks, since too many of them are missing key variables. This problem with the data is an

underlying factor throughout this study. For those wishing to conduct their own investigation into the

merger activity of the banking industry, a good source of data should be the primary concern. Another

main concern is the great variability in the values of many of the observations. The largest banks were up

to a thousand times larger than the smallest ones, leading to many problems when modeling. While an increase of $40 million in total expenses is huge to the small banks, it is not very noteworthy to the larger banks.

In the future, further studies would benefit greatly from more complete data. Many of the smaller banks simply did not have data for some variables, and therefore, had many variables thrown out of the decisioning process. The larger banks, in contrast, had a much greater proportion of the data complete. From questions I have posed to those at the Chicago Federal Reserve, this is directly a result of tighter government regulation of the largest banks. While the small banks are not unregulated, they do operate with a great deal more tolerance when it comes to their government reporting. If these banks were to have complete data, then perhaps a better picture could be drawn about the industry as a whole, and the behavior of the banks at the smaller end of the industry.

Table 1: Summary Statistics

Variable	Mean	Std Dev	N
Percentage of Cash Balances Due	1.64	2.35	9305
Percentage of Depreciating Cash Balances	1.29	2.42	9301
Percentage of Non-Risk Assets	1.88	2.54	9305
Percentage of Total Income	3.36	7.63	9383
Percentage of Volatile Liabilities	7.71	28.12	9346
Liquidity	0.29	0.41	8857
Percentage of Risky Assets	98.12	2.54	9305
Percentage of Total Expense	1.36	6.57	9383

**Variables expressed in terms of percentage of total assets

Table 2: Logit Results

	Small Acquirer	Large Acquirer	Small Target	Large Target
Cash Balance Due	-0.475	0.113 *	0.427 *	0.009
(as percent of net assets)	(0.751)	(0.047)	(0.200)	(0.037)
	[-0.014]	[0.019]	[0.059]	[0.001]
Depreciation Cash Balance	-0.121	0.058	0.075 *	0.025
(as percent of net assets)	(0.129)	(0.040)	(0.034)	(0.032)
	[-0.004]	[0.010]	[0.010]	[0.004]
Non-Risky Assets	0.444	-0.139 **	-0.541 **	0.002
(as percent of net assets)	(0.751)	(0.022)	(0.199)	(0.019)
	[0.013]	[-0.024]	[-0.075]	[0.000]
Total Income	0.015 *	0.052 *	-0.025 *	-0.089 **
(as percent of net assets)	(0.007)	(0.022)	(0.010)	(0.023)
	[0.000]	[0.009]	[-0.003]	[-0.015]
Volatile Liabilities	0.003 *	0.047 **	0.000	0.035 **
(as percent of net assets)	(0.001)	(0.005)	(0.002)	(0.005)
	[0.000]	[0.008]	[0.000]	[0.006]
Liquidity	-3.569	1.505 **	-1.785	0.074
	(4.933)	(0.111)	(1.813)	(0.104)
	[-0.108]	[0.257]	[-0.247]	[0.013]
Total Expenses	-0.009	-0.047 *	-0.005	0.053
(as percent of net assets)	(0.009)	(0.023)	(0.013)	(0.035)
	[0.000]	[-0.008]	[-0.001]	[0.009]
Intercept	-3.449 **	-2.558 **	-1.420 **	-1.470 **
	(0.107)	(0.112)	(0.062)	(0.099)
Obs. Prob.	0.031	0.218	0.166	0.214
N	4451	4336	4451	4336
LL (constant only)	-618.64	-2273.33	-2000.88	-2254.01
LL (model)	-613.39	-2093.03	-1987.60	-2201.99
p-value LR(slope parameters=0)	0.2325	0.0000	0.0008	0.0000

**: Significant at 99%. *: Significant at 95%

Standard Errors in Parentheses

Marginal Effects in Brackets

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