Risk-Taking Behavior in the U.S. Thrift Industry: Ownership Structure and Regulatory Changes
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John D. Knopf and John L. Teall

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RISK-TAKING BEHAVIOR IN THE U.S. THRIFT INDUSTRY:
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John D. Knopf
Department of Finance
Stern School of Business Administration
New York University
44 West 4th Street
New York, NY 10012

John L. Teall
Department of Finance
Pace University
One Pace Plaza
New York, NY 10038

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ABSTRACT

RISK-TAKING BEHAVIOR IN THE U.S. THRIFT INDUSTRY:
Ownership Structure and Regulatory Changes

This paper is concerned with the relationship between ownership structure and risk taking in the U.S. thrift industry along with the impact of the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA) on this relationship. Our results, based on balance sheet and market measures of risk, suggest that insider controlled thrifts were more likely to engage in risk taking behavior prior to 1989 than were diversely held institutions. FIRREA seems to have curtailed much of the risk taking behavior of these institutions; in fact, some evidence suggests that insider controlled thrifts may have actually engaged in less risk taking behavior than their diversely held counterparts after 1989. We find inverse relationships between risk-taking behavior and levels of institutional shareholdings during all periods. This finding, along with the finding that increased risk-taking does not increase returns to thrift shareholders, suggests that the motive for risk-taking behavior on the part of insider held thrifts may not have been the maximization of the "option" value associated with shares as reported elsewhere. We do find evidence that entrenched managers may have generated significant private benefits for themselves.

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I. INTRODUCTION

The thrift industry was created to provide low-cost, fixed-interest-rate mortgages for housing. The Federal Home Loan Bank Board (FHLBB) and the Federal Savings and Loan Deposit Corporation (FSLIC) were created in 1932 and 1934 to regulate and insure the thrift industry. Because long-term mortgages were financed primarily with short term deposits, interest rate increases in the 1970's and early 1980's caused the thrift industry to experience significant difficulties. The Depository Institutions Deregulation and Monetary Control Act of 1980 and the Garn-St.Germain Depository Institutions Act of 1982 were intended to establish a new regulatory framework for thrifts and to address apparent causes of distress in the industry. This legislation enabled thrift institutions to raise and invest funds in manners that were previously not allowed, while increasing deposit insurance ceilings. Thus, S&L's were permitted to make commercial and consumer loans, purchase corporate debt securities and make direct real estate equity investments, while capital standards were reduced and capital requirements were re-defined, enabling institutions to continue operations when technically insolvent. Clearly, opportunities for thrifts to increase risk-taking behavior had arisen as a result of de-regulation in the early 1980's. The Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA) was intended to deal with these problems, mandating higher capitalization ratios, reducing real estate equity holdings for most thrifts, regulating the use of brokered CD's and requiring that at least 70% of thrift assets be housing mortgages. Furthermore, Title IX of FIRREA provided for significant penalties to be levied on and reimbursements to be required of S&L managers who engaged in prohibited activities which put FDIC at risk.

Numerous studies have demonstrated that the shareholder of a highly leveraged firm (such as an S&L) may benefit from increased risk-taking activity by that firm (e.g.: Galai and Masulis

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[1976] and Kraus and Litzenberger [1973]). Marcus and Shaked [1984] and Merton [1977] apply results such as these to the valuation of federal insurance in the banking industries. Shareholder "option" values increase with increased risk taking behavior of their managements; shareholders receive the benefits of successful risk-taking behavior and creditors and insurers bear significant portions of the losses associated with unsuccessful risk-taking behavior. Numerous studies suggest that firms which are controlled by insiders or large blockholders are more likely to engage in increased risk-taking behavior (e.g.: Amihud and Lev [1981] and Shavell [1979]); presumably, such behavior increases shareholder wealth. Saunders, Strock and Travlos [1990] argue that higher commercial bank risk levels are related to officer and manager proportional shareholdings. They argue that banks with high levels of insider shareholdings attempt to increase shareholder wealth by increasing their riskiness. They also find that the incidence of risk-taking behavior among insider controlled commercial banks increases during periods of relative deregulation. The results of these studies might imply that institutions such as thrifts with high proportional insider shareholdings are more likely to engage in risk-taking activity; institutions with more diverse shareholdings are more likely to be controlled by managers who may value their job security and reputations most highly.

At the same time, particularly high levels of insider shareholdings may enable management to become entrenched (Morck, Shleifer and Vishny [1988] and Bagnani, Milonas, Saunders and Travlos [1994]) or discourage profitable takeover activity for that firm (Weston [1979]). One might expect that as insider shareholdings increase, insiders have a greater incentive to act on behalf of shareholder interests; yet particularly high levels of insider shareholdings may lead to managerial entrenchment. Thus, entrenched insiders may be able to secure non-stock benefits at the expense of shareholders.

Most institutional shareholders do not have the same incentives as insider shareholders to become entrenched as managers. Managers of institutions holding thrift shares are not as capable of

obtaining perqs as are inside shareholders of thrifts. In a sense, institutional shareholders provide for a second "layer" of monitoring; managers of the thrift are monitored by the management team of the institutional shareholder which is in turn monitored by the shareholders of the institution. Furthermore, most institutional shareholders of thrift institutions are regulated by the so-called prudent man rule which, in effect, requires that they not make investments in firms whose risks are not justified by their anticipated returns.[1]

Institutional shareholders seem more likely than inside shareholders to hold well diversified portfolios. Due to their abilities to diversify and the second "layer" of monitoring, thrifts held and monitored by institutions might be expected to maintain a risk profile consistent with shareholder wealth maximization. Thus, the observation of risk-taking behavior being directly related to insider shareholdings and inversely related to institutional shareholdings may be regarded as evidence suggesting that this risk-taking behavior is not consistent with shareholder wealth maximization, particularly if risk-taking does not result in increased returns.

The purpose of this paper is to determine whether risk-taking behavior in the thrift industry has been related to levels of insider and institutional stockholdings and how these relationships have been affected by the FIRREA of 1989. We wish to determine whether insider controlled thrifts maintained higher levels of risk-taking activity than their diversely held or institutionally controlled counterparts and what the motivations for this risk-taking might have been. In the following section of this paper, we discuss our indicators of risk-taking behavior and our rationale for selecting this particular set of indicators. Our testing methodology is presented in Section III, where we present our model of thrift behavior in Part A and describe our data and statistical tests in Parts B and C.

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[1]More specifically, the prudent man rule as articulated by *Harvard College and Massachusetts General Hospital v. Francis Armory* in 1830 dictates that the prudent man would consider "the probable income as well as the safety of the capital invested."

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Results of these tests are presented in Section IV. In Section V, we discuss results of piecewise regressions for the purpose of associating motives with behaviors and we discuss our conclusions in Section VI.

II. MEASURING THE RISK OF THRIFT INSTITUTIONS

Many studies of publicly traded companies emphasize stock return variability as the primary indicator of risk-taking by management. Because one is often not able to properly measure return variances for a thinly traded thrift, and return variability in the thrift may not have been intended by management, we use three classes of indicators of risk-taking behavior by thrift management: stock price measures, balance sheet measures and incidence of failure among various groups of thrifts. Our first class of indicators of managerial risk-taking behavior is based on market prices of shares. We emphasize absolute market price risk measures rather than stock betas, following Saunders, Strock and Travlos [1990] who argue that stock return variance is a more appropriate indicator of risk for commercial banks than stock beta. However, thinness of trading of most thrift institutions' securities, especially the smaller ones, renders computation of variance estimates rather problematic. Thus, the log of the high-low ratio as proposed by Parkinson [1980] seems to be the most reliable of the market risk indicators for these thinly traded institutions.

Our primary balance sheet indicators of risk are based on the results of Barth, Bartholomew and Bradley [1990] and confirmed by Cole et al. [1990], which, in part, were concerned with the financial statement components distinguishing solvent thrifts from those that failed. For example, Barth, Bartholomew and Bradley [1990] suggest that capitalization ratios are good indicators of thrift risk-taking.[2] One might expect the conservative manager to maintain a high capitalization ratio. It is, however, important to note that in some cases, capitalization ratios may simply reflect past profit

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[2]Capitalization ratios reported in this study are based on balance sheet compilations defined by GAAP.

performance rather than indicate risk-taking behavior. Thus, additional measures of risk taking behavior are necessary.

Barth, Bartholomew and Bradley [1990] as well as Barth, Bartholomew and Labich [1990] show that during the period 1985-88, the presence of real estate equity investment was significantly higher on insolvent S&L balance sheets than on solvent S&L balance sheets. Our study also indicates this. Many recent S&L failures have been related to real estate equity investment. Such differences might indicate either an incidence of risk-taking behavior, inability to diversify real estate portfolios, use of the S&L as a "private" source of funds for equity investment, an incidence of asset repossession, or some combination of the above.[3]   In addition, Barth, Bartholomew and Bradley also find evidence that the presence of brokered CD's on thrift balance sheets was correlated with the incidence and severity (measured by the cost of resolution to the insurer) of thrift failure. Use of brokered CD's also provide the thrift the opportunity to obtain financing in more distant geographical regions where their reputations for risk-taking are not so well established; the level of brokered CD's are an indicator of the thrift's perceived risk. FIRREA has substantially limited the use of brokered CD's by thrifts.

Thus, the balance sheet proxies for risk we use in this study are the real estate to total assets ratio (RETA), the equity to total assets ratio (ETA) and the brokered deposits to total regulatory assets ratio (BRCD). Consistent with the studies quoted above, we find that each of our three balance sheet risk measures are related to variability in stock returns, as summarized in Table 1. In this table, we summarize relationships between various balance sheet risk proxies and our market risk proxy based on data collected from 1986 to 1991. During this six year period, we obtained 1738 data points

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[3]Later, we will suggest that the motivation for high levels of real estate equity investment by thrifts with entrenched management teams may have been for the purpose of extracting private benefits - as opposed to attempting to maximizing the option value of the firm's stock.

reflecting the number of thrifts for which we had complete data for each of the six years times the number of firms for each year. Based on our multiple regression, we obtain a multiple r-squared indicating that 24.99% of earnings variability as measured by the log of the 52 week hi-lo market price ratio (LOGHL) can be explained by these three risk measures along with the log of total asset value (our control variable for firm size). The decision to emphasize these three balance sheet risk proxies was based on results of initial regressions including cash, non-mortgage loans, mortgages for 1-4 unit residential properties, mortgages for 4+ unit residential properties as well as the three risk measures we settled upon. We found that other balance sheet proxies contributed little or nothing to explaining market return variability.[4] Our individual simple regression results reported in Table 1 were consistent with the results of our multiple regression. Furthermore, Table 2 indicates that our balance sheet risk measures are indicative of S&L failure.

III. TESTING METHODOLOGY

A. The Empirical Model

First, assume that two types of shareholders maintain ownership in limited liability savings and loans corporations: insiders (managers) and institutions. Insiders are individuals which, during periods of relative de-regulation, may have the ability to extract private non-security benefits. However, insiders are also limited in their capacity to diversify their holdings. Insiders realize private benefits by controlling:

1. **The investment policy of their employers:** Insiders maintain outside business interests (such as real estate development firms) which may receive financing or other benefits from the thrift. Such private benefits may increase the risk of the thrift and

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[4]We found that including all of these variables increased r-square from 22.3% to 22.8% while decreasing the F-statistic from 99.3 to 48 (These figures differ somewhat from those reported in the body of the paper because of the smaller data set for which we had complete data). Elimination of each of these individual variables increased the F-statistic while barely affecting r-square.

decrease its returns, increasing the likelihood of failure.

2. The financing policy of their employers: Insiders are able to control their ability to extract private benefits if their employers maintain high levels of leverage and receive financing from outside of the regions in which they operate. High levels of leverage imply fewer shares held by outside shareholders and corresponding reduced monitoring by outside shareholders. Furthermore, higher levels of leverage reduce the cost to insiders of extracting private benefits. Receiving financing from outside of their regions of operations by selling brokered CD's enables thrifts to be unencumbered by their regional reputations for undertaking risky activities.

We also assume here that institutional shareholders are regulated by the so-called prudent man rule subjecting management of institutions to liability for losses resulting from imprudent risk-taking. Hence, thrifts with significant institutional shareholdings have reduced incentive to engage in risky activity.

Next, assume that during periods of relative deregulation, each shareholder j (for insider) and k (for institution) has the potential to realize increased "option" profits on his stock from higher levels of business and financial risk taking σ_i by thrift managers. However, reimbursements and penalties provided by FIRREA of 1989 and the prudent man rule (affecting institutional shareholders) effectively terminates the limited liability feature of the stock thrift. After 1989, managers in effect face unlimited liability with respect to the results of behavior prohibited by Section III of FIRREA. Institutional shareholders face liability for certain realized losses during all periods due to the prudent man rule. We assume here that inside shareholders manage an unlimited shareholder liability firm after passage of FIRREA and institutional shareholders always face liability for losses realized from imprudent activities. Both inside investors j and institutional investors k are presumed to benefit from higher returns $r_{i,t}$ generated by thrift i. Thus, we write the incentive or wealth function $w_{j,t}$ for inside

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shareholder j and $w_{k,t}$ for institutional shareholder k at time t as follows:

(1) $$w_{j,t} = f[\sigma_{i,t}; \; p_{j,t}(\sigma_{i,t}); \; r_{i,t}(\sigma_{i,t}; \; p_{j,t}); \; t] \; ; \; w_{k,t} = g[\sigma_{i,t}; \; r_{i,t}(\sigma_{i,t}; \; p_{j,t})]$$

(2) $$f'(\sigma_{i,t}) > 0 \mid t<0 \; ; \; f'(\sigma_{i,t}) < 0 \mid t>0; \; g'(\sigma_{i,t}) \gtreqqless 0$$

(3) $$\sigma'_{i,t} > 0 \; ; \; f'(p_{j,t}) > 0 \mid t<0; \; p'_{j,t}(\sigma_{i,t}) > 0$$

(4) $$r'(\sigma_{i,t}) \gtreqqless 0$$

where private benefit consumption $p_{j,t}$ by investor j is assumed to increase the risk of the thrift. The date t=0 is when the inside held limited liability thrift essentially becomes an unlimited liability firm due to passage of FIRREA. Increased risk taking behavior $\sigma_{i,t}$ for t<0 increases inside shareholder wealth $w_{j,t}$; increased risk taking behavior for t>0 decreases shareholder wealth unless the value of private benefits realized by insiders exceeds the value of the penalty levied by regulatory authorities.

Since increased shareholdings by a specific group (in our study, insiders INSH and institutional shareholders INST) might be expected to lead to managerial behavior which would increase the wealth of that group, risk-taking by the thrift might be modeled as follows:

(5) $$\sigma_{i,t} = a_t + b_{1,t} \cdot INSH_{i,t} + b_{2,t} \cdot INST_{i,t}$$

Our model presented above would predict that $b_{1,t}$ exceeds zero for t<0 (in real time, 1989 is equivalent to t=0) and is less than zero for t>0 and that $b_{2,t}$ is always less than zero.

B.   Data

Data used in this study is collected for every publicly traded (NYSE, AMEX and OTC) stock thrift institution as of June 30 in each of the years from 1987 to 1992. Much of the ownership and financial data used for this study was compiled from the "SNL Quarterly Thrift Digest" published by SNL Securities, Inc. Insider shareholdings, measured here as a fraction of overall shares outstanding, are taken from the most recent proxy filing as of March 31 of the given year. Institutional shareholdings, measured here as a fraction of overall shares outstanding, are taken from the most recent form 13-F filing as of March 31 of the given year.

Stock return volatilities are computed from price data taken from CRSP tapes. Real estate equity holdings reported here are based on the sum of real estate held for development and sale, acquired through foreclosure and investment in and advances to joint ventures. Equity levels used to compute equity to total asset ratios are taken from GAAP standardized statements based on information obtained from 10-K filings. Total broker originated deposits data was obtained from thrift call reports.

C.   Tests

We first examine the relationship between managerial risk-taking and insider shareholdings over the period 1986-1991. We then perform a Chow Test of Structural Change to determine whether the period 1986-91 may be divided into separate regression regimes.[5] Our results suggest three distinct regression regimes which seem to coincide with FIRREA:

1.   1986-1988: The period prior to FIRREA of 1989

2.   1989: The transition period

3.   1990-1991: Post FIRREA of 1989

Next, we explore the corresponding relationships between institutional holdings and risk-taking behavior over the same period and sub-periods. Our five indicators of risk-taking behavior are:

1.   The log of the 52 week hi-lo stock price ratio (LOGHL)

2.   The Real Estate to Total Asset Ratio (RETA)

3.   The Equity to Total Asset Ratio (ETA)

4.   Brokered CD's relative to Total Assets (BRCD)

5.   Incidence of bankruptcy or forced resolution

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[5]Our regressions of LOG(HI/LO) on LOGTA and INSH were separated first into two regimes: 1986-88 and 1989-90 based on significantly significant Chow Test F-statistics of $F(3,1692) = 39.22$, indicating that a structural change did occur between these two periods. The periods 1989 and 1990 were separated by another statistically significant Chow test with an F-statistic of $F(3,707) = 29.43$.

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More specifically, we hypothesize the following:

1. During the pre-FIRREA period, thrifts closely held by insiders will engage in higher levels of risk-taking behavior than their more diversely held counterparts.

2. Stricter regulation (and unlimited liability for losses resulting from prohibited behavior) provided by FIRREA will reduce the willingness of insiders to engage in this risk-taking behavior as FIRREA increases the costs of this behavior. Thus, we predict that risk-taking will be inversely correlated with levels of insider shareholdings during the post-FIRREA period.

3. Risk taking by thrifts will always be inversely correlated with levels of institutional shareholdings.

IV. RESULTS

A. Insider Shareholdings and Risk Taking Behavior

Table 4 summarizes relationships between insider shareholdings and risk taking behavior as proxied by logs of high-low ratios (LOGHL) during our entire testing period 1986-1991 as well as the three sub-periods. Over the entire period, we find that insider shareholdings are not significantly correlated with the market proxy for risk, with an r-square value of 0 and a t-statistic of .1889. However, results for each of the sub-periods showed significant differences. For the period 1986-88, the correlation between insider shareholdings and the market risk proxy was positive and statistically significant at the .05 level, with a t-statistic of 2.53. The correlation dropped in later periods, with t-statistics of .0119 in 1989 and -3.5028 for 1990. Clearly, the incidence of risk taking behavior of insider controlled thrifts relative to diversely held thrifts decreased after passage of FIRREA. Our results suggested some anticipation of and adjustment to this act, with r-squares and t-statistics dropping over time (although not reported here, r-squares and t-statistics dropped each year during the 1986-88 period as well). It seems that prior to FIRREA, thrifts which were primarily insider held

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experienced more volatile stock prices; after, FIRREA, thrifts which were primarily insider held maintained less volatile stock prices.

Table 5 depicts the relationship between insider shareholdings and each of our three balance sheet risk surrogates during the

period 1986-1991 as well as the three sub-periods. During the entire period, each of the three balance sheet risk surrogates were significantly correlated with insider shareholdings, with t-statistics of 5.1304 for real estate holdings, -10.8595 for the equity to total asset ratio and 3.5350 for brokered CD's. These significant correlations suggest higher incidence of risk-taking behavior among thrifts more closely held by insiders over the period as a whole, although they may be biased by the inclusion of three pre-FIRREA years of data.

We also examine how the relationship between insider control and risk-taking evolved over time, paying particular attention to FIRREA of 1989. Table 5 indicates that each of our three risk surrogates were strongly correlated with insider shareholdings during the period 1986 to 1988. Values for r-square for the three risk proxies ranged from .0554 to .0777, with t-statistics whose absolute values equaled or exceeded 6.2656. Thus, all were significant at the .01 level. These correlations suggest higher incidence of risk-taking behavior on the part of the insider held thrifts during the period prior to passage of FIRREA.

However, according to Table 5, our results began to shift in 1989. Neither real estate holdings nor brokered CD's seem correlated with insider shareholdings with r-square values not exceeding .0046. The equity to total asset ratio is still strongly inversely correlated with insider shareholdings, though this may be just as easily interpreted as a result of poor performance due to earlier risk-taking behavior by thrifts rather than as a sign of current risk taking behavior.

Table 5 indicates that the relationship between insider shareholdings and risk-taking continued to shift in 1990-91. In both cases, t-statistics for insider shareholdings on both real estate to total

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assets and brokered CD's shifted from positive values to negative values. The r-square value for the equity to total asset ratio dropped from .062 to .0123. Results for real estate equity holdings and selling of brokered CD's suggest that insider held institutions were managed in a more conservative manner than the more diversely held institutions. Although equity to total asset ratios were still inversely related to levels of insider shareholdings, the coefficient and r-square value dropped in the 1990-91 period from the 1989 period. Furthermore, this inverse relationship might be due to the poor performance of insider controlled thrifts in prior periods.

We also examine incidence of failure (bankruptcy or resolution forced by FSLIC or FDIC) among the various classes of thrift institutions. We presume that managers of bankrupt institutions were more likely to have maintained higher levels of risk-taking activities than managers of institutions which remained solvent. Of 349 publicly traded NYSE, AMEX and NASDAQ thrift institutions considered as of June 30, 1987, 41 had failed by March 31, 1991. Average insider shareholdings as of 1987 for institutions later failing were 23.08% versus 10.95% for those remaining solvent (See Table 2). Table 2 also provides financial characteristics distinguishing between those institutions failing by March 31, 1991 and those remaining solvent by that date. The difference was significant, with an F statistic of 18.65. The impact of insider shareholdings on thrift failure seems to hold within geographic regions and within states. Table 3 categorizes the thrifts by state and solvent/failure status. In general, those states whose publicly traded thrifts experienced high failure incidence tended to have thrifts maintaining large insider shareholdings (e.g: Texas and Arizona) while those states which experienced low failure incidence tended to have thrifts which were more widely held (e.g: Massachusetts and New York). Furthermore, among those states with more than 5 publicly traded thrifts, both incidence of thrift failure and higher insider shareholdings are higher in regions with less restrictive regulation (Florida and the southwest) than in regions with stricter regulation (New York and New England).

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B.   <u>Institutional Shareholdings and Risk Taking Behavior</u>

Table 6 depicts the relationship between institutional shareholdings and the market proxy for risk, indicating an inverse relationship between stock variability and institutional shareholdings. However, the statistical significance of this relationship does not seem consistent over time. Nonetheless, Table 6 does suggest that risk taking seems inversely related to the level on institutional shareholdings. Table 7 suggests that real estate shareholdings were inversely correlated with institutional shareholdings levels with statistical significance at the .01 level both prior to and after 1989 (though not statistically significant during 1989). The equity to total asset ratio suggested that thrifts with significant institutional shareholdings also tended to maintain more conservative debt-equity positions (Though these conservative ratios could be due to higher prior profitability). The only balance sheet risk measure which did not indicate that thrifts with significant institutional shareholdings tended to decrease risk taking behavior was the brokered CD proxy. This result might be explained by the fact that brokered CD's tended to be used more by the larger thrifts and that the larger thrifts tended to have larger levels of institutional shareholdings. FIRREA (Section III) placed stringent conditions on the use of brokered CD's, perhaps rendering use of this financing technique unrelated to ownership structure.

C.   <u>Insider versus Institutional Control and Return Levels</u>

Results presented in Parts A and B above demonstrate that the behavior of insider held thrifts was quite different from institutionally controlled thrifts during the pre-FIRREA period. What motivates this difference in behavior? Table 8 provides no evidence that insider held thrifts were more profitable than institutionally controlled thrifts, nor does it suggest that various types of risk-taking behavior discussed here led to higher returns. The poor performance of insider controlled thrifts would suggest that the motivation for insider risk-taking is to secure private benefits from activities which increase thrift risk. This issue will be discussed in greater detail in the next section.

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V. PIECEWISE OLS REGRESSION RESULTS

The purpose of this series of tests is to shed further light on potential motives for apparent risk-taking behavior by thrifts. We segregate thrifts according to their apparent blocks of control, accounting for potential non-linearities of relationships discussed earlier. Tables 9 through 13 are concerned with relationships between risk indicators and the extent to which thrifts seem controlled by insiders and institutions. We control for firm size in our regressions with LOGTA, finding in each period that each risk variable is directly related to size as we did in the results discussed earlier.

We find that the level of institutional shareholdings is never positively related to any of our indicators of risk-taking behavior. Furthermore, we establish a dummy control variable to distinguish between those S&L's which are apparently controlled by institutional shareholders from those where insiders maintain larger blocks of shareholdings. This dummy variable assumes a value of one for a particular thrift if insider shareholdings exceed institutional shareholdings; otherwise, it assumes a value of zero. In only three instances does this dummy variable seem significant: 1) In the period 1986-88, capitalization ratios are inversely correlated with the dummy variable suggesting that institutional shareholders tend to shy away from thrifts with low capitalization ratios (or perhaps are not invested in thrifts which may have experienced significant declines in equity), 2) This same relationship seems to hold in 1989, and 3) In the period 1986-88, capitalization ratios are directly correlated with the dummy variable suggesting that institutional shareholders tend to shy away from thrifts with high levels of real estate equity investment. Thus, all of our tests seem to confirm that institutions avoided investing in thrifts with high levels of risk-taking behavior.

Following Morck, Shleifer and Vishny [1988] and others who used piecewise OLS regressions to study the relationship between insider shareholdings and Q-Ratios, we categorize thrifts into three groups according to levels of insider shareholdings. Their three categories included firms with insider shareholdings which were less than 5%, between 5% and 25% and those whose

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insider shareholdings exceeded 25%. Twenty five percent (296) of the S&L's in our 1986-88 sample had insider shareholdings which was less than 5% and were assigned to the INSH<5 group in Tables 9 through 13. Levels of insider shareholdings within this group were not significantly correlated with any of our risk indicators for any period in our study. Morck, Shleifer and Vishny suggest that managers of thrifts in this control class (less than 5% of firm shares are held by insiders) are not likely to be entrenched. Thus, they do have incentives to act on behalf of shareholder interests. At the same time, they should be expected to maintain low risk levels given their incentive to maintain their own job security. The incentives to act on behalf of shareholders and to maximize the security of their employment are consistent if risk-taking behavior in this industry tends to result in financial policies which are negative NPV from the perspective of shareholders. For example, Table 8 demonstrates a statistically significant inverse relationship between stock returns and commercial real estate equity holdings (RETA). Insiders within this INSH<5 group maintained the lowest levels of RETA, .010 compared to .014 and .027 for the other two groups. Firms in this group took low risk positions. Passage of FIRREA did not affect the relationship between risk-taking behavior and insider shareholdings of this group in later periods.

Approximately 60% of the thrifts in our 1986-88 sample had insider shareholdings which were between 5% and 25% and were assigned to the INSH5-25 group in Tables 9 through 13. During the period 1986-88, levels of insider shareholdings within this group were directly related to each of our indicators for risk-taking except for RETA (Real Estate to Total Assets). However, the mean level of RETA for this INSH5-25 group was .014, compared to .010 for INSH<5 and .027 for INSH>25. These differences between pairs of means were all statistically significant at the .05 level (and .01 level for INSH>25 against INSH5-25 and INSH>25 against INSH5). Although the relationship between INSH and LOGHL within the INSH5-25 group was direct and statistically significant at the .05 level, its average LOGHL of .559 was not significantly different

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from the average of .577 within the INSH<5 group (Standard two sample t-statistic of 0.69). Its average was, however, statistically significantly different at the .01 level from the average of .656 within the INSH>25 group (t-statistic of 2.74). During the later periods 1989 through 1991, relationships within the INSH<5 group between insider shareholdings and each of the risk-taking indicators except ETA became negative. Thus, thrifts in this INSH5-25 class seemed to be managed quite differently after passage of FIRREA.

During the pre-FIRREA era 1986-88, within the INSH>25 group, direct relationships were indicated between insider shareholdings and real estate (RETA). Interestingly, LOGHL within this group is not significantly related to INSH, though the average, as we reported earlier, is higher than that for the INSH5-25 group. This suggests that the entrenched managers in this group may have derived non-stock benefits from the real estate equity investments of their employers. Firms with higher insider shareholdings within this group maintained higher ETA levels than their counterparts with lower shareholdings. It appears that as insider shareholdings increased, managers within this group did not attempt to increase riskiness of their employers; INSH was not significantly related to LOGHL (actually, it was insignificantly inversely related to LOGHL). Thus, as insider shareholdings increased, thrifts invested more into the equity of commercial real estate, without substantially increasing LOGHL or decreasing ETA. This suggests that non-stock benefits may have been obtained by managers within this class. Relationships between insider shareholdings levels and risk indicators within this class were insignificant during the 1989 through 1991 periods. This might suggest that FIRREA increased the cost of non-stock benefits derived by managers.

We also computed Herfindahl index values (sum of squared proportional shareholdings for institutions filing 13-F forms with the SEC) based on institutional shareholdings concentration. The Herfindahl index is intended to indicate institutional shareholders' willingness to monitor thrifts which they invested in. We found the indices to be inversely related to risk taking behavior, but not

as significantly as INST. Furthermore, the index was not related to thrift returns when INST was included as an independent variable. This suggests that the superior return and risk performance of thrifts with significant institutional shareholdings was not due to their monitoring efforts; institutions may simply have selected investments which would perform better (or, not be "mis-managed"). After controlling for our market indicator of risk (LOGHL), we find in Table 13 that institutional shareholders tended to invest less in thrifts as insiders invested more prior to 1989; this result shifted after passage of FIRREA. Thus, institutions seemed to avoid investing in thrifts with entrenched managers until FIRREA made the cost of perq consumption prohibitively high.

VI. SUMMARY AND CONCLUSIONS

Our study finds evidence that insider shareholdings is correlated with risk-taking behavior in the thrift industry in a manner somewhat consistent with the results obtained by Saunders, Strock and Travlos regarding the commercial bank industry. We also obtain the same conclusion that risk-taking behavior decreases as regulations are tightened. However, our evidence is not entirely consistent with the hypothesis that the motive for increased risk-taking was to increase shareholder wealth by increasing the "option" value of their stock; we find that, thrift risk-taking seems inversely correlated with institutional shareholdings. This should indicate that insider motives regarding risk taking behavior differ from those of institutional shareholders. One possible explanation for these results is that inside shareholders are able to benefit from "perqs" (which might include opportunities to defraud) that their institutional counterparts are not. It may also suggest that institutions are bound by the prudent man rule while insider shareholders are not.

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TABLE 1: BALANCE SHEET SOURCES OF MARKET RETURN VARIABILITY

Multiple Regression Results

Balance Sheet Measure	Coeff.	t-statistic	p-value
Intercept	.1961	1.4718	.1413
Real Estate to Total Assets	7.3526	16.9882**	.0000
Equity to Total Assets	-1.9835	-7.0478**	.0000
Brokered CD's to Total Assets	.0060	2.8027**	.0051
Log Total Assets	0.0381	4.1354**	.0000

Dependent Variable: Log HI-LO Market Price-Ratio (LOGHL); 1986-90
Summary: r-squared: 0.2499; n: 1738; F-statistic: -144.3068;
     d.f. numerator: 4; d.f. denominator: 1733; p-value: 0

Simple Regression Results

Balance Sheet Measure	Coeff.	r-square	t-statistic
Real Estate to Total Assets	7.7027	0.1646	20.0959**
Log Total Assets	0.0863	0.0516	10.5610**
Equity to Total Assets	-3.5963	0.1042	-15.4346**
Brokered CD's to Total Assets	0.0182	0.0352	7.9632**

Dependent Variable: Log HI-LO Market Price Ratio (LOGHL); 1986-90

**significant at the .01 level

TABLE 2. Characteristics of Failed and Solvent Institutions

	FAILED	SOLVENT
Total Number	41	308
Number of Federal Chartered	17	160
Number of State Chartered	24	172
Average Insider Holdings	23.08	10.95
Standard Deviation	19.27	11.35
Average Equity to Total Assets Ratio	3.61	8.40
Standard Deviation	2.09	5.50
Average Real Estate to Total Assets	4.99	1.20
Standard Deviation	4.56	1.72
Average Institutional Holdings	12.55	15.33
Standard Deviation	14.11	15.33
Average Market to Book Value of Equity	93.44	93.48
Standard Deviation	52.79	35.77

Data are given from the most recent financial statements or SEC filings as of June 30, 1987.

TABLE 3. Failed versus Solvent Institutions by State

STATE	SOLVENT	BANKRUPT	RATE	INSIDER SHAREHOLDINGS
AL	4	1	0.20	16.34
AR	0	1	1.00	9.60
AZ	0	3	1.00	39.40
CA	27	6	0.18	15.50
CO	6	1	0.14	17.64
CT	26	0	0.00	5.93
DC	1	0	0.00	2.70
DE	1	0	0.00	2.60
FL	26	4	0.13	18.67
GA	6	1	0.14	18.27
HI	2	0	0.00	4.70
ID	1	0	0.00	17.40
IL	5	1	0.17	16.15
IN	5	0	0.00	14.14
KS	2	0	0.00	20.95
KY	1	0	0.00	30.00
MA	43	1	0.02	6.65
MD	6	1	0.14	14.46
ME	3	0	0.00	4.77
MI	9	0	0.00	16.27
MN	2	0	0.00	11.20
MO	4	0	0.00	12.20
MS	1	0	0.00	18.80
MT	3	0	0.00	13.23
NC	7	2	0.22	23.50
ND	1	0	0.00	12.70
NE	2	1	0.33	7.27
NH	10	0	0.00	7.86
NJ	11	1	0.08	6.75
NM	0	1	1.00	44.10
NV	2	0	0.00	7.95
NY	21	0	0.00	3.62
OH	5	1	0.17	14.47
OK	1	2	0.67	19.53
OR	2	1	0.33	6.93
PA	15	2	0.12	9.38
PR	4	0	0.00	20.88
RI	2	0	0.00	5.20
SC	5	0	0.00	11.40
TN	3	1	0.25	8.83
TX	1	4	0.80	25.32
UT	2	0	0.00	8.00
VA	10	4	0.29	18.90
VT	3	0	0.00	10.00
WA	12	0	0.00	10.10
WI	5	0	0.00	12.80
WV	0	1	1.00	25.80

TABLE 4: OLS REGRESSIONS OF THE MARKET RISK PROXY (LOGHL) ON INSIDER SHAREHOLDINGS (INSH)

INSH As Independent Variable				
Year	Coefficient	t-stat	r^2	Observations
1986-90	0.0002	0.1889	0.0000	2047
1986-88	0.0024	2.5339*	0.0065	985
1989	0.0002	0.1195	0	372
1990	-0.0072	-3.5028**	0.0175	690

* significant at the .05 level
**significant at the .01 level

TABLE 5: OLS REGRESSIONS OF BALANCE SHEET RISK PROXIES ON INSIDER SHAREHOLDINGS (INSH)

Panel A: RETA as Dependent Variable				
Year	Coefficient	t-statistic	r^2	Observations
1986-91	0.0002	5.1304**	0.0127	2047
1986-88	0.0005	8.1847**	0.0638	975
1989	0.0001	1.1313	0.0046	372
1990-91	-0.0002	-2.2860*	0.0075	690

Panel B: ETA as Dependent Variable				
Year	Coefficient	t-statistic	r^2	Observations
1986-91	-0.0009	-10.8595**	0.0545	2047
1986-88	-0.0011	-9.0981**	0.0777	985
1989	-0.0009	-4.9541**	0.0622	372
1990-91	-0.0004	-2.9305**	0.0123	690

Panel C: BRCD as Dependent Variable				
Year	Coefficient	t-statistic	r^2	Observations
1986-91	0.0369	3.5350**	0.0072	1734
1986-88	0.1114	6.2656**	0.0554	672
1989	0.0203	0.7769	0.0016	372
1990-91	-0.0003	-0.0310	0	690

* significant at the .05 level
**significant at the .01 level

TABLE 6: OLS REGRESSIONS OF THE MARKET RISK PROXY (LOGHL)
ON INSTITUTIONAL SHAREHOLDINGS

INST As Independent Variable				
Year	Coefficient	t-stat	r^2	Observations
1986-90	-0.0020	-3.0395**	0.0045	2049
1986-88	-0.0001	-0.1112	0	987
1989	-0.0015	-1.1859	0.0038	372
1990	-0.0045	-2.9911**	0.0128	690

** significant at the .01 level

TABLE 7: OLS REGRESSIONS OF BALANCE SHEET RISK PROXIES
ON INSTITUTIONAL SHAREHOLDINGS (INST)

Panel A: RETA as Dependent Variable				
Year	Coefficient	t-statistic	r^2	Observations
1986-91	-0.0002	-5.2522**	0.0133	2049
1986-88	-0.0002	-3.2045**	0.0103	987
1989	-0.0001	-1.0238	0.0028	372
1990-91	-0.0003	-4.0717**	0.0235	690
Panel B: ETA as Dependent Variable				
Year	Coefficient	t-statistic	r^2	Observations
1986-91	0.0003	4.3991**	0.0094	2049
1986-88	0.0002	2.1866**	0.0099	987
1989	0.0003	2.0340*	0.0111	372
1990-91	0.0003	3.6054**	0.0185	690
Panel C: BRCD as Dependent Variable				
Year	Coefficient	t-statistic	r^2	Observations
1986-91	0.0259	3.4429**	0.0068	1736
1986-88	0.0526	4.0434**	0.0238	674
1989	0.0171	0.9299**	0.0023	372
1990-91	-0.0003	-0.0310	0	690

* significant at the .05 level
**significant at the .01 level

TABLE 8: FACTORS AFFECTING ANNUAL STOCK RETURNS

Balance Sheet Measure	Multiple Regression Results: 1986-88		
	Coeff.	t-statistic	p-value
Intercept	.6767	3.3149**	.0010
Real Estate to Total Assets	-2.7392	-4.9969**	.0000
Log Total Assets	-.0529	-3.6514**	.0003
Equity to Total Assets	.0656	.1837	.8543
Insider Shareholdings	.0013	1.0721	.2840
Institutional Shareholdings	.0030	2.9206**	.0036
Brokered CD's to Total Assets	-.0024	-.9511	.3419

Dependent Variable: Annual Stock Returns (RET): 1986-88
Summary: r-squared: .0947; n: 670; F-statistic: 11.5612;
      d.f. numerator: 6; d.f. denominator: 663; p-value: 0

Balance Sheet Measure	Multiple Regression Results: 1989		
	Coeff.	t-statistic	p-value
Intercept	.9076	2.6551**	.0083
Real Estate to Total Assets	-4.3013	-3.8279**	.0002
Log Total Assets	-.0709	-2.9209**	.0037
Equity to Total Assets	-.5363	-.8672	.3864
Insider Shareholdings	.0032	1.7714	.0773
Institutional Shareholdings	.0055	3.4810**	.0006
Brokered CD's to Total Assets	-.0077	-2.1557*	.0318

Dependent Variable: Annual Stock Returns (RET): 1989
Summary: r-squared: .1287; n: 372; F-statistic: 8.9865;
      d.f. numerator: 6; d.f. denominator: 365; p-value: 0

Balance Sheet Measure	Multiple Regression Results: 1990		
	Coeff.	t-statistic	p-value
Intercept	.0842	.3710	.0083
Real Estate to Total Assets	-3.6472	-7.0911**	.0002
Log Total Assets	-.0449	-2.8401**	.0037
Equity to Total Assets	1.6496	3.9920**	.3864
Insider Shareholdings	.0032	2.5646*	.0773
Institutional Shareholdings	.0024	2.0563*	.0006
Brokered CD's to Total Assets	-.0046	-1.6379	.0318

Dependent Variable: Annual Stock Returns (RET): 1990
Summary: r-squared: .3455; n: 341; F-statistic: 29.3852
      d.f. numerator: 6; d.f. denominator: 334; p-value: 0

* Significant at the .05 level
** Significant at the .01 level

TABLE 9: PIECEWISE OLS REGRESSIONS OF REAL ESTATE TO TOTAL ASSETS (RETA) ON INSIDER SHAREHOLDINGS (INSH)

RETA as Dependent Variable for each of three periods						
1986-88: Multiple r^2=.13; N=1189; F-statistic=28.7 on 6 and 1182 d.f.; p-value=0						
1989: Multiple r^2=.06; N=397; F-statistic=4.36 on 6 and 390 d.f.; p-value=0						
1990: Multiple r^2=.05; N=359; F-statistic=3.58 on 6 and 352 d.f.; p-value=0						

Variable	Coef. 1986-88	Coef. 1989	Coef. 1990	t-stat. 1986-88	t-stat. 1989	t-stat. 1990
INTERCEPT	-.0562	-.0448	-.0291	-6.2992	-3.0301	-1.2603
LOGTA	.0049	.0043	.0039	7.9692	4.6237	2.7129
INST	-.0002	-.0002	-.0003	-2.4432	-1.8145	-2.5903
DUMMY CONTROL	.0066	.0046	.0074	2.9341	1.4286	1.5654
INSH<5	.0005	-.0001	.0009	.7396	.5211	.4704
INSH5-25	.0001	-.0001	-.0006	.8848	-.6958	-2.1400
INSH>25	.0006	.0001	-.0001	5.1752	.3593	-.4189

TABLE 10: PIECEWISE OLS REGRESSIONS OF EQUITY TO TOTAL ASSETS (ETA) ON INSIDER SHAREHOLDINGS (INSH)

ETA as Dependent Variable for each of three periods						
1986-88: Multiple r^2=.20; N=1189; F-statistic=49.7 on 6 and 1182 d.f.; p-value=0						
1989: Multiple r^2=.42; N=397; F-statistic=47.5 on 6 and 390 d.f.; p-value=0						
1990: Multiple r^2=.37; N=359; F-statistic=35.8 on 6 and 352 d.f.; p-value=0						

Variable	Coef. 1986-88	Coef. 1989	Coef. 1990	t-stat. 1986-88	t-stat. 1989	t-stat. 1990
INTERCEPT	.3317	.4133	.3751	20.195	16.334	13.287
LOGTA	-.0181	-.0248	-.0233	-15.882	-15.467	-13.140
INST	.0006	.0008	.0011	4.911	5.444	7.019
DUMMY CONTROL	-.0103	-.0115	-.0046	-2.486	-2.102	-.800
INSH<5	-.0020	-.0006	.0006	-1.516	-.2515	.243
INSH5-25	-.0008	-.0012	-.0008	-3.242	-3.581	-2.143
INSH>25	.0004	.0001	-.0003	1.910	.313	-.926

TABLE 11: PIECEWISE OLS REGRESSIONS OF BROKERED CD'S TO TOTAL
ASSETS (BRCD) ON INSIDER SHAREHOLDINGS (INSH)

BRCD as Dependent Variable for each of three periods 1986-88: Multiple r^2=.24; N=670; F-statistic=35.7 on 6 and 663 d.f.; p-value=0 1989: Multiple r^2=.10; N=372; F-statistic=7.1 on 6 and 365 d.f.; p-value=0 1990: Multiple r^2=.05; N=341; F-statistic=3.3 on 6 and 334 d.f.; p-value=.003						
Variable	Coef. 1986-88	Coef. 1989	Coef. 1990	t-stat. 1986-88	t-stat. 1989	t-stat. 1990
INTERCEPT	-23.438	-24.04	-14.86	-9.3859	-5.2505	-3.4200
LOGTA	1.7373	1.839	1.127	10.1629	6.3235	4.1975
INST	.0077	-.042	-.045	.4360	-1.5682	-1.8686
DUMMY CONTROL	.3942	-.217	-.031	.6413	-.2182	-.0358
INSH<5	.3154	.452	.468	1.5180	1.1038	1.3008
INSH5-25	.0895	.061	-.017	2.2883	1.0316	-.3297
INSH>25	.1496	-.026	.002	4.1333	-.5202	.0504

TABLE 12: PIECEWISE OLS REGRESSIONS OF LOG HI-LO (LOGHL)
ON INSIDER SHAREHOLDINGS (INSH)

LOGHL as Dependent Variable for each of three periods 1986-88: Multiple r^2=.09; N=983; F-statistic=16.9 on 6 and 976 d.f.; p-value=0 1989: Multiple r^2=.14; N=372; F-statistic=10.3 on 6 and 365 d.f.; p-value=0 1990: Multiple r^2=.22; N=341; F-statistic=15.9 on 6 and 334 d.f.; p-value=0						
Variable	Coef. 1986-88	Coef. 1989	Coef. 1990	t-stat. 1986-88	t-stat. 1989	t-stat. 1990
INTERCEPT	-.6613	-.9783	-2.151	-4.6238	-3.2036	-3.6488
LOGTA	.0951	.1300	.2544	9.5500	6.6987	6.9821
INST	-.0045	-.0080	-.0176	-4.3174	-4.3838	-5.2947
DUMMY CONTROL	-.0393	-.0023	.0905	-1.0882	-.0340	.7683
INSH<5	.0049	.0157	.0450	.4258	.5734	.9212
INSH5-25	.0048	-.0091	-.0298	2.1175	-2.2686	-4.0433
INSH>25	-.0018	.0063	.0055	-.9089	1.8128	.8587

TABLE 13: PIECEWISE OLS REGRESSIONS OF INSTITUTIONAL SHAREHOLDINGS (INST) ON LOGTA, INSIDER SHAREHOLDINGS (INSH) AND LOGHL

INST as Dependent Variable for each of three periods 1986-88: Multiple $r^2=.39$; N=983; F-statistic=127.4 on 5 and 977 d.f.; p-value=0 1989: Multiple $r^2=.44$; N=372; F-statistic=57.3 on 5 and 366 d.f.; p-value=0 1990: Multiple $r^2=.42$; N=341; F-statistic=47.9 on 5 and 335 d.f.; p-value=0						
Variable	Coef. 1986-88	Coef. 1989	Coef. 1990	t-stat. 1986-88	t-stat. 1989	t-stat. 1990
INTERCEPT	-48.134	-45.74	-74.20	-9.8239	-4.6595	-7.4123
LOGTA	5.8732	6.4528	6.8327	18.1255	10.7838	11.3074
LOGHL	-5.0275	-8.9349	-6.3798	-4.4070	-5.2798	-6.7895
INSH<5	-2.0551	-2.6875	1.9084	-5.0411	-2.9751	2.1434
INSH5-25	-0.3592	-0.6549	-0.5911	-5.0381	-5.6116	-5.1256
INSH>25	-5.0275	0.1197	-0.0485	-2.8276	1.0334	-0.4136

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