Regulatory Regimes and Takeovers of U.S. Thrifts

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Abstract

This paper examines the effect of regulatory regime changes on the attributes of acquired thrifts for periods of stringency in 1990 to 1993, and deregulation in 1994 to 2000, with the removal of significant impediments for bank takeovers of thrifts. We test a regime change hypothesis that predicts a more effective takeover market in the later regime. Consistent with the hypothesis, we find bank acquirers to engage in diverse motivations for takeovers in the later regime, including revenue turnaround motives, allowing discipline of profit inefficient firms. The results suggest greater takeover discipline in the later regime, but also suggest a complimentary role for regulatory discipline, with acquirers avoiding more cost inefficient and risky thrifts. In contrast in the early regime, regulatory concerns for building up capital dominate acquisition decisions.

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1. Introduction

Financial institutions have always been heavily regulated. In the U.S. we have witnessed a systematic relaxation of many of these regulations over the last decade or so. Boot et al. (2000) argue that direct (explicitly restrictive) and indirect (incentive based) regulations introduce competitive distortions into the financial services industry. A significant amount of research in banking examines time periods that may not be long enough to capture the effect of such distortions on bank behavior. Results based on research that do not control for changing regimes or is limited in scope to a short time period may be influenced by the regulatory regime surrounding the study, and be potentially biased by it. Hence, in a radically changing industry, policy implications and industry analysis based on these results may be misleading.[1]

In this paper we show that differences in regulatory regimes affect bank behavior, suggesting a need for caution by policy makers in reaching conclusions based on research that does not incorporate cross-regime differences and controls. To provide evidence that regulatory regimes alter bank behavior, we focus on the attributes of acquisitions in the U.S. thrift industry over the 1990's where significant regulatory changes have taken place.

With widespread consolidation in the U.S. financial services industry in the 1990's, the determinants of takeovers have been actively debated in the academic literature (see Calomiris and Karceski, 2000 and Dymski 1999, among many others). Although the merger wave of the 1990's represents the largest historical wave of voluntary mergers for thrifts, little research has examined the factors that affect thrift takeovers (see Gupta, LeCompte, and Misra, 1997; Cook,

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[1] Santomero (1999, p. 640) for instance notes that "there have been decades of studies illustrating the linkage between structure and performance for the U.S. banking system. Yet, most of these studies are of little relevance. They were conducted in a regulated market environment where competitive pressures were restricted by design."

Hogan, and Kieschnick, 2003, for earlier time periods, and Cebenoyan, Cebenoyan, and Cooperman, 2003, for later years).

The thrift merger wave of 1990 to 2000 is interesting as it involves acquisitions of thrifts by both banks and other thrifts, and encompasses two rather distinct regulatory/economic regimes: (1) 1990 to 1993, a period of re-regulation and regulatory stringency in the aftermath of the thrift crisis of the 1980's, and (2) 1994 to 2000, a period of deregulation, regulatory normalcy and market liberalization, with the removal of impediments for bank acquisitions of thrifts.

We study the attributes of thrift acquisitions by both bank and thrift acquirers for the two regimes. Specifically, we test a regime change hypothesis that predicts a more effective bank takeover market for thrifts in the later regime allowing bank acquirers to engage in diverse motivations for acquisitions. Thrifts acquirers provide a control group, since they did not experience a similar removal of impediments to acquisitions.

Consistent with the regime change hypothesis, the empirical results show bank acquirers to engage in diverse motivations for takeovers in the later regime, while thrift acquirers exhibit few changes in acquisition attributes. In particular, bank acquirers appeared to target profit inefficient thrifts, suggesting revenue turnaround motives, providing takeover discipline for profit inefficient firms. Regulatory discipline, through incentive-based regulations and prompt corrective actions, however, continues to be important as a compliment to takeover discipline, with bank acquirers also avoiding cost inefficient and more risky thrifts. In contrast, regulatory concerns dominate the early regime, with better capitalization the key determinant for acquisitions. We also expand the current literature on takeovers by considering profit efficiency as an important determinant of takeovers.

The paper proceeds as follows: Section 2 examines the different regulatory regimes and the relevant literature; section 3 provides the methodology and the data; section 4 discusses the results; and section 5 concludes.

2. Regulatory Background and Relevant Literature

We separate the 1990's into two regulatory regimes. The early regime is characterized by thrifts scrambling to meet more stringent regulatory product restrictions and capital requirements (phased in by 1993) under the Financial Institution Reform, Recovery, and Enforcement Act (FIRREA) of 1989 and Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991.[2] As noted by Cook, Hogan, and Kieschnick (2003) and Leonard and Biswas (1998), both FDICIA and FIRREA, through direct restrictions (e.g. additional product restrictions for qualified thrift lenders (QTL)), and indirect incentives (i.e. capital requirements, risk-based deposit insurance) increased the costs of excessive risk-taking for thrifts and sent signals to regulators that they would be held responsible for future losses (mandatory interventions, prompt corrective actions). This resulted in increased regulatory scrutiny in the early 1990's. Accordingly, studies find banks taking on lower risk by holding larger portions of securities and fewer commercial loans in their portfolios, suggesting a desire to avoid regulatory interference, a

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[2] Under FDICIA risk-based federal deposit insurance premiums were phased in by 1994, and risk-based capital requirements by 1993. A universal examination schedule was also implemented with required exams for all depository institutions every 12 or 18 months, depending on their size and condition, and generally accepted accounting practices put into place. Under FIRREA thrifts had to hold predominantly housing related assets to meet the qualified thrift lender test (QTL) which set standards for giving thrifts regulatory and tax advantages over banks. To meet this test, thrifts had to have 70 percent (later reduced to 65 percent under FDICIA) of their adjusted assets in mortgage related products, reducing their ability to diversify their loan portfolios. Thrifts had to get rid of junk bonds by 1994, and commercial real estate loans were limited to four times capital. Real estate loans had to meet loan to value limits, and direct real estate investments could only be made through a separately capitalized subsidiary. Only a maximum of three percent of assets could be held in service corporations (a previous vehicle for thrifts in states with liberal regulations to engage in more risky, non-banking activities). State chartered thrifts were also required to abide by the same restrictions as federal thrifts (see Gardner, Mills, and Cooperman, 2000, p. 77; and Cole and McKenzie, 1994).

factor contributing to the credit crunch at this time (Berger and Udell, 1994; Hancock and Wilson, 1993; Peek and Rosengren, 1995; Shrieves and Dahl, 1995; Wagster, 1999).

Kane (1999, p. 671) notes that "the attractiveness of a thrift's charter to diversified acquirers was lessened in the early 1990's by requirements to maintain a portfolio heavily specialized in housing finance and to shoulder substantial insurance premium costs to help pay for the bailout in the aftermath of the thrift crisis. Hence, few diversified acquirers were eager to enter what appeared to be a moribund industry." Although thrifts were allowed interstate branching privileges by 1992 and healthy bank holding companies were allowed to take over healthy thrifts under FIRREA, thrift and bank managers may have been more concerned with meeting new, more stringent regulatory requirements during the early regime.[3] However, McCoy, Frieder, and Hedges (1994, p. 15) note that with deflated prices in the aftermath of the thrift crisis, undercapitalized thrifts may have offered an inexpensive strategy for bank expansion. Since banks were not allowed to takeover weaker thrifts, the choice of thrift targets would also be inhibited in this period.

In contrast to the early regime, the later regime, 1994 to 2000, encompasses a period of economic expansion, regulatory normalcy, significant deregulation, and the removal of impediments to acquisitions of thrifts by banks. Bank and thrift managers also faced less regulatory scrutiny with the implementation of a program by U. S. bank and thrift regulators set up specifically to ease the burden of intense regulatory scrutiny (Interagency Policy Statement on Credit Availability, March 10, 1993).[4] A number of studies at this time confirmed an easing

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[3] Calomiris and Karceski (2000, p. 97) point out that the Office of the Comptroller of the Currency in 1988 also authorized similar branching laws for banks in some states to be the same as thrifts. By 1990, the majority of states had relaxed their branching laws and regional pacts also allowed limited interstate branching across the country.
[4] Wagster (1999) observes that the reduction of regulatory burden under this program including removing impediments for lending to small and medium-sized businesses, reduced appraisal requirements for real estate loans,

of the credit crunch (Wessel 1993, Zimmerman 1994, and Wagster 1999). Regulatory barriers to bank/thrift mergers were also reduced under the Riegle-Neal Interstate Banking and Branching Inefficiency Act (IBBEA) in 1994. Riegle-Neal removed remaining branching and interstate takeover restrictions for banks by 1997, with many states opting in earlier.

Kane (1999) points out that Congress also significantly reduced regulatory burdens for thrifts in 1996, intensifying interest in thrift takeovers by other institutions. Congress allowed thrifts to be more diversified by easing the qualified thrift lender test and increasing the percentage of commercial loans that a federal thrift could hold. Congress also recapitalized the Savings Association Insurance Fund (SAIF), reducing previously high special deposit insurance premiums for thrifts. In addition, the Office of Thrift Supervision (OTS) increased the net regulatory benefits of a thrift charter by reducing restrictions for chartering and acquiring thrift institutions (Kane 1999; Tannenbaum, 1997). A special provision of the Small Business Jobs Protection Act of 1996 eliminating preferential treatment for thrift bad debt reserves removed tax-related deterrents for charter changes and takeovers by banks. This special treatment had previously deterred bank/thrift mergers, since special reserves had to be recaptured with thrift's conversion to a bank charter. Provisions of the Gramm-Leach Bliley (Financial Modernization) Act of 1999 narrowed the range of differences in activities for bank versus thrift holding companies, removing further impediments to bank/thrift mergers (see Williams 2002).[5] We note that over the decade deregulatory moves lifted more restrictions from banks' acquisitions of thrifts than of thrifts' acquisitions of other thrifts.

Berger and Mester (2003) observe that the later 1990's was a time of dynamic change in terms of technology, deregulation, and a greater competitive environment for financial services

streamlined bank examiner decision appeals, and a reduction in the burden associated with the examination process

firms. Examining changes in cost and profit inefficiency for the banking industry over the 1990's, they find evidence of an increase in cost inefficiency in the later 1990's, as banks increased costs to offer new products and services to compete with other financial services firms. However, they also find evidence that banks generally increased revenues at a greater rate than costs that resulted in an overall rise in profit efficiency for the industry. Berger and Mester, hence, warn that studies examining changes in bank performance using only cost efficiency while ignoring profit efficiency may be misleading. Similarly Akhavein, Berger, and Humphrey (1997, p. 96) propose that "profit efficiency is a more inclusive concept than cost efficiency, because it takes into account the cost and revenue effects of the choice of the output vector, which is taken as given in the measurement of cost efficiency." They point out that changes made by banks may improve a bank's profit efficiency without improving its cost efficiency. For instance, if a firm reconfigures its outputs, this can result in increases in revenues greater than the necessary increases in costs, increasing overall profit efficiency. Similarly, if a bank reduces costs at a greater rate than it reduces revenues, profit efficiency rises. We introduce profit efficiency as a distinct independent variable, along with cost efficiency in our models. To our knowledge this has not been done before in the large number of studies on bank efficiencies.

Berger, Kashyap, and Scalise (1995) classify the early 1990's as an era of banking decline, and the regime after 1994 as a new era of banking. They predicted that with deregulation allowing a larger set of organizations nationwide to acquire and reform inefficient banks, an improved takeover market would result in "improvements in economic efficiency" for depository institutions. Kane (1999) similarly notes that the increase in the net regulatory benefits of the thrift charter made thrifts more attractive for takeover by a larger set of diversified acquirers.

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and other regulations.

Calomiris and Karceski (2000, pp. 96-97) argue that greater competition in the later 1990's should result in a higher likelihood of mergers being value maximizing, with a highly competitive environment offering "less opportunity for rent extraction by banks." Their case study of nine mergers in the 1990's finds evidence of value creation, consistent with this premise.

The impact of regulations on banks and their merger activity has been widely debated. Regulatory restrictions on bank/thrift mergers have frequently been criticized as blocking an effective disciplinary device for poor managers. Research examining characteristics of acquisitions by Prowse (1997), Hadlock, Houston, and Ryngaert (1999), and Wheelock and Wilson (2000) for banks; and Cook, Hogan, and Kieschnick (2003) and Cebenoyan, Cebenoyan, and Cooperman (2003) for thrifts, accordingly, do not find evidence of takeover discipline. Only Moore (1996) finds some evidence supporting discipline of poorly performing banks, characterized by lower earnings, slower asset growth, low capital ratios, and low market share during 1993 to 1996. Similarly, previous studies generally do not find cost efficiency gains associated with mergers (see Calomiris and Karceski, 2000). However, previous studies generally examine periods prior to the deregulation of the later 1990's. Also, studies use proxies for managerial quality or firm performance based only on cost efficiency and/or accounting performance measures. Akhavein, Berger, and Humphrey (1997, among others) argue that accounting performance measures serve as crude measures of performance, resulting in potential biases and misleading results.[6]

In this study we extend upon previous literature by being the first study to examine: (1) the entire thrift merger wave from 1990 to 2000; (2) differences in determinants of targets by

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[5]See Gardner, Mills, and Cooperman, 2000, 253-254 for a detailed discussion of these regulatory changes.

regulatory regime and acquirer type; and (3) profit efficiency as an additional proxy for management quality as a determinant of takeovers. We test a regime change hypothesis that predicts that the dismantling of barriers to bank takeovers of thrifts will result in greater freedom for banks to pursue a variety of motivations for takeovers of thrifts, allowing a shift in acquisition attributes, and, hence, greater takeover discipline of inefficient firms. To test this hypothesis, we examine separately the characteristics of acquisitions for each period. We also examine acquisitions by banks that experienced a significant regulatory change in choice of targets, and by thrifts that did not, as a control group. The data and methodology used to test the hypothesis are discussed in the following sections.

3. Data and Methodology

We collect data on thrifts from the Office of Thrift Supervision Consolidated Statements of Condition and Operations, as recorded by Thomson Financial for all U.S. stock-chartered thrifts operating in 1990 to 2000. Our inefficiency scores are estimated using data of all stock thrifts with available data in every year during the testing period of eleven years.[7] The number of stock thrifts with available data that were included in our sample varies on a year by year basis from 1,008 in 1990 to 646 in 2000. Since this study focuses on non-regulatory assisted acquisitions, we exclude failed thrifts and regulatory-assisted acquisitions in this analysis.

Previous empirical studies use either logit models to examine ex-post correlates of takeovers or proportional hazard models to predict time to takeover hazard. Although proportional hazard models are better predictive models for the temporal risk of takeover (Trimbath, Frydman, and Frydman, 2002), they require restrictive assumptions, such as constant proportionality. Hence,

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[6] Akhavein, Berger, and Humphrey (1997, pp. 101-102) point out that accounting performance ratios include a bias by not controlling for input prices, and by simply dividing by assets or equity as a crude indicator of bank scale.

for our examination of ex-post correlates of takeovers, we use the less restrictive logit approach. To avoid a potential bias for logit models that use beginning of the period characteristics of firms that are not taken over until much later (Trimbath, Frydman, and Frydman, 2002), we use the methodology of DeFond and Park (1999), where all existing thrifts in 1990 are followed through 1993 for the first regime. Similarly, all existing thrifts in 1994 are followed through 2000 for the second regime. However, targets in each period are only included in the year of their takeover.

The above procedures yield 1,026 firm-year observations for the logit analysis for 1990 to 1993 and 2,483 firm-year observations for the analysis for 1994 to 2000.[8] The total sample includes 2,892 observations of not-acquired thrifts and 617 of acquired over 1990-2000. To identify takeovers, we used the *Thomson Savings Directory* (Skokie, Illinois: Thomson Financial Publishing Company) and the Federal Reserve Board NIC website which provides bank/thrift acquisition histories. Other data sources used for other independent control variables included: (1) U.S. Department of Commerce Bureau of the Census County and City Data Book; and (2) County and City Extra: Annual Metro, City, and County Data Book (Lanham, Maryland: Bernan Press), ed. by Courtenay M. Slater and George E. Hall; and (3) the Bureau of Economic Analysis (BEA): Regional Accounts Data, Annual State Personal Disposable Income, and Annual Population by State on the BEA website (www.bea.gov/bea/regional/spi/).

3.1 Cost Efficiency Measures

As Berger and Mester (1997) note cost inefficiency gives a measure of how much a particular firm's cost deviates from the best practice firm's minimum cost for the same output under the

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[7] We include in our analysis only stock thrifts and exclude de-novo thrifts and recently converted mutual thrifts to avoid biases associated with less efficient operations for newly formed and newly converted firms.

same conditions.   This information is derived from a cost function that evaluates the firm's

variable costs in terms of variable outputs, variable input prices, fixed inputs, random error and

inefficiency. It can be stated as:

$$C = f(y, w, z, u_c, v_c) \tag{1}$$

where C equals variable costs, y, vector of variable outputs, w, a vector of prices of variable

inputs, and z are quantities of any fixed inputs included to account for their effects on variable

costs, since they may be substitutable or complementary with variable inputs. The terms u and

v are inefficiency and random error terms, respectively. Assuming the inefficiency and random

terms are multiplicatively separable from the rest of the cost function, (1) above is represented in

natural logs as

$$\ln C = f(y, w, z) + \ln u_c + \ln v_c \tag{2}$$

To estimate the composite error term, $(\ln u_c + \ln v_c)$, in equation (2) and in turn calculate each

firm's cost inefficiency index u_c, we estimate the following popular multiproduct translog cost

specification (suppressing individual thrift subscripts): [9]

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[8] During the efficiency estimation we lost minimal number of firm-years due to missing information. We further eliminated eight thrifts with negative potential profits that made the profit efficiency ratios meaningless. The final sample is 3,509 firm-years.

[9] See Aigner, Lovell and Schmidt (1977), Meeusen and Broeck (1977), Jondrow et al (1982) for a description of this methodology. For more recent applications, see Berger and Mester (1997) and Rogers (1998).

$$\ln(C/w_2 z_2) = \alpha + \gamma_1 \ln(w_1/w_2) + \frac{1}{2}\gamma_2 \ln(w_1/w_2)^2$$

$$+ \sum_{j=1}^{5} \beta_j \ln(y_j/z_2) + \frac{1}{2}\sum_{j=1}^{5}\sum_{l=1}^{5} \beta_{jl} \ln(y_j/z_2)\ln(y_l/z_2)$$

$$+ \delta_1 \ln(z_1/z_2) + \frac{1}{2}\delta_2 \ln(z_1/z_2)^2 \qquad\qquad (3)$$

$$+ \sum_{j=1}^{5} \rho_j \ln(y_j/z_2)\ln(w_1/w_2) + \eta_1 \ln(z_1/z_2)\ln(w_1/w_2)$$

$$+ \sum_{j=1}^{5} \omega_j \ln(y_j/z_2)\ln(z_1/z_2) + \ln u_c + \ln v_c$$

As pointed out by previous studies, the translog function provides consistent inefficiency rankings relative to other functional forms. It also has the advantage of simplicity.[10]

In this estimation, five outputs, y_j, are used: (1) 1-4 family mortgage loans and mortgage-backed securities; (2) multifamily and nonresidential mortgage loans; (3) non-mortgage loans including consumer and commercial loans and lease financing; (4) cash and other security investments including U.S. government and agency securities, municipals, and other securities; and (5) construction and land loans, and real estate and service-corporation investment. The prices of two variable inputs, w_k, are used: (1) labor and (2) deposits and other borrowings. We measure the price of labor as total expenditures on employees divided by the number of full-time equivalent employees at the end of the year. The price of deposits is total interest expense divided by total deposits and other borrowings. We further impose the usual linear homogeneity in input price restrictions in estimation. Two fixed input quantities, z, are also included: the dollar value of physical capital (premises and other fixed assets) and the dollar value of financial

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[10]For greater precision in calculating efficiency scores, Berger and Mester (1997) suggest the use of a Fourier-flexible function form. However, the translog form is easier to use, and for ranking decisions, studies demonstrate that it provides similar rankings as other forms. Also, Altunbas and Chakravarty (2001) demonstrate that the slightly better fit of Fourier-flexible models does not reliably improve forecasts of bank costs.

equity capital. All variable output quantities and physical capital are specified as ratios to the

equity capital to control for heteroskedasticity and to reduce the scale bias.

In the last step, we define the cost efficiency of thrift i as the ratio of its estimated cost to

produce its output if it were as efficient as the best-practice thrift in the industry to thrift i's

actual cost as follows:

$$Ceffratio_i = \frac{\hat{C}^{min}}{\hat{C}^i},$$ (4)

where $Ceffratio_i$ is the thrift i's cost efficiency, $\hat{C}^i$ is the estimate of predicted cost for thrift i,

and $\hat{C}^{min}$ is the minimum value of all $\hat{C}^i$'s in the sample. Given the formulation of (2), equation

(4) becomes:

$$Ceffratio_i = \frac{\hat{u}_c^{min}}{\hat{u}_c^i}$$ (5)

where $\hat{u}_c^{min}$ is the minimum observed cost inefficiency factor estimated using equation (3). To

reduce the effect of extreme values of inefficiency, prior to substitution of this measure into

equation (5), truncation is used to reassign less extreme values at 5th and 95th percentile to the top

and bottom 5% of the distribution respectively. This truncation is applied within size class (by

total assets) quartiles to mitigate the persistent luck effects within their size groups (Berger and

Mester, 1997). By design, *Ceffratio* ranges between 0 and 1, with 1 being the best practice thrift

in the sample.

3.2 Profit Efficiency Measures

Berger and Mester (1997) note that a profit efficiency concept can be superior to cost

efficiency for reviewing a firm's overall performance since the former accounts for inefficiency

on the output as well as the input side. Profit efficiency is based on a goal of profit

maximization requiring equal managerial attention to the creation of a marginal dollar of revenue as to the elimination of a marginal dollar of costs. Profit efficiency also captures the variance in the quality of output, as higher quality outputs may be generating higher revenues (Berger, Hancock, Humphrey 1993).   A profit function may also be more fitting in a more deregulated and competitive environment where cost management may not be the only road to success. Berger and Mester (2003) particularly note that studies in the 1990's that exclude revenues when examining bank performance may create misleading results, since this was a period of rising profit productivity for depository institutions.

An alternative profit frontier as suggested by Berger and Mester (1997) replicates the cost function detailed in equations (1) and (2) except that it replaces the dependent variable with variable profits. An alternative profit function holds variable output constant, similar to the cost function, while output prices are allowed to vary and affect profits. The alternative profit function is particularly appropriate for banking studies, since it controls for unmeasured differences in output quality, as frequently is the case with bank/thrift services. It controls for the possibly higher costs by thrifts which offer these high-quality services by including additional revenues that might be generated from these services into the estimation process. As a result, it helps to avoid classifying a firm as (cost) inefficient if the same thrift offsets its high cost with high revenues.

In estimating the equation (3) to get profit inefficiency measures, we replace the dependent variable of cost with variable profits plus a constant ((all interest and fee income-the variable costs included in cost function) + θ). The constant is the minimum profits for the sample plus 1, and is added to every firm's profit so that natural log is taken of a positive number since the minimum profits are usually negative. That way the profits of the thrift with the minimum profits

would become 0 since log(1)=0. The same truncation process is applied to these profit

inefficiency measures before they are converted to efficiencies using a conversion similar to

equation (4). The profit efficiency is defined as the ratio of predicted actual profits to maximum

profits that could have been achieved if this firm were the best-practice thrift of the sample, as

follows:

$$Peffratio_i = \frac{\hat{P}^i}{\hat{P}^{\max}},$$

$$(6)$$

where *Peffratio_i* is the thrift *i*'s profit efficiency, $\hat{P}^i$ is the estimate of predicted actual profit for

thrift *i*, and $\hat{P}^{\max}$ is the maximum profits that the thrift *i* could have earned at the best-practice

thrift's efficiency level in the sample. Due to the addition of the constant to include the thrifts

with negative earnings into the estimation process, equation (6) doesn't converge into the simple

ratio of $\hat{u}$'s as in the cost equation of (5). Since the inefficiency is not multiplicatively separable

from the profit function anymore, we instead calculate the *Peffratio* using (6) with an adjustment

to compensate for θ addition in inefficiency estimations.[11] Similar to cost efficiency, the best

practice thrift gets 1 as an efficiency score. However, in contrast to cost efficiency, profit

efficiency can be negative since a firm could discard more than 100% of its potential profit.

3.3 Logit Model

   In the second stage of the estimation, we use the maximum likelihood (MLE) logit models to

examine the relationship between acquisitions and cost and profit efficiency and other factors.

The MLE logit model permits an analysis of the binary dependent variable of a thrift being taken

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[11] See Berger and Mester (1997) and Rogers (1998) for more details of the application of this methodology.

over versus continuing to operate independently. The MLE logit model is based on the cumulative logistic probability function and is specified as:[12]

$$P_i = F(\alpha + \beta X_i) = \frac{1}{1 + e^{-(\alpha + \beta X_i)}} \tag{7}$$

where e is the base of natural logarithms, and α and β are the respective estimated model coefficients for the independent variables, X.

Following the extant literature on takeovers (e.g. Wheelock and Wilson (2000)), we estimate a cross-sectional model including control variables for size, market characteristics, and asset portfolio risk characteristics for thrifts. We expand upon previous studies by estimating models for each regime as:

$$\begin{aligned}
P_{it} &= \alpha_1 + \alpha_2 SMALL + \alpha_3 MEDIUM + \beta_1 CEFFIC_{it-1} + \beta_2 PEFFIC_{it-1} + \beta_3 MSH_{it-1} \\
&+ \beta_4 TRAD_{it-1} + \beta_5 REPOS_{it-1} + \beta_6 SERVCO_{it-1} + \beta_7 CAP_{it-1} + \beta_8 MSA_{it-1} + \beta_9 PERCAP_{it-1} \\
&+ \beta_{10} PGROW_{it-1} + \sum_{j=11}^{22} \beta_j YEAR + \varepsilon_i
\end{aligned} \tag{8}$$

where:

P_i = dummy variable of 1 if thrift is taken over during the merger wave of 1991 to 2001,

$SMALL$ = dummy variable of 1 if thrift has total assets <100 million,

$MEDIUM$ = 1 if thrift has total assets between $100 million and $1 billion,

$CEFFIC_i$ = cost efficiency instrumental variable =1 if the thrift's cost efficiency score

(*Ceffratio*) is above median of the sample, and -1 if below,

$PEFFIC_i$ =profit efficiency instrumental variable =1 if the thrift's profit efficiency score

(*Peffratio*) is above median of the sample, and -1 if below,

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[12]See Pindyck and Rubinfeld (1981) and Judge, Hill, Griffiths, Lutkepohl, and Lee (1982) for reviews of maximum likelihood logit models.

MSH_i = market share of state thrift assets,

$TRAD_i$ = the percentage of traditional home-mortgage assets,

$REPOS_i$ = the percentage of repossessed assets,

$SERVCO_i$ = the percentage of Service Corporation assets,

CAP_i = total equity to total assets,

MSA_i = dummy variable indicating operation in a Metropolitan Statistical Area,

$PERCAP_i$ = per capita income in thrift's home state,

$PGROW_i$ = population growth percentage of the state in which the thrift operates,

$YEAR_i$ = year dummies, and

ε_i = a random error term.

Explanatory variables are lagged one year to allow a reasonable time lag between a thrift's firm-specific and environmental conditions and its takeover activity (Hannan and Rhoades, 1987). With the exception of profit efficiency, *PEFFIC,* all the firm-specific variables used in equation (8) are fairly standard variables that are shown to be related to takeover activities in the extant literature (Hannan and Rhoades, 1987; Moore, 1996; Wheelock and Wilson , 2000; and Cebenoyan, et al, 2003). The size dummy variables are incorporated in the analysis to account for different acquirer preferences for different size institutions and non-linearity in size, with LARGE, the reference (omitted) variable for thrifts with assets >$1 billion. To test the sensitivity of our results, we substituted the log of total assets for the size dummies, with similar results.

As a proxy for management quality, measures of cost inefficiency have been employed in the takeover literature (Wheelock and Wilson, 2000). In addition to the standard cost efficiency

measure, *CEFFIC,* we include *PEFFIC,* the profit efficiency variable. Since the frontier

methodology described earlier removed random elements, and efficiency scores are based on

how thrifts perform relative to other thrifts, *PEFFIC* provides a direct measure of management

quality in terms of competitive profit generation. Hence, this measure avoids a common

problem with accounting profitability measures that may reflect economic conditions versus

managerial skills. To address the possible bias introduced by potential errors-in-variables

problem, we replaced the efficiency measures with instrumental variables of 1 for observations

with efficiency scores (*Ceffratio* and *Peffratio*) above the median and with -1 for observations

below.[13]

   To incorporate an alternative measure of efficiency in terms of marketplace success, we

include a firm's market share, *MSH*, as suggested by Moore (1996). A thrift's market share in

this study is measured in terms of its assets as a percentage of total assets of all thrifts in the state

in which it operates.[14] As Moore (1996) points out thrifts that have low market shares may be

attractive for their turnaround potential by acquirers that are more successful in the marketplace,

or lower market shares may be attractive to avoid regulatory interference with mergers.

   To control for asset portfolio differences that may affect the likelihood of takeover, *TRAD*, the

percentage of home mortgage assets held by thrift, is included. In an industry where asset

portfolio variation is limited, higher levels of *TRAD* may signal a lack of innovativeness on the

part of management, and/or a lack of market breadth and depth with low potential for creativity

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[13] See Greene, 1993, pg. 284, and Maddala, 1977, pg. 296. The model was also re-estimated using the levels with unchanged results in terms of both direction and significance to the ones reported here. To test the sensitivity of our results, we also performed the regressions including only one of the efficiency measures (cost or profit efficiency) with similar signs and results.

[14] Radecki (1998) argues that state, rather than city or county, provides better boundaries for retail banking markets. Geographic restrictions on within state branching were removed across the U.S. in almost all states by the end of 1992.

in product offerings, making it a less attractive target. Alternatively, acquirers may have preferences for more traditional thrifts, with larger holdings of home mortgage assets.

To control for differences in loan quality or risk that might be associated with takeovers, *REPOS*, the ratio of repossessed assets to total assets, and *SERVCO*, the percentage of investment in service corporations are included. Service corporation assets are holding companies for non-traditional thrift activities including real estate property development and property management, insurance agency and brokerage services, and other activities, which often entail greater risk. *REPOS* proxies for the quality of a thrift's loan portfolio. With bad debt reserve recaptures required after 1996 for thrifts, a larger *REPOS* might make a thrift a less attractive target. Capital adequacy, *CAP*, a firm's equity to assets ratio, is one of the variables often cited as a possible factor affecting acquisition activity (Hannan and Rhoades, 1987, and Moore, 1996, Wheelock and Wilson, 2000). As noted by McCoy, Frieder, and Hedges (1994, p. 15), less than adequately capitalized thrifts offered a cheaper expansion alternative to banks during the early 1990's. From this perspective, lower capitalized thrifts may have been attractive targets. However, since lower capital ratios also signal a lower safety buffer against insolvency risk, a lower CAP could make a firm less attractive as a target.

Three additional variables are included to control for the economic environment in which the firms operate. An *MSA* dummy is employed to distinguish different types of markets the targets are located in. Moore (1996), for example, finds a greater probability of takeover for banks operating in urban markets that offer greater opportunity for growth. A state's annual population growth rate, *PGROW*, is also included to account for expansion opportunities in the target market. All else equal, growth prospects of the market may encourage the acquirers to target thrifts in high growth areas (Hannan and Rhoades (1987)). *PERCAP*, per capita income of the

thrift's home state, is included to reflect the economic environment in which a firm operates. Acquirers may be more attracted to thrifts operating in economically- robust states; although thrifts in less robust states may be less expensive targets making them attractive. Finally ten time dummy variables for 1990 through 1999 are included, with the last year of 2000 omitted, to account for the year-effects for the total sample.

(Insert Table 1 about here)

4. Empirical Results

4.1 Descriptive Statistics

Descriptive statistics for not-acquired versus acquired thrifts for the entire 1990 to 2000 period are shown in Table 1. The test for differences in means suggest that on average acquired firms tended to be located in urban markets (*MSA* dummy) with lower average per capita income (*PERCAP*), but higher average population growth (*PGROW*) than non-acquired firms. In terms of firm-specific attributes, acquired firms on average are more cost efficient than not-acquired firms, with a significantly higher mean on *CEFFIC*. However, they also on average are less profit efficient, with a significantly lower mean on *PEFFIC*, suggesting revenue turnaround motives by acquirers. Acquired firms also on average are significantly better capitalized (higher mean *CAP*) than the not-acquired thrifts, supporting the argument that low-capitalized thrifts make undesirable targets.

(Insert Table 2 about here)

Table 2 presents Pearson correlations between independent variables included in the logit analysis. One item is worth noting. The variables *CEFFIC* and *PEFFIC* are negatively

correlated at significant levels, similar to the relationship that Berger and Mester (1997) and

Berger and Mester (2003) find for large commercial bank samples. They point out two possible

explanations for this result. One possibility is that firms with high market power can generate

high revenues without feeling the need to control their costs. An alternative explanation is that

firms with high quality services generate sufficiently high revenues to offset the high costs that

their products create, resulting in higher costs but also high profit efficiency. Hence, this

relationship is consistent with a possible bias if profit efficiency is excluded in measuring

managerial performance.

4.2 Logit Model Results for the Determinants of All Acquisitions

Table 3 presents the logit results for all acquisitions, including both bank and thrift acquirers

during the entire sample period, and each regime. As shown by the very significant Wald chi-

square statistics, the models have a good fit for the entire period and each sub-period.

(Insert Table 3 about here)

Focusing first on managerial efficiency as a takeover determinant, consistent with Wheelock

and Wilson (2000), the coefficient on *CEFFIC* is significant and positive for the total sample

period. Cost efficient thrifts were more likely to be taken over. As Wheelock and Wilson note,

acquirers may have avoided cost inefficient thrifts, since cost inefficiency could signal other

potential problems for a target. On the other hand, the coefficient of *PEFFIC* is negative and

significant, supporting the notion that acquirers prefer profit inefficient thrifts, possibly for their

potential for turnaround on the revenue side (Moore, 1996). Cost inefficient thrifts, perhaps with

out-of-date technology or expensive systems to replace, may be more difficult to turnaround than

profit inefficient thrifts. Similarly, acquirers may have little control over other aspects of a

target's cost structure, such as the cost of labor or the cost of deposits in a particular market. In contrast, revenue turnaround motives for profit inefficient thrifts may be easier to implement, such as instituting new pricing policies or implementing cross-selling strategies for new products.

For other risk-related variables, the coefficients on *CAP* and *SERVCO* are significant for the entire sample period, positive on *CAP* and negative on *SERVCO*. Acquirers on average appeared to avoid less-capitalized and more risky thrifts. They also seemed to prefer urban thrifts, with a significant positive coefficient on *MSA*, and to have avoided very small thrifts, with a significant, negative coefficient on *SMALL*.

When we evaluate the takeover determinants by focusing on different time periods however, characteristics of acquired thrifts are very different for the two periods (except for *MSA* which is significant for both regimes). In the early regime, the key characteristic of acquired firms is *CAP*, with a very significant positive coefficient. This result suggests a desire by acquirers to build up capital with mergers and, hence, avoid regulatory intervention associated with the phasing in of new capital requirements. Regulatory considerations appear to dominate in this regime. As noted by Persia, et al (2000), acquirers may have received a wake-up call in the aftermath of the thrift crisis, resulting in an avoidance of low capital thrifts. The result is also consistent with previous studies that found greater risk aversion by banks and thrifts in the early 1990's (e.g. Wagster, 1999; Cook, Hogan, and Kieschnick, 2003). The coefficient on *SMALL* also continues to be negative and significant.

Results from period 2, on the other hand, display a general change in this relationship. Firm attributes play a more prominent role in takeover decisions. Specifically, the coefficients on both efficiency measures of *PEFFIC* and *CEFFIC*, and portfolio risk variables of *REPOS* and

SERVCO are significant in the same directions as discussed above. In contrast to Period 1, *CAP* is no longer significant. This suggests that regulatory concerns over capital are replaced by other concerns that focus more on a target's operating characteristics. The revenue turnaround potential of profit inefficient thrifts appears to dominate the acquisition decisions in the latter regime, consistent with greater takeover discipline. Yet, acquirers appear to avoid more cost inefficient and risky thrifts, characteristics found to be linked to depository institution failures in previous studies (Berger and Humphrey, 1992; Cebenoyan, Cooperman, and Register,1993; Hermalin and Wallace, 1994; among others). Hence, this suggests the continued need for regulatory discipline for more risky and cost inefficient thrifts, as a complement to takeover discipline of profit inefficient firms.

4.3 **Multinomial Logit Model Results for Bank and Thrift Acquisitions**.

To examine the regime change hypothesis that predicts a greater change in acquisition behavior for bank versus thrift acquirers, we perform a multinomial logit estimation, which includes as a dependent variable three outcomes of no takeover, takeover by a bank, and takeover by a thrift acquirer.

Table 4 reports these results. The very large, significant Wald chi-squares indicate an even better fit for these models. It is worth noting that the number of acquisitions increased more dramatically for bank acquirers (from 129 to 279) than for thrift acquirers (89 to 120) in the later regime. This suggests that the removal of impediments for bank acquisitions of thrifts in the later regime stimulated acquisitions by bank acquirers.

(Insert Table 4 about here)

Table 4 reveals two distinct points: (1) Acquisition characteristics are very different for the two regimes for thrifts acquired by banks; and (2) Acquisitions characteristics are not as different for the two regimes for thrifts acquired by other thrifts. An awakening on the part of bank acquirers appears when released from regulatory restrictions, with a large number of significant attributes in Period 2 versus few in Period 1. On the other hand, thrift acquirers appear to be conducting business as usual, with few additional significant characteristics with the shift in regimes.

Examining the results for Period 1 by acquirer type, we find capital ratio (*CAP*) is the primary attribute for acquired thrifts acquired in Period 1, regardless of acquirer type. This highlights the dominance of regulatory concerns in the early regime. However, in Period 2, bank acquirers pay attention to both firm-specific and market characteristics (profit inefficiency, higher asset quality, urban environment, and higher population growth). Consistent with the regime change hypothesis, thrifts acquired by banks exhibit more varied characteristics, suggesting the ability of bank acquirers to engage in diverse motivations. Cost efficiency is no longer a significant determinant. Profit inefficient thrifts, however, have a higher likelihood of takeover, consistent with revenue turnaround motives by bank acquirers providing discipline for profit inefficient managers. Bank acquirers in Period 2 also appear to target thrifts in urban markets with higher growth rates and thrifts with better asset quality (positive significant coefficients on *MSA*, *PGROW*, and negative on *REPOS* and *SERVCO*). Overall, the results support greater freedom for bank acquirers in the later regime to engage in a variety of motives for revenue turnaround opportunities, market expansion, and loan portfolio quality enhancement..

Consistent with the regulatory regime hypothesis, the changes in characteristics of thrifts acquired by other thrifts do not exhibit as dramatic a change as those for bank acquirers in Period

2, with only three characteristics significant. Larger thrifts, with lower state market shares, and operating in an urban setting have a greater likelihood to be acquired by other thrifts (negative coefficients on *SMALL and MSH* and a positive coefficient on *MSA*).

The difference in acquisition characteristics by acquirer type may reflect the greater ability of commercial banks, as diversified firms, to engage in cross-selling of new products, new pricing strategies, or better marketing services. This greater abilities may make it easier for bank acquirers to implement revenue turnaround strategies versus thrift acquirers. Acquiring and turning around profit inefficient thrifts may be particularly desirable for bank acquirers, since they can provide new revenue generating outputs for acquired thrifts. Similarly, taking over profit inefficient thrifts may have offered a cheaper means of expanding into new rapidly growing markets. Thrifts, as less diversified firms, with fewer opportunities for new, higher revenue products or opportunities for cross-selling, in contrast, do not demonstrate such a motive. Thrift acquirers, however, appear to be attracted to larger targets, perhaps to build strength in order to compete with large banks with the advent of national interstate banking. By avoiding thrifts with large market shares, thrift acquirers may also have avoided regulatory interference with mergers and/or have engaged in market turnaround motivations, as suggested by Moore (1996).

5. Summary and Conclusions

This study adds to the previous literature by examining the factors affecting the takeover market during the thrift merger wave of 1990 to 2000, focusing on changes in acquisition characteristics for regulatory regimes of stringency in 1990 to 1993, and normalcy and

deregulation in 1994 to 2000, with the elimination of significant barriers to bank acquisitions of thrifts. We test a regime change hypothesis that predicts a more effective takeover market in the later regime, allowing banks to engage in diverse motivations to improve their particular organization, including turnaround motives that discipline inefficient firms.

Our empirical results indicate different characteristics of acquisitions for different regulatory environments. During times of regulatory stringency in the aftermath of the thrift crisis, 1990 to 1993, both bank and thrift acquirers acquired better capitalized thrifts, suggesting regulatory concerns as a primary motivation for mergers. In contrast, for 1994 to 2000, firm-specific attributes dominate acquisition decisions by bank acquirers, indicating diverse motivations for takeovers including market expansion, revenue turnaround, and asset quality motivations, consistent with a regime change hypothesis. Takeover discipline is more apparent for profit inefficient managers, with a higher likelihood of takeover for profit inefficient thrifts by bank acquirers, suggesting a revenue turnaround motive. This suggests that the omission of profit inefficiency as a significant attribute of financial institutions can lead to misleading results.

Consistent with our 'regimes matter' hypothesis, continuing regulatory incentives and constraints (prompt corrective actions, higher regulatory taxes on riskier firms) compliment the takeover discipline motives with bank acquirers avoiding thrifts with higher risks, and higher cost inefficiencies. This suggests from a policy-maker perspective that regulatory discipline continues to be a necessary compliment versus a substitute for takeover discipline, since acquirers appear to be unwilling to takeover more risky institutions.

In contrast, thrift acquirers, who did not experience as significant a regulatory change as bank acquirers, show a less dramatic change in acquisition behavior. In the later regime, thrift acquirers target firms with larger asset size, lower market share, and urban settings. These

preferences may reflect motives by thrift acquirers to build a greater market presence to prepare for banks entering their markets with the advent of national interstate banking. By acquiring larger thrifts with lower market shares, they may have also attempted to avoid greater regulatory interference or may have engaged in market turnaround strategies as suggested by Moore (1996).

Overall, the results suggest that the removal of barriers to bank takeovers of thrifts, increasing the number of potential acquirers nationwide, resulted in a more competitive and effective takeover market. In contrast to previous studies, the results demonstrate a culling of profit inefficient thrifts from the industry by bank acquirers with the removal of impediments to bank acquisitions of thrifts in the later regime. This suggests that takeover discipline can be a complement to regulatory discipline, whose need is also demonstrated by findings that bank acquirers also avoided more risky thrifts in this regime. From the perspective of policy implications, the results also show an important impact of regulatory environments on the motives and behavior of acquirers, consistent with Boot et al. (2000) who suggest that regulators need to carefully fine-tune indirect, incentive-based regulations in more competitive environments. This can be better accomplished with more representative research. The results strongly suggest the need for researchers to control for changes in regulatory regimes that can produce changes in financial institution behavior to avoid misleading results and their regulatory implications.

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Table 1: Descriptive Statistics for Not Acquired and Acquired Thrifts 1990-2000

Variables	Sample	N	Mean	Σ	t-stat[a]
SIZE (in thous..) (Log Assets)	All	3509	12.193	0.024	
	Not Acquired	2892	12.157	0.027	
	Acquired	617	12.361	0.058	-3.12***
CAP (equity to assets)	All	3509	0.084	0.0007	
	Not Acquired	2892	0.083	0.0007	
	Acquired	617	0.089	0.002	-3.26***
MSH (thrift's fraction of total state thrift assets)	All	3509	0.051	0.002	
	Not Acquired	2892	0.051	0.002	
	Acquired	617	0.049	0.004	0.43
MSA (Dummy =1 if in MSA; 0, otherwise)	All	3509	0.700	0.007	
	Not Acquired	2892	0.685	0.008	
	Acquired	617	0.779	0.016	-4.65***
PERCAP (per capita income in thrift's home state)	All	3509	20,308	56.182	
	Not Acquired	2892	20,456	62.505	
	Acquired	617	19,615	123.85	5.72***
PGROW (population growth in thrift's home state)	All	3509	1.518	0.024	
	Not Acquired	2892	1.465	0.026	
	Acquired	617	1.768	0.071	-4.64***
CEFFIC (Cost Efficiency Dummy =1 if > median score)	All	3509	0.0002	0.016	
	Not Acquired	2892	-0.042	0.018	
	Acquired	617	0.199	0.039	-5.46***
PEFFIC (Profit Efficiency Dummy =1 if > median score)	All	3509	-0.0002	0.016	
	Not Acquired	2892	0.027	0.018	
	Acquired	617	-0.131	0.039	3.58***
TRAD (% traditional. home mortgage assets to assets)	All	3509	0.462	0.003	
	Not Acquired	2892	0.464	0.003	
	Acquired	617	0.450	0.006	1.71*
REPOS (% repossessed assets to assets)	All	3509	0.006	0.0002	
	Not Acquired	2892	0.005	0.0002	
	Acquired	617	0.006	0.0005	-1.16
SERVCO (% service corporation assets)	All	3509	0.002	.0001	
	Not Acquired	2892	0.002	.0001	
	Acquired	617	0.002	.0003	0.40

[a] The t-statistics refer to t-tests comparing the means of the two samples. ***, ** p<0.01 and 0.05, respectively

Table 2: Pearson Correlations between Independent Variables

CEFFIC is a dummy variable equal to 1 for thrifts with cost inefficiency scores above the median. PEFFIC is a dummy variable equal to 1 for thrifts with profit inefficiency scores above the median. CAPRAT is a firm's equity to asset ratio. MSH is the fraction of market share a thrift has of total state thrift assets. MSA is a dummy variable equal to 1 for thrifts in metropolitan areas. PGROW is the annual population growth rate for a firm's home state. PERCAP is the per capita income in a thrift's home state. TRAD is the percentage of traditional home mortgage assets to total assets. REPOS is the percentage of repossessed assets. SERVCO is the percentage of service corporation assets.

	CEFFIC	PEFFIC	CAPRAT	MSH	MSA	PGROW	PERCAP	TRAD	REPOS
PEFFIC	-.145***								
CAPRAT	.027*	-.134***							
MSH	.016	.046***	-.022						
MSA	-.031*	.057***	-.106***	.077***					
PGROW	.044***	.048***	-.004	-.042**	.006				
PERCAP	-.236***	.010	.047***	.069***	.231***	-.277***			
TRAD	.086***	.040**	-.051***	-.085***	-.037**	.019	-.045***		
REPOS	-.051***	.024	-.150***	-.033**	.073***	.031*	-.112***	-.065***	
SERVCO	.092***	-.023	-.041**	.006	-.006	.019	-.164***	-.012	.137***

***, **, * p<.01, p<.05 and p<.10 respectively.

Table 3: Logit Model Results for the Determinants of All Acquisitions

Below the coefficient for each variable are the marginal effect and the z-statistic in parentheses.
Variable names are shown in Table 2. SMALL is a dummy variable for <$100 mil., MEDIUM for $100 mil. to $1 bil. in asset size.

	Total sample period of 1990-2000	Period 1 1990-1993	Period 2 1994-2000
Constant	-2.588	-0.885	-2.792
SMALL	-0.459	-0.700	-0.244
Marginal effects[a]	-0.057	-0.104	-0.028
z-stat	**(-1.86)***	**(-1.85)***	(-0.91)
MEDIUM	-0.214	0.106	-0.309
	-0.028	0.016	-0.036
	(-0.93)	(0.31)	(-1.25)
CEFFIC	0.148	0.135	0.125
	0.019	0.020	0.014
	(2.45)**	(1.42)	**(1.76)***
PEFFIC	-0.139	-0.144	-0.165
	-0.018	-0.022	-0.019
	(-2.41)**	(-1.52)	**(-2.46)****
MSH	-0.415	-0.047	-0.364
	-0.054	-0.007	-0.043
	(-0.63)	(-0.05)	(-0.54)
TRAD	-0.501	-0.629	-0.466
	-0.065	-0.096	-0.055
	(-1.31)	(-1.09)	(-1.14)
REPOS	0.592	6.699	-22.817
	0.077	1.030	-2.695
	(0.16)	(1.43)	**(-2.30)****
SERVCO	-15.258	-11.383	-39.208
	-1.991	-1.750	-4.632
	(-1.76)*	(-1.19)	**(-2.53)****
CAP	3.966	10.820	1.378
	0.517	1.663	0.162
	(1.97)**	**(4.16)*****	(0.79)
MSA	0.479	0.459	0.542
	0.058 [b]	0.066	0.059
	(2.90)***	**(1.80)***	**(3.05)*****
PERCAP	-1.3e-05	-4.0e-05	3.2e-06
	-1.7e-06	-6.2e-06	3.7-e07
	(-0.38)	(-0.75)	(0.08)
PGROW	0.024	-0.084	0.042
	0.003	-0.012	0.005
	(0.45)	(-0.60)	(0.81)
N	3,509	1,026	2,483
Acquired N	617	218	399
Pseudo-R^2	0.07	0.07	0.08
Wald chi2	159.68***	51.48***	141.66***

***, **, * p<.01, p<.05 and p<.10 respectively. [a] Marginal effects reported are calculated at the means of independent variables.
[b] Marginal effect of MSA is for discrete change of dummy variable from 0 to 1.

Table 4: Logit Model Results for Determinants of Respective Bank and Thrift Acquisitions

Below the coefficient for each variable are respectively the marginal effects and the z-statistic in parentheses. Variable names are shown in Table 2. SMALL is a dummy variable for <$100 mil., MEDIUM for $100 mil. to $1 bil. in asset size.

	Sample period of 1990-2000		Period 1 1990-1993		Period 2 1994-2000	
	Banks	**Thrifts**	**Banks**	**Thrifts**	**Banks**	**Thrifts**
Constant	-2.49	-4.68	-0.15	-3.22	-2.94	-4.08
SMALL	-0.43	-0.52	-1.13	-0.14	-0.09	-0.73
Marginal effects[a]	-0.03	-0.01	-0.10	-0.001	-0.006	--0.02
z-stat	-1.62	-1.53	**-2.79***	-0.03	-0.26	**-2.09**
MEDIUM	-0.23	-0.18	-0.14	0.42	-0.27	-0.52
	-0.02	-0.006	-0.02	0.03	-0.02	-0.01
	-0.94	-0.56	-0.49	0.91	-0.95	-1.47
CEFFIC	0.17	0.09	0.13	0.16	0.11	0.16
	0.02	0.003	0.01	0.01	0.009	0.004
	2.48	0.91	1.02	1.11	1.33	1.35
PEFFIC	-0.17	-0.07	-0.11	-0.20	-0.23	-0.002
	-0.02	-0.002	-0.009	-0.01	-0.02	0.0006
	-2.61*	-0.71	-0.85	-1.44	**-3.11***	0.20
MSH	-0.14	-1.28	-1.71	1.37	0.27	-3.63
	-0.007	-0.05	-0.18	0.11	0.03	-0.11
	-0.12	-1.39	-1.37	1.35	0.61	**-2.52**
TRAD	-0.53	-0.39	-0.35	-1.01	-0.56	-0.12
	-0.04	-0.01	-0.02	-0.07	-0.04	-0.002
	-1.31	-0.68	-0.43	-1.28	-1.29	-0.11
REPOS	-3.44	4.66	3.69	10.06	-34.77	-9.16
	-0.34	0.21	0.27	0.67	-3.03	-0.17
	-0.83	1.19	0.63	**1.66***	**-2.37**	-0.56
SERVCO	-21.13	-8.76	-15.80	-6.89	-45.82	-29.66
	-1.94	-0.26	-1.47	-0.35	-3.94	-0.77
	-2.25	-0.58	**-1.67***	-0.37	**-2.04**	-1.42
CAP	3.31	5.13	8.49	13.04	1.10	1.71
	0.28	0.19	0.71	0.84	0.09	0.04
	1.64*	**1.84***	**2.34**	**4.03***	0.62	0.74
MSA	0.41	0.62	.400	0.55	0.46	0.76
	0.03[b]	0.02	0.03	0.03	0.03	0.01
	2.21	**2.76***	1.22	1.55	**2.31**	**2.87***
PERCAP	-2.6e-05	1.0e-05	-7.8e-05	5.6e-09	-4.4e-06	7.1e-06
	-2.5e-06	5.5e-07	-7.6e-06	6.5e-07	-4.1e-07	2.3e-07
	-0.70	0.32	-1.23	0.15	-0.11	0.16
PGROW	0.09	-0.10	-0.06	-0.11	0.12	-0.11
	0.009	-0.004	-0.005	-0.007	0.01	-0.004
	1.75*	-1.55	-0.34	-0.49	**2.23**	-1.62
N	3509		1026		2483	
Acquired N	408	209	129	89	279	120
Pseudo-R^2	0.07		0.07		0.08	
Wald chi2	193.99***		69.32***		180.88***	

***, **, * p<.01, p<.05 and p<.10 respectively.
[a] Marginal effects reported are calculated at the means of independent variables.
[b] Marginal effect of MSA is for discrete change of dummy variable from 0 to 1.