Managerial Stock Ownership As A Corporate Control Device:

When Is Enough, Enough?

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Abstract

It has long been accepted that managerial stock ownership, beyond some range of possible entrenchment, can be an effective means of aligning the interests of professional managers with those of a firm's outside owners to the benefit of firm performance. In this paper, we offer evidence on the effectiveness of managerial stock ownership as a corporate control device by analyzing the behavior of 81 thrift institutions operating over the six-year period, 1989-1994. Based on the estimation of stochastic cost and profit frontiers, as well as other performance measures, our results suggest that managerial stock ownership provides an effective corporate control device. However, this device is only effective as managerial holdings surpass about 33% of outstanding shares for improvements in cost efficiency and about 40% for profit efficiency.

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"*Managers in a company must have autonomy and a big (financial) stake to stay keen."*

John Malone, TCI Chairman and CEO[1]

"Shareholders don't manage banks; boards and senior executives do."

Thomas Theobald, Former Chairman Continental Bank Corporation[2]

I. Introduction

Faced with growing challenges from factors such as increased competition, regulatory reform, and technological change, firms in most industries have focused considerable new attention on the efficiency of their operations in the recent past. This is particularly true for the banking industry that by the early 1990's was characterized by considerable over-capacity and inefficiency. In response, many banks and thrifts undertook major restructuring programs involving substantial layoffs, consolidation, and the implementation of new technology. In addition, firms such as Banc One and the Travelers Group adopted policies explicitly requiring managers to hold significant stock ownership in the firm. Many states have also instituted policies requiring minimum stock ownership for directors of banking institutions. In each case, the expectation is that by directly tying the manager's wealth to the performance of the firm, the manager becomes more likely to operate the firm in a value-maximizing way that is generally consistent with the desires of owners.

[1] Cited in *The Denver Post*, February 18, 1999, C1 on approval date of TCI and AT&T merger.

[2] Tom Theobald, "For Better Banks, Risk Management's Money," *The Wall Street Journal*, July 7, 1992, A14.

Whether managerial ownership improves firm performance is an unresolved empirical question, however. Amihud, Kamin, and Ronen (1983) and Amihud and Lev (1981) frame the issue well by stressing the distinction between *managerialism* and *ownerism.* In an environment of managerialism, professional managers can be expected to operate the firm in their own interests, while ownerism exists when managers act in the interests of the firm's external owners. Bridging this divergence of interests is commonly assumed to be possible through managerial stock ownership. That is, high enough levels of managerial stock ownership relative to managers' personal wealth may align the interests of managers with those of external shareholders for value-maximizing behavior, converting an environment of managerialism into one of ownerism (Jensen and Meckling, 1976; Gorton and Rosen, 1995).

This should not be taken to suggest that stock ownership on the part of the manager, in and of itself, necessarily brings about the beneficial performance effects inherent in ownerism. In fact, managerialism and its accompanying poor firm performance may be reinforced by modest levels of managerial holdings. That is, at low levels of stock holdings, managers may become entrenched and use their ownership power, though limited, to prevent their ouster even as they pursue their own interests, at the expense of the value of the firm (Amihud and Lev, 1981; Demsetz 1983; and Williamson, 1963). This entrenchment is likely to be further reinforced within so-called *opaque* firms such as banks and thrifts (Ross, 1989*)*. With confidentiality a necessity in banking, outside stockholders do not have access to many of the managers' decisions. Hence, with very limited risk of detection and punishment in such an environment, entrenched managers may be more likely to choose to pursue individual goals at the expense of firm value.

Gorton and Rosen (1995) offer an explanation of entrenchment in banking from a slightly different perspective. They point out that banking was a declining industry in the 1980's with considerable over-capacity. As the best and brightest often preferred to offer their services to the economy's growing sectors, the industry tended to retain a relatively large share of "bad managers. Consequently, the existence of a declining industry, with its relatively large share of bad managers, creates a perfect environment for managerial complacency.[3]

From these arguments, it is clear that the divergence between managerialism and ownerism is contingent on the size of the ownership stake that managers have in a firm. Up to a certain point, rising managerial ownership may have a detrimental effect on firm performance as managers become more entrenched and complacent (managerialism dominating). Beyond this point, further increases in managerial ownership may be beneficial to the performance of the firm, with manager-owners striving to improve the efficiency and value of the firm (the emergence of ownerism).

These theoretical considerations provide a background for a test of a *Beneficial Ownership Threshold* hypothesis. Under this hypothesis, managerial stock ownership and firm performance should be related in a curvilinear fashion. At modest levels of managerial ownership, the relatively poor performance predicted by managerialism is expected while above some threshold level of managerial ownership, the superior performance of ownerism is anticipated. We examine this hypothesis by first creating measures of firm-level profit and cost inefficiency for 81 thrifts operating from 1989 to 1994, yielding a total of 486 observations. Since thrifts, by

[3] Such complacency is often associated with monopolies in the Hicksian sense whereby, without the threat of competition, managers become slack, enjoying the "quiet life," by putting less effort into maximizing operating efficiency. This managerial slack creates various social costs including a restriction of output relative to the competitive level, a misallocation of resources, and higher consumer prices. In the case of managerialism, bad,

their nature, tend to produce homogenous products, predominantly home mortgage loans and mortgage securities, their relative profit and cost inefficiencies can be reliably calculated. These inefficiency scores serve as our primary measures of firm performance. In a separate step, we relate the profit and cost inefficiency scores to managerial stock ownership to directly test the hypothesis. To consider the reliability of these tests, we also relate managerial stock holdings to alternative, accounting- and regulatory-based measures of firm performance and risk.

Our empirical results generally support the Beneficial Ownership Threshold hypothesis for thrifts. At levels of managerial stock ownership below about 33% for cost efficiency and 40% for profit efficiency, we find the negative relation between managerial holdings and firm performance predicted by managerialism. As managerial stock ownership rises above these thresholds, the relation turns from negative to positive, suggestive of ownerism. Interestingly, subsequent analysis of various risk measures indicates that firm risk may fall as managerial ownership rises above similar ownership levels. Taken together, the results suggest that managerial stock ownership may serve as an effective corporate control mechanism to reduce managerial agency costs for thrifts *but* only when managers control a relatively large share of the firm's stock.

In the remaining paper, Section II provides a brief summary of previous studies examining the relation between ownership and firm performance. Section III presents the empirical models and data used in the study. Section IV contains the empirical results, and Section V provides conclusions.

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entrenched managers similarly may seek a "quiet life" in which they do not have to maximize operating efficiency and misallocate resources at the firm level (see Berger and Hannan 1998; Amihud and Lev 1981; Hicks 1935).

II. Overview of Previous Studies

Previous research includes relatively recent cost and/or profit efficiency studies which bear directly on the current paper and also studies on risk which, while only indirectly related, are important in the development of the current paper. These are discussed in the following sections and are summarized in Table 1.

Relatively few studies have directly examined the relation between managerial stock ownership and firm efficiency using cost and profit functions because of both data constraints and the conditions necessary to make efficiency comparisons between firms. With respect to data constraints, cost and profit function data are simply rarely available for all but firms of regulated industries. On the latter point, as Berger and Hannan (1998) suggest, to effectively determine relative efficiency between firms, those firms must: 1) be part of the same industry, 2) have access to the same production technologies, and 3) produce relatively homogenous products. The banking industry satisfies these constraints rather well and, thus, has served as the environment for a number of analyses of relative firm efficiency.[4]

Only five of these studies directly offer evidence on the relation between managerial stock ownership and bank efficiency. Pi and Timme (1993) considered the effect of CEO ownership structure on the operating efficiency of a sample of very large bank holding companies (BHC's) during the late 1980's. They find superior performance for banks with relatively high CEO managerial ownership, but only when the CEO is not also the chairman of the board. Berger and Hannan (1998) include managerial ownership in 1988 as a potentially important control variable in a study examining the effect of market concentration on BHC performance in the 1980's.

[4]See Berger and Mester (1997) for a discussion of the production function for depository institutions and a survey of articles examining bank and thrift cost efficiency.

Berger and Mester (1997) also examine determinants of cost and profit efficiency of BHCs between 1990 and 1995, as a minor portion of a larger study. Based on 1988 managerial stock ownership levels, they do not find managerial stock ownership to be a significant determinant. More recent studies by De Young, Spong, and Sullivan (1998, 1999) examine the relation between ownership and profit efficiency for a random sample of small, closely held U.S. banks in the Tenth Federal Reserve District from 1991 to 1994. For this sample of predominantly small banks, they find that as managerial stock ownership rises, profit efficiency improves. However, at higher levels of ownership profit efficiency falls.

Other related studies focus more on the relation between managerial stock ownership and market risk measures. Saunders, Strock, and Travlos (SST) (1990), Mullins (1991), Demsetz, Saidenberg and Strahan (1997), Chen, Steiner, and Whyte (1998), and Anderson and Fraser (2000) examine the relation between market risk measures and ownership. SST and Mullins find a significant positive linear relation between ownership and risk for a sample of 38 large BHCs using data in the late 1970's to mid-1980's. Demsetz, et al. find a similar, positive relation, but only for low charter banks in the early 1990's. In contrast, Chen, Steiner, and Whyte (1998) and Anderson and Fraser (2000) find a significant positive relation in the 1980's, but a significant negative relation in the 1990's. Brewer and Saidenberg (1996) study the relation between market risk and managerial ownership for large, publicly-traded thrifts in the 1980's. They, however, find a nonlinear relation with a positive relation between managerial stock ownership and market risk measures at high levels of ownership and a negative relation at low levels of ownership.

Other studies using accounting data to avoid problems of low ownership levels for large publicly-traded firms also find significant relations between risk-taking and ownership.

Cebenoyan, Cooperman, and Register (1995, 1999) examining the relation between accounting risk measures and managerial ownership for thrifts in the 1980's and early 1990's find a nonlinear relation similar to that found by Brewer and Saidenberg. Interestingly, they find that while the risk-taking of the 1980's was relatively unprofitable, the risk-taking of the early 1990's appeared to be profitably taken. Gorton and Rosen (1995) examining BHCs in the 1980's similarly observe a nonlinear relation consistent with a corporate control hypothesis. They find lower credit risk and higher returns for BHCs with high levels of managerial ownership (above about 40%) with an entrenchment effect at lower ownership levels. Somewhat consistent with Gorton and Rosen's results, Byrd, Fraser, Lee, and Williams (2000) find a lower probability of failure for manager-owned thrifts in the 1980's. However, Sullivan and Spong (1998, 1999) examining small, closely held banks find evidence of higher risk for banks when hired managers have significant ownership stakes. Hence, evidence generally supports a significant effect of ownership on bank/thrift risk-taking behavior, but whether this effect is salutary or deleterious to the firm is less clear.

While each of these papers at least indirectly considers the issue we address, each has shortcomings in this application. First, when the focus is on large BHC's and market risk measures, since risk is measured in terms of market volatility, closely held firms with thin trading must be excluded from the analysis (see Anderson and Fraser, 2000). Thus, the analysis is necessarily limited to considering firms that are widely traded that often have very low levels and narrow ranges of managerial ownership. Large BHCs often have low managerial stock ownership. For example, in the sample used by Pi and Timme (1993), mean CEO holdings were about 1% of outstanding shares. DeYoung, Spong and Sullivan (1998) and Sullivan and Spong (1998, 1999) overcome the problem of limited managerial ownership by restricting their sample

to very small banks. However, since the average asset size for the banks they consider is only $50 million, the results should probably not be generalized to larger institutions. While Berger and Hannan (1998), Berger and Mester (1997), and Gorton and Rosen (1995) use non-market data to analyze large samples of banks with a wide range of ownership across a number of years, they use data on managerial ownership for a single year, 1988. The use of ownership data for only one year may be problematic given the enormous changes in ownership structure that took place during the 1980's and early 1990's.

Studies of thrifts offer a much broader range of ownership levels than do BHC's or banks, regardless of how they are selected. As such, the thrift market provides an appropriate environment in which to consider managerial ownership and firm performance relations. However, most previous studies analyze data from the 1980's, a period of regulatory laxity, which may well have lead to distorted relations between managerial stock holdings and firm performance. With a new regulatory environment and considerable restructuring in the bank and thrift industries, along with trends for mandatory managerial ownership, such relations may be quite different today. Studies of thrifts have focused on the relation between ownership and thrift risk taking using measures of ex-post market risk or financial performance. These measures may be biased since they are affected by a number of exogenous forces or random events beyond management's control. In contrast, measures of controllable managerial operating inefficiency are less subject to exogenous factors, making them superior proxies for managerial behavior. This study adds to the previous literature by examining the relations between controllable managerial operating cost and profit inefficiency and managerial ownership for thrifts, which have not been previously examined.

III. Empirical Model and Data

To identify the relation, if any, between managerial stock ownership and controllable managerial operating inefficiency and, in a subsequent analysis, firm financial performance and risk, we estimate equations of the form:

$$Y_i = f\,(INSIDE_i, INSIDESQ_{i\,,} X_i\,) + \in_i \qquad (1)$$

where INSIDE is the fraction of stock owned by managers and directors of thrift i; INSIDESQ is the square of INSIDE and allows for the identification of a curvilinear relation between managerial ownership and firm performance; X represents a vector of other factors that are likely to influence thrift performance; $\in$ is a mean-zero error term; and Y is one of several respective measures of thrift i's controllable operating inefficiency, financial performance, or risk. Our primary focus is on the relative controllable operating cost and profit inefficiency of thrift operations. As such, inefficiency scores for each thrift are calculated from stochastic frontiers, as detailed below. In an alternative regression, we use ROA (return on assets) as a measure of a firm's financial performance. To examine relations between ownership and risk, we also include CAPRATIO (a firm's tangible equity to capital ratio) and PEER (a firm's Sheshunoff regional risk ranking by similar to a regulatory camel ranking combining capital, asset quality, management, earnings, and liquidity).

A. Inefficiency Measures

We employ measures of both cost and profit inefficiency resulting from the estimation of stochastic frontiers (see Aigner, Lovell, and Schmidt, 1977; Meeusen and Broeck, 1977; Berger and Mester, 1997; and Rogers 1998). The stochastic cost-frontier methodology incorporates a

two-component error structure. One component represents random, uncontrollable factors, and the other represents individual-firm deviation from the efficient frontier caused by factors within a manager's control, such as technical allocative efficiency. By estimating the ratio of the variability of these factors, overall measures of controllable thrift cost and profit inefficiency can be calculated. Hence, inefficiency measures exclude exogenous, uncontrollable factors that managers have little control over. The frontier used to calculate these measures are described in more detail in the following sections.

1. Cost Efficiency Frontier

As noted by Rogers (1998), the frontier, from a cost perspective, can be expressed in simple terms as:

$$C = f(y, w, u_c, v_c) \qquad (2)$$

where C represents variable costs; y is a vector of quantities of variable outputs; w is a vector of variable input prices; u_c is a measure of cost inefficiency; and v_c denotes random error.

Given the estimate of predicted cost for thrift i, the cost inefficiency score for that thrift is calculated as:

$$CINEFF_i = 1 - [C^{min} / C^i] = 1 - [u_c^{min} / u_c^i] \qquad (3)$$

where C^{min} is the minimum value of C for all thrifts in the sample. A CINEFF value of 0.10 for a particular firm means that this firm produces its output at roughly 10% greater cost than would its most efficient counterpart. As Rogers (1998) points out, cost inefficiency estimates include both inefficiency on the technical side, using too many inputs to produce y, and inefficiency on the allocative side, using suboptimal proportions of each of the inputs and outputs given

prevailing market prices. Hence a CINEFF of .15, for example, would indicate that a firm is producing its outputs at a cost that is about 15% greater than the best practice firm.

2. Profit Efficiency Frontier

Profit inefficiency estimation utilizes information on both the cost and revenue sides of the firm's operations but is otherwise mechanically similar to cost inefficiency. That is, the best-practice firms are identified—those with greatest variable profit for a given set of variable input prices and outputs. Then, all other firms in the sample are compared to these best-practice firms. Profit inefficiency is thus identified as a particular firm's deviation from the maximum possible profit of the best-practice firms.

Under conditions of substantial unmeasured differences in the quality of services produced and where it is often impossible to compute prices of nontraditional output, which is generally the case in banking, Berger and Mester (1997) suggest that the appropriate approach to estimating the profit model is the alternative profit frontier. While a standard profit frontier relates bank profits to both input and output prices, under the alternative profit frontier, output prices are taken as exogenous. Hence, efficiency is measured by how close a bank comes to earning maximum profit given its output levels rather than its output prices.[5]

The alternative profit function can be used as follows:

[5] The alternative profit efficiency frontier, as pointed out by Berger and Mester (1997, p. 901) and Rogers (1998), is helpful when some of the assumptions underlying cost and standard profit efficiency are not met. Rather than measuring deviations from optimal output as inefficiency as in the standard profit function, variable output is held constant as in the cost function, while output prices are free to vary and affect profits. Berger and Mester (1997) point out that the alternative profit function should be used when one or more of the following conditions hold: (1) there are substantial unmeasured differences in the quality of banking services; (2) outputs are not completely variable, so that a bank cannot achieve every output scale and product mix; (3) output markets are not perfectly competitive, so that banks have some market power over the prices they charge, and (4) output prices are not accurately measured.

$$\Pi = \Pi (y, w, u_n, v_s) \qquad (4)$$

where Π is a thrift's variable profit, u_n is a measure of profit inefficiency, and v_s denotes random error. The most efficient thrift will have the maximum value of u_n. The alternative profit function utilizes the same output and input quantities as in the cost function of equation (2) but variable profit serves as the dependent variable instead of variable cost. Based on the estimates of Π, the profit inefficiency score for thrift i is computed as:

$$\text{PINEFFi} = 1 - [\Pi^i / \Pi^{max}] = 1 - [u^i / u_\Pi^{max}] \qquad (5)$$

where Π^{max} is the maximum value of Π for all thrifts in the sample. As with CINEFF, a PINEFF value of 0.10 would indicate that the thrift is sacrificing about 10% of potential profit. As pointed out by Berger and Mester (1997, p. 900), unlike cost efficiency, profit efficiency can be negative, whereby a thrift could "throw away more than 100%" of its potential profit. Hence a profit inefficiency score can be greater than 100%. They also 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.

B. Econometric Modeling of Inefficiency

We employ a standard stochastic frontier methodology based on multiproduct translog cost and profit functions to calculate inefficiency scores for the thrifts in our sample.[6] These scores in turn are used as the dependent variables in cross-sectional regressions to examine the relations between managerial stock ownership and cost and profit inefficiency.

1. Multiproduct Cost Function

As noted above, the cost and alternative profit frontiers use different dependent variables, respectively variable cost and variable profit, but employ the same set of exogenous variables: input prices and output quantities. Using Berger and Mester's (1997) approach, cost efficiency is derived from a cost function in which variable costs depend on the prices of variable inputs, the quantities of variable outputs in addition to fixed inputs, random error, and efficiency. Under the assumption that the inefficiency factors and random error terms are multiplicatively separable, equations (2) and (4) can be represented in natural logs as:

$$\ln Z = f(y, w, z) + \ln u_z + \ln v_z \qquad (6)$$

where Z equals C, variable costs (interest and personnel expenses); and Π, variable profits (interest and fee income earned minus variable costs), for the profit frontier. The term y is a 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

[6] See Aigner, Lovell and Schmidt (1977), Meeusen and Broeck (1977), Jondrow et al (1982) for a description of this methodology and, for more recent applications, see Cebenoyan, Cooperman, Register, and Hudgins (1993), Berger and Mester (1997) and Rogers (1998).

or complementary with variable inputs. The terms u_z and v_z are, respectively, inefficiency and random error terms for each model.

To estimate the error term in equation (6) and in turn calculate each firm's cost inefficiency and profit inefficiency index, we estimate the following popular translog specification (suppressing individual thrift subscripts):[7]

$$\ln Z = \alpha + \sum_{j=1}^{5} B_j \ln y_j + \sum_{k=1}^{2} \gamma_k \ln w_k + \tfrac{1}{2} \sum_{j=1}^{5} \sum_{l=1}^{5} B_{jl} \ln y_j \ln y_l + \tfrac{1}{2} \sum_{k=1}^{2} \sum_{l=1}^{2} \gamma_{kl} \ln w_k \ln w_l$$

$$+ \sum_{j=1}^{5} \sum_{k=1}^{2} \delta_{jk} \ln y_j \ln w_k + \ln z_k + \ln u_z + \ln v_z, \qquad (7)$$

where Z represents, alternately, variable cost or variable profit, depending on which frontier is estimated.

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) nonmortgage 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. Two fixed input quantities z, as used by Berger

[7]For greater precision in calculating efficiency scores, Berger and Mester (1997) suggest the use of a Fourier-flexible function form, which is less restrictive than a translog cost function. However, the translog form is easier to use, and for ranking decisions, studies demonstrate that it provides similar rankings as other forms. Typical of many panel data analyses, convergence problems left no option to the pooled time series, cross-sectional approach taken here.

and Mester (1997), are also included: the dollar value of physical capital (premises and other fixed assets) and the dollar value of financial equity capital.[8]

C. Primary Cross-Sectional Models

In the second stage of the estimation, we perform cross-sectional regressions as in equation (1) for the sample using respective models on controllable managerial operating cost and profit inefficiency. The cross-sectional regression to be estimated is:

$$INEFF_i = \beta_0 + \beta_1 INSIDE_i + \beta_2 INSIDESQ_i + \beta_3 OUTSIDE_i + \beta_4 LOGSIZE_i + \beta_5 UNEMP_i + \beta_6 MKBK_i + \beta_{7\text{-}12} YEAR_i + \varepsilon_i \quad (8)$$

where:

INEFF = individual inefficiency score of a thrift,

INSIDE = the percentage of equity held by managers and directors,

INSIDESQ = the square of INSIDE,

OUTSIDE = the percentage of equity held by institutional directors,

LOGSIZE = the log of asset size of a thrift,

UNEMP = a control variable for regional economic factors,

MKBK = market to book value of equity, as a proxy for thrift charter value,

YEAR = a set of 5, year-specific dummies, with 1989 as the reference, and

ε = a random error term.

[8]These measures are similar to those used by Cebenoyan, Cooperman, Register, and Hudgins (1993, 1998) and Cebenoyan, Cooperman, and Register (1993). See Cebenoyan, Cooperman, Register, and Hudgins (1993, 1998) and Rogers (1998) for a more detailed discussion of this methodology which this section heavily draws from. We use a financial intermediation approach, following the arguments of Sealey and Lindley (1977) to specify thrift inputs and

In addition to INSIDE and INSIDESQ[9] used to test the Beneficial Ownership Threshold hypothesis, OUTSIDE is included to control for effects of institutional ownership on firm inefficiency, since McConnell and Servaes (1990) and other studies find institutional investor ownership to have a significant effect on firm performance.

To control for size, regional economic conditions, and charter value that previous studies find at times to affect a thrift's performance (see Cebenoyan, et. al., 1993, 1995, 1998; Demirguc-Kunt, 1989; Brewer and Saidenberg, 1996 and Anderson and Fraser, 2000), we include LOGSIZE, UNEMP and MKBK. LOGSIZE is the log of asset size in millions. UNEMP is the unemployment rate for the home state. MKBK is a proxy for thrift charter value, measured as the ratio of a thrift's market to book value of equity. Cebenoyan, et al. (1995, 1999), Brewer and Saidenberg (1996), and Anderson and Fraser (2000) find charter value to be negatively related to firm or market risk measures. Berger and Humphrey (1991), among other studies, find asset size to be significantly related to firm efficiency. Studies also find thrifts in states suffering economic distress tend to have relatively higher inefficiency scores (Cebenoyan, et al., 1993).

Finally, we include a set of five, year-specific dummies (YEAR) that capture trends in performance affecting all firms within the period relative to performance in 1989. Should performance benefits exist for the restructuring, adaptation of new technology, or renewed regulatory vigor that all thrifts have experienced during the period, we would expect them to be reflected in these dummies. Based on the work of Stroh (1997) which showed thrift cost

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outputs in the cost function. This method assumes a thrift uses physical capital, deposits, other borrowings and labor as inputs to produce earning assets. Results of the frontier estimations are available from the authors upon request.

[9] To determine whether a model should include INSIDESQ, we use Lagrange multiplier tests (see Ramanathan, 1992, p. 313).

efficiency to improve in the mid-1990's, we do anticipate finding thrift performance improving across the six years studied.

D. Data

We collect financial ratios and PEER rating measures from *Sheshunoff's S&L Quarterly* for each year, 1989 to 1994, published by Sheshunoff Information Services, Inc., Austin, Texas. Income and balance sheet data come from the Federal Home Loan Bank Board (FHLBB) call reports, as recorded by Sheshunoff on its Ferguson and Company Analysis and Forecasting System CD for all U.S. stock-chartered thrifts. Our ownership and market to book data is from *The SNL Quarterly Thrift Digest*, 1990 to 1995 (SNL Securities, Charlottesville, Virginia). Manager and director ownership are based on 13D, 13G, and F11 filings to the SEC, FDIC, or OTS by individuals currently holding more than 5% of an S&L's common stock, supplemented by the beneficial ownership information disclosed in proxy filings. Institutional ownership data are compiled from 13F filings.[10] Unemployment rates are from various issues of the U.S. Bureau of the Census, *Statistical Abstract of the U.S.*, Washington, D.C.

To avoid any bias associated with three-year limitations placed on managerial ownership for S&Ls converting to stock ownership after 1980,[11] our sample encompasses the period 1989 to 1994 for all thrifts with complete data for the entire period, meeting this requirement. The

[10] Since data on large non-institutional blockholders were not included in the data collected for outside ownership by SNL Securities, OUTSIDE excludes other large blockholders. Most other papers use 5% blockholders. Consequently, our measure may underestimate the effect of large external shareholders on managerial operating inefficiencies.

[11] After 1980, regulations for conversions prevented an alignment of the interests of managers and stockholders for a three-year period by incorporating an anti-takeover rule in which any beneficial ownership by an individual could be no more than 10% for any class of equity security for three years following conversion. Limits were also placed on

sample begins in 1989, a year of restored regulatory oversight under FIRREA. The sample ends in 1994, because of a large number of sample thrifts that merged with other thrifts and banks in 1995 and since. Given these restrictions, our sample includes 81 thrifts operating for the six continuous years, encompassing 486 observations.

IV. Empirical Results

A. Descriptive Statistics

Descriptive statistics for selected variables used in estimating the cost and profit functions are shown in Table 2. The average variable costs for the thrifts in the sample was $110.526 million and the average variable profit was about $55.744 million, representing an operating profit margin before taxes, extraordinary items and other fixed costs of about 33.5%. Considering the means for different thrift outputs as a percentage of assets, about 68% of the typical thrift's assets were in home mortgages or mortgage-backed securities. This suggests that the majority of thrifts in the sample were traditional home lenders. The typical thrift had 12.3% of assets in multifamily and nonresidential mortgage loans, 9.43% in cash and other securities, 4.22% in nonmortgage loans, and 2.53% in construction, land, real estate, and service corporation investments. The mean price of deposits and other borrowings was 6.08% and the mean employee salary $30,991. These means are similar to other thrift efficiency studies.

Table 3 reports descriptive statistics for variables used in the primary cross-sectional regression models. The mean cost inefficiency score for the sample, CINEFF, is 11.2%, indicating that the average thrift produces its outputs at a cost that is about 11% greater than the best practice firm in the sample. The mean profit inefficiency score, PINEFF, is 35.6%

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the amount of stock that could be offered during this period: a) to 5% for any person or identified group; and 2) to

suggesting that the average thrift is losing more than one-third of the profit it could be earning were it to produce and market its services as effectively as its best-practice counterparts. These figures are within the observed ranges of existing cost and profit efficiency studies of banking institutions. The average for INSIDE is about 18%, and for OUTSIDE about 17%. Since many thrifts remain closely held, the range of ownership is wide, with a maximum of about 73% for INSIDE and 91% for OUTSIDE. The mean for the market-to-book ratio, MKBK, is .84. Prior to 1991, thrifts had very low market to book ratios but with improved profitability in the 1990's, these ratios averaged greater than one during the later part of the sample period. UNEMP, the average state unemployment rate was about 6% over the period. The mean asset size, SIZE, is $2 billion, with the thrifts in the sample having a fairly large size, ranging from $68 million to $39.7 billion.

The mean ROA (return on assets) is .53% over the period with a wide range from –6.33% to 2.93%. The mean for CAPRATIO (tangible equity capital to assets) is about 7.30% ranging from about .30% to 21.33%. This wide range reflects both improved profitability and a higher capital requirement for thrifts after 1990. The average for PEER is 54. PEER ranges from 0 to 99, with higher rankings indicating greater safety.

B. Cross-Sectional Results on Cost Inefficiency

Regression results, throughout the paper, use White's (1980) consistent variance-covariance estimation procedure to adjust for heteroscedasticity. The first panel of Table 4 presents the regression results using cost inefficiency as the dependent variable. The significant Wald chi-square indicates a relatively good fit for the model. The coefficient on INSIDE is significant and

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15-25% for all officers and directors (see Cordell, MacDonald, and Wohar, 1992).

positive while the coefficient on INSIDESQ is significant and negative, both at .01 significance levels. These outcomes suggest that as managerial ownership rises initially, so does cost inefficiency. Above a threshold of about 33%, further increases in managerial ownership become associated with falling cost inefficiency.[12]

OUTSIDE is not significantly related to cost inefficiency, supporting the suggestions by Ross (1989), Zeckhauser and Pound (1990), and Gorton and Rosen (1995), that outside owners have little effect on managerial performance in banking possibly as a result of the often cited information asymmetries in the industry.

Interestingly, the dummy variables for the different years strongly support the contention that the thrift industry, on average, significantly improved its cost inefficiency performance during the period. Specifically, in each year beyond 1989, the coefficient on the year-dummies increase in size and, following 1991 (YEAR3) become significantly negative. This is a clearly hopeful sign for an industry that performed so poorly during the 1980's. The coefficient on LOGSIZE is significant and positive indicating greater cost inefficiency for larger thrifts in contrast to Berger and Mester's (1997) finding of no relationship for their sample of banks in the 1990's. The coefficient on UNEMP is also significant and positive, consistent with Cebenoyan, Cooperman, and Register's (1993) finding of greater inefficiency for thrifts in economically distressed states.

C. Cross-Sectional Results on Profit Inefficiency

The second panel of Table 4 presents the regression results using profit inefficiency as the dependent variable. The significant Wald chi-square again indicates a good fit for the model.

[12] The turning point is calculated by solving for the unknown managerial ownership level at which the full effect is

Similar to the cost inefficiency model, the coefficient on INSIDE is significant and positive while the coefficient on INSIDESQ is significant and negative, both at a .05 level. The turning point on ownership is a bit higher to that for the cost inefficiency regression, about 40%.[13]

The coefficient on OUTSIDE is again insignificant, possibly suggesting information asymmetries in banking between external stockholders and managers. For other control variables, the coefficient on LOGSIZE is significant and positive, indicating greater profit inefficiency for larger thrifts in the sample, consistent with Berger and Mester (1997) who interpret this result as indicating potential revenue-generating difficulties for banks as they get larger.

The coefficient on MKBK is significant and negative, indicating lower profit inefficiency for thrifts with higher charter values. Higher charter value thrifts had lower profit inefficiency. Finally, as was the case for the cost inefficiency model, the YEAR dummies indicate that thrifts as a group experienced improving profit performance during the period—though the effect here does not seem to be as strong. The YEAR dummies from the two models indicate that while thrifts experienced efficiency gains during the period, those gains seem to have been relatively concentrated on the cost side of operations. Given that managers have greater control over internal operations than over market conditions, this outcome is as would be expected.[14]

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equal to zero.

[13] Tests for multicollinearity between independent variables indicated no significant multicollinearity (see Belsey, Kuh, and Welsch, 1980).

[14]We also performed tests for other turning points on ownership using piecewise dummy variables (0 to 5%, 5 to 20%, 25 to 30%, > 30%), as well as an alternative $INSIDE^3$ variable. Other than the >30% ownership dummy variable, these dummy variables and the $INSIDE^3$ variable were insignificant. In addition, we tested for outliers by removing individual firms with high levels of ownership from the sample. The results were similar with the exclusion of these firms. To test for a potential relation between size and ownership, we performed tests that indicated no significant multicollinearity between the two variables. We also performed alternative regressions that included interaction variables between size and ownership. The interaction coefficients were insignificant, and Wald chi-square tests indicated that they should not be included.

Taken together with the results from the cost model, these results are very consistent with the Beneficial Ownership Threshold hypothesis, where modest levels of managerial ownership are likely to lead to the entrenchment of managers who have enough stock-voting power to prevent their ouster, but not enough to fully align their interests with the value-maximizing desires of outside owners. Above the threshold, however, a clear alignment of interests between managers and stockholders in general occurs leading to value-maximizing behavior. While the threshold levels of beneficial managerial stock ownership reported here might seem rather high, it should be noted that they are consistent with that reported by Gorton and Rosen (1995) who find evidence of entrenchment up to a managerial ownership level of about 40%.

D. Additional Cross-Sectional Regressions on Other Performance and Risk Measures

To help determine the reliability of the results presented above, we perform the additional cross-sectional regressions using an alternative, non-frontier based measures of performance, ROA, and risk measures, CAPRATIO and PEER.[15]

Table 5 shows the regression results for ROA. In contrast to the regressions for CINEFF and PINEFF which had nonlinear relations on managerial ownership, Lagrange multiplier tests indicate a positive linear relationship between managerial ownership and ROA. That is, as managerial ownership rises at any ownership level, financial performance improves. The result on ROA is similar to that observed by Cebenoyan, Cooperman, and Register (1999) using a

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[15] We performed additional regressions on REO, real estate owned and REPOS, the percentage of repossessed assets held by thrifts. For these regressions, managerial ownership variables were insignificant. The results of these regressions are available from the authors.

different sample of thrifts in the 1990's. The coefficient on OUTSIDE is significant and positive, indicating superior performance for thrifts with greater institutional investor ownership.

For other control variables, the coefficient on LOGSIZE was significant and negative. As thrifts got larger over this period, they appear to have lower ROA's. Consistent with the previous regression on PINEFF, MKBK is significant and positive for both regressions indicating superior performance for higher charter value thrifts. The time dummy variables were insignificant.

Table 6 shows the respective results for the cross-sectional regression on CAPRATIO and PEER. Lagrange multiplier tests indicated that a significant nonlinear relation for the CAPRATIO regression. For this regression, the coefficient on INSIDE is significant and negative, and the coefficient on INSIDESQ is significant and positive. The turning point on the CAPRATIO for INSIDE is about 41%, a result completely in keeping with the turning point identified by Gorton and Rosen (1995) and the previous results for the PINEFF regression. At low levels of managerial ownership, capital ratios fall, but at levels of ownership above about 41%, capital ratios rise with managerial ownership. Similar to the previous regressions, the coefficient on LOGSIZE is significant and negative indicating lower capital ratios for larger thrifts. Also similar to the previous regressions, MKBK is significant and positive, indicating higher capital ratios for thrifts with higher charter values consistent with previous studies that find a negative relation between charter value and risk (Brewer and Saidenber, 1996; Cebenoyan, et al.,1999; and Anderson and Fraser, 2000).

For the PEER regression, Lagrange multiplier tests indicated that the relation between managerial ownership and PEER was linear and that INSIDESQ should be excluded as an independent variable. The coefficient on INSIDE is significant and positive at a .10 level. As

managerial stock ownership rises at whatever ownership level, PEER rises. The coefficient on OUTSIDE is also positive and highly significant. As institutional investor ownership rises, peer rankings rises. Similar to the CAPRATIO regression, the coefficient on MKBK is also positive and significant. YEAR dummy variables are significant and negative for years 3, 4, 5, and 6. This may suggest greater thrift risk-taking reflected in lower peer ratings over time as the economy improved over the 1990's, as suggested recently by regulators. UNEMP was significant and negative indicating greater risk for thrifts in areas that were more economically distressed.

Thus, the results on CAPITAL are very consistent with the results on CINEFF and PINEFF with a similar turning point on managerial ownership for CAPRATIO, supporting the Beneficial Ownership Threshold hypothesis. The results for the ROA and PEER regressions provide weaker evidence of a positive effect of managerial ownership on firm risk and financial performance at any ownership level. CINEFF and PINEFF, as less ambiguous measures of controllable managerial operating inefficiency, appear to be more strongly affected by different levels of managerial ownership. It is also interesting to note that while institutional investor ownership is significant for the regressions using published accounting/regulatory variables (PEER, CAPITAL and ROA), it is insignificant for the regressions based on internal measures of controllable managerial operating inefficiency (CINEFF and PINEFF), more opaque measures to outside investors. This supports the premise that external investors of financial institutions have little control over managerial behavior relative to manager owners.

V. Summary and Conclusion

In this paper we present tests of a Beneficial Ownership Threshold hypothesis whereby managerial stock ownership is expected to be effective in aligning the interests of managers and owners, in general, for firm value maximization, but only above a threshold of managerial ownership. Analyzing a sample of thrifts over the six-year period 1989 to 1994, we find strong support for this hypothesis. The turning point occurs at a managerial stock ownership share of roughly 33% for cost and 40% for profit inefficiency. Below this level, it appears that managerial ownership leads to the entrenchment effect embodied in managerialism. Above this level, increases in managerial holdings are significantly associated with improving firm performance as would be expected from ownerism. Subsequent analysis of additional measures of thrift performance and risk generally support this conclusion.

Taken together, these results provide support for the proposition that recent mandates by banks/thrifts that managers and directors hold significant stock ownership stakes may be an effective agency cost control device, but only when total mandated ownership results in rather high levels of managerial ownership. While the reasons for such a high threshold are not immediately obvious, productive avenues of inquiry might include assessing whether this outcome is tied to the generally declining nature of banking or informational asymmetries between investors and bank/thrift managers making these institutions less subject to external market discipline. That is, a rather lower threshold of beneficial managerial ownership might well be found in growing industries, with relative transparency to outsiders. Another interesting finding concerns the apparent ability of institutional owners to positively impact a thrift's financial performance but not its operating efficiency. This seems most likely due to the opaque nature of banking. On a caveat, additional research is needed, particularly for the banking industry in the 1990's to confirm these results. Finally, the results should not be assumed to

necessarily hold for non-financial firms. A fruitful area for future research would be to examine the effect of performance-based compensation programs on firm efficiency as well. This issue is beyond the scope of this paper and is left for future research.

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Table 1: Summary of Previous Studies on the Effect of Managerial Stock Ownership on Banks and Thrifts

Study (Date)	Sample	Results
Cost & Profit Efficiency Studies Pi & Timme (1993)	Large BHCs in the 1980s	Cost efficiency improved with greater non-chairman CEO ownership.
Berger & Hannan (1998) Berger & Mester (1997)	BHCs in the 1980's BHCs in the 1980's & 1990's	Cost & profit efficiency were unaffected by level of managerial ownership.
DeYoung, Spong & Sullivan (1998, 1999)	Small, closely-held U.S. banks operating in the 10th Federal Reserve District in 1991 to 1994	Ownership by hired managers initially improves profit efficiency, but at higher levels profit efficiency falls.
Risk-Taking Behavior Studies Saunders, Strock & Travlos (1990)	Very large BHCs in 1978 to 1985	Positive linear relationship between ownership & market risk measures
Mullins (1991)	BHCs in 1986	Positive linear relationship for large BHCs, but insignificant for a larger sample.
Demsetz, Saidenberg, and Strahan (1997)	Sample of BHCs during 1991 to 1995	Positive linear relationship between ownership & risk but only for low charter value BHCs.
Chen, Stein & Whyte (1998)	Samples of large publicly-traded BHCs & thrifts in the 1990s	The relationship between ownership & market risk is negative in the early 1990's.
Gorton & Rosen (1995)	Sample of BHCs in the 1980's using accounting data & a wide range of ownership	At a turning point of about 40% inside ownership, BHCs held higher returning, lower risk portfolios (entrenchment effects at lower ownership levels).
Brewer & Saidenberg (1996)	Large publicly-traded thrifts in the 1980's	At a turning point of about 30% inside ownership, large thrifts had greater market risk (lower risk at lower ownership levels).
Cebenoyan, Cooperman & Register (1995, 1999)	Thrift sample in the 1980's to mid-1990's	Similar results to Brewer, et al. In the 1980's risk was unprofitably taken, but profitably taken in the 1990's.
Sullivan & Spong (1998, 1999)	Sample of small banks operating in the 10th Federal Reserve District in the 1990's	Small, closely held banks had greater risk when hired managers had significant ownership stakes.
Bryd, Fraser, Lee & Williams (2000)	Sample of Thrifts Operating in the Mid-1980's	Manager-owned thrifts had a lower probability of failure.
Anderson & Fraser (2000)	Sample of BHCs operating from 1987 to 1994.	Positive relation between risk and managerial ownership in the 1980s; opposite in 1990's.

Table 2: Descriptive Statistics for Selected Variables Used in Cost and Profit Functions (N=486)

Variable	Mean	Std	Min.	Max.	
Variable Costs (mils.)	$110.53	296.18	3.31	2,758.89	
Variable Profits (mils.)	55.74	44.96	-4.24	992.96	
% Total Revenues	33.53%				
					% Total Assets
Home mortgages & Mortgage-Backed Securities (mils.)	1,413.99	4,022.08	31.87	32,403.52	68.00%
Multifamily & Nonresidential loans (mils.)	255.44	710.90	0.86	4,932.58	12.30%
Nonmortgage Loans (mils.)	87.69	184.82	0.29	1,689.10	4.22%
Cash & Other Security Investments (mils.)	196.09	400.36	4.18	2,374.01	9.43%
Construction, Land, Real Estate & Serv. Corporation Invs. (mils.)	52.56	107.86	0.04	1,079.43	2.53%
Price of Deposits %	6.08%	2.12%	2.54%	14.37%	
Price of Labor (thous**)**	$30.99	7.77	9.81	60.16	

Table 3: Descriptive Statistics for Cross-Sectional Analysis Variables (N=486)

CINEFF is a thrift's cost inefficiency score. PINEFF is a thrift's profit inefficiency score.
INSIDE is the percentage of stock held by officers and directors.
OUTSIDE is the percentage of stock held by institutional investors.
SIZE is the asset size in millions. UNEMP is the state unemployment rate.
MKBK is the market to book value of equity.
ROA is net income to assets.
PEER is a safety ranking from 0 to 99.
CAPRATIO is tangible equity to assets.

SYMBOL	MEAN	STD	MIN	MAX
CINEFF	0.112	0.063	0.021	0.559
PINEFF	0.356	0.297	0.034	2.753
INSIDE	17.958%	13.924%	0.260%	72.700%
OUTSIDE	16.922%	18.756%	0.000%	91.100%
SIZE (mils.)	2,079.408	5,353.498	68.645	39,697.36
UNEMP	6.145%	1.485%	2.200%	11.300%
MKBK	0.838	0.403	0.083	2.207
ROA %	.528	.997	-6.330	2.930
PEER	54.395	26.924	0.000	99.000
CAPRATIO %	7.296	3.061	.295	21.327

Table 4: Results on Cost Inefficiency (CINEFF) and Profit Inefficiency (PINEFF)

INSIDE is the percentage of stock held by officers and directors.
INSIDESQ is the square of INSIDE. OUTSIDE is the percentage of institutional investor ownership.
LOGSIZE is the log of the assets in millions. UNEMP is the state unemployment rate.
MKBK is the market to book value of equity. YEAR2…6 are year dummy variables.
Wald Chi Square is a test of whether the independent variables are jointly different from zero.

	Results on CINEFF		Results on PINEFF	
	Coeff.	**T-stat**	**Coeff.**	**T-stat**
Constant	0.02547	1.250	.04741	.468
INSIDE	0.00265	3.644***	.00961	2.342**
INSIDESQ	-0.00004	-3.625***	-.00012	-2.158**
OUTSIDE	0.00005	0.206	-.00236	-1.558
LOGSIZE	0.00631	1.883*	.05968	3.036***
UNEMP	0.00322	1.702*	-.00523	-.588
MKBK	0.01225	1.241	-.07055	-1.778*
YEAR2	-.00368	-.368	-.00945	-.165
YEAR3	-.00895	-.864	-.03766	-.709
YEAR4	-.02047	-1.996*	-.09735	-1.831*
YEAR5	-.02534	-2.294**	-.11719	-2.087**
YEAR6	-.0321	-2.785***	-.0894	-1.548
Turning Point INSIDE	33.125%		40.042%	
Wald Chi Square	27.226***		42.868***	
No. of Observations	486		486	

*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

Table 5: Results on Return on Assets (ROA)

INSIDE is the percentage of stock held by officers and directors.
INSIDESQ is the square of INSIDE. OUTSIDE is the percentage of institutional investor ownership.
LOGSIZE is the log of the assets in millions. UNEMP is the state unemployment rate.
MKBK is the market to book value of equity. YEAR2…6 are year dummy variables.
Wald Chi Square is a test of whether the independent variables are jointly different from zero.

	Results on ROA	
	Coeff.	**T-stat**
Constant	.00960	4.191***
INSIDE	.00007	2.515***
OUTSIDE	.00014	4.201***
LOGSIZE	-.00243	-5.492***
UNEMP	-.00020	-.696
MKBK	.01060	6.797***
YEAR2	-.00120	-.843
YEAR3	.00070	.487
YEAR4	.00156	1.175
YEAR5	.00048	.272
YEAR6	-.00053	-.421
Turning Point Inside	None	
Wald Chi Square		112.252***
No. of Observations		486

*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.

Table 6: Empirical Results on Capital to Assets Ratio (CAPRATIO) and Peer Rankings (PEER)

INSIDE is the percentage of stock held by officers and directors.
INSIDESQ is the square of INSIDE. OUTSIDE is the percentage of institutional investor ownership.
LOGSIZE is the log of the assets in millions. UNEMP is the state unemployment rate.
MKBK is the market to book value of equity. YEAR2…6 are year dummy variables.
Wald Chi Square is a test of whether the independent variables are jointly different from zero.

	Results on CAPRATIO		Results on PEER	
	Coeff.	**T-stat**	**Coeff.**	**T-stat**
Constant	15.4140	14.590***	80.4700	10.720***
INSIDE	- .05909	-2.201**	.1396	1.828*
INSIDESQ	.00072	1.925*		
OUTSIDE	.06614	6.005***	.7560	8.784***
LOGSIZE	-1.6443	-10.830***	-6.8363	-6.201***
UNEMP	.0931	1.164	-1.2833	-1.760*
MKBK	1.8092	4.592***	31.0040	8.639***
YEAR2	.0066	.016	-3.0770	-.980
YEAR3	-.1772	-.388	-11.0170	-3.180***
YEAR4	-.2284	-.433	-25.7300	-6.226***
YEAR5	.3630	.737	-27.5780	-6.671***
YEAR6	.1273	.258	-23.6180	-6.535***
Turning Point INSIDE		41.035%		None
Wald Chi Square		169.076***		282.808***
No. of Observations		486		486

*** Significant at the 0.01 level.
** Significant at the 0.05 level.
* Significant at the 0.10 level.