Organizational form and risk taking in the savings and loan industry

Benjamin C. Esty

Harvard Business School, Harvard University, Boston, MA 02163, USA

(Received October 1993; final version received May 1996)

Abstract

I hypothesize that risk taking is greater in stock thrifts than in mutual thrifts because the residual and fixed claims are separable. I find that stock thrifts exhibit greater profit variability during the 1982-86 period and that conversions from mutual to stock ownership are associated with increased investment in risky assets and increased profit variability. These findings illustrate the relation between the structure of residual claims, incentives, and firm performance as well as the unintended consequences resulting from changes in thrift regulations.

Key words: Organizational form; Residual claims; Agency; Debt; Savings and loan

JEL classification: G32; G21; L22

1. Introduction

Both stock and mutual firms exist in the savings and loan (S&L), or thrift, industry. Prior to the 1980s, few S&L regulators believed that organizational form was an important determinant of firm performance. In testimony before
Congress on the issue of S&L conversions, the Commissioner of the Texas Department of Savings and Loans said (U.S. Senate, 5/13/76, p. 107):

If the studies of the [Federal Home Loan Bank] Board... stand for anything, it is that the form of corporate ownership is not a significant consideration in evaluating the performance of an S&L association.

By the early 1980s, however, regulators argued that organizational form affects firm performance, particularly with regard to risk taking (Federal Home Loan Bank Board, 1983, pp. 55–56):

... investors who hold stock in a business firm have motivations and reactions similar to those of debtholders. However, shareholder losses in bankruptcy are greater, thus their reaction to risk-taking is more acute (than debtholders)... Thus one means of instilling more market discipline to control risk-taking is to encourage the conversion of mutual associations to the stock form... (emphasis added)

Based on these beliefs, the regulators encouraged mutual-to-stock conversions and removed restrictions against stock ownership for federally chartered thrifts. Although the regulators' view had changed, they completely misunderstood the incentive effects of leverage. I argue that stock thrifts are more, not less, likely to adopt high-risk financial strategies because their residual claims are leveraged and separable from their fixed claims. The payoffs to leveraged equity resemble a call option whose value can be increased by increasing the volatility of firm value, a phenomenon known as risk shifting. Financial institutions can increase the volatility of their firm value by investing in assets with volatile cash flows or by mismatching the duration of assets and liabilities, which increases the sensitivity of cash flows to interest rate movements. Flannery and James (1984) show that equity returns are a function of interest rate movements and that interest-rate sensitivity is related to the maturity mismatch between assets and liabilities for banks and thrifts. Strategies that increase firm volatility transfer value from the fixed claims to the residual claims.

The incentive to adopt a risky financial strategy, however, depends on whether the fixed and residual claims are separable. When the claims are not separable, as in mutual thrifts, increasing risk will not affect total wealth because the gain on the residual claim is offset by the loss on the fixed claim. Because only stock thrifts have separable claims, where value transfers are possible, I hypothesize that risk taking is greater in stock thrifts and should increase following the conversion from mutual to stock ownership.

---

1The Federal Home Loan Bank Board (FHLBB) was the regulator of federally chartered S&Ls.
Thrifts, and stock thrifts in particular, could not have implemented risky financial strategies without a decrease in monitoring by fixed claimants and an expansion of asset and liability powers. In fact, regulatory changes during the 1980s actually facilitated risk shifting. For example, thrift managers used the expanded asset powers granted by the Money Control Act of 1980 and the Garn–St Germain Act of 1982 to increase firm volatility rather than to decrease their interest sensitivity. The inherent liquidity of financial assets allowed managers to increase volatility quickly and at relatively low cost. Thus regulatory changes not only encouraged stock ownership, but also gave thrifts the ability to implement high-risk financial strategies.

I test for a relation between organizational form and risk taking between 1982 and 1988 by analyzing two measures of profit variability that serve as proxies for the volatility of firm value. The standard deviation of cumulative return on assets, a cross-sectional measure of profit variability, is five times larger for stock thrifts than for mutual thrifts. The standard deviation of quarterly return on assets, a time-series measure of profit variability, is two times larger for stock thrifts. Perhaps the strongest evidence of risk taking comes from the converting thrifts. Following conversion from mutual to stock ownership, these thrifts invest proportionally more in risky assets and exhibit greater profit variability. I conclude that organizational form influences the amount of risk taking by savings and loan associations.

Many authors, notably Barth (1991), Brumbaugh (1988), Kane (1989), Kormendi et al. (1989), and White (1991), have analyzed risk taking in the S&L industry, but they have focused on the effects of leverage rather than organizational form. Only recently have studies such as Benston et al. (1992) and Cordell et al. (1993) begun to analyze the role of organizational form.

This paper differs from the more recent work in four ways. First, I measure risk taking in terms of profit variability under the assumption that it is correlated with the volatility of firm value. Other researchers, such as Cordell et al. (1993) and Benston et al. (1992), examine balance sheet composition and assume it is correlated with the volatility of firm value. Second, I analyze the performance of converting thrifts to link changes in risk taking with changes in organizational form. Third, I correct for survivorship bias, which is especially critical in an industry in which nearly 15% of the firms failed during the observation period. Finally, I test whether the presence or creation of stock thrifts can be explained by measures of local economic risk and find no evidence that it is. Rather than choosing the stock organizational form to take advantage of local opportunities for risk shifting, it appears that stock thrift managers engaged in risk shifting regardless of location.

A related case study (Esty, 1997) describes how the managers of one stock thrift adopted a high-risk financial strategy, while the managers of a nearby mutual thrift did not. That example illustrates a case in which high-risk financial
strategies were less a function of local risk-taking opportunities, which existed in all regions, and more a function of organizational form and managerial intent. This paper expands on that study to increase our understanding of what happened in the thrift industry during the 1980s and to provide empirical evidence on the relation between organizational form, residual claims, incentives, and firm performance.

2. Comparison of residual claims

If deposits are debt claims, then a typical thrift has a debt-to-equity ratio of approximately 20 to 1. Black and Scholes (1973) show that the payoffs to leveraged equity resemble a call option on the firm's assets. The value of the option is a function of firm volatility. Assuming firm value is constant, increasing firm volatility transfers value from debt to equity thereby creating an incentive conflict between the fixed and residual claimants with regard to risk. This phenomenon, known as risk shifting, is more severe in stock than in mutual thrifts for three reasons.

First, the ability to benefit from risk shifting depends on whether the claims are separable. In a mutual thrift, the claims are not separable. Depositors are fixed claimants who ostensibly own a pro rata share of residual profits even though, as O'Hara (1981) argues, they have poorly defined property rights. As risk increases, the increase in the residual claim's value is offset by a decrease in the fixed claim's value. In contrast, when the claims are separable, as they are in stock thrifts, the residual claimants do not experience the concomitant loss in value on the fixed claim. Because the residual claimants in a stock thrift experience equal or greater gains from increases in risk, they have greater incentive to engage in risk shifting even in a system with fixed-price deposit insurance, provided there are some uninsured debtholders in a mutual thrift or the residual claimants in a stock thrift do not hold all of the uninsured debt.

Second, separability allows stock thrifts to sell additional equity to absorb operating losses resulting from risky investments. By issuing equity, residual claimants can extend the maturity of the call option they hold on the firm's assets, thereby increasing its value. The only way mutual thrifts can raise equity, and therefore prevent regulatory closure or default, is through internally generated cash flow.

Finally, the combination of leverage and nonseparability of claims results in diffusion of ownership and managerial control in mutual thrifts. Depositors

\(^2\)Merton (1977) models deposit insurance as a put option and interprets the option's maturity date as the date of the regulator's next examination at which time they could close a thrift.
have little incentive to monitor firm performance because deposit insurance limits losses and the inability to sell residual claims limits gains. As a result, managers set financial strategy. And because their compensation resembles a fixed claim—receiving a salary is like receiving coupon payments on debt—they have no incentive to engage in risk shifting as long as their firms are solvent. Thus, mutual ownership intensifies the owner/manager conflict, but minimizes the fixed/residual claimant conflict. In contrast, the combination of leverage and separability facilitates the concentration of ownership and control in stock thrifts. While high inside ownership minimizes the owner/manager conflict, it exacerbates the fixed/residual claimant conflict because the managers now participate in the benefits of risk shifting. In fact, Esty (1993) finds that risk taking is positively related to inside ownership for stock thrifts; Saunders, Strock, and Travlos (1990) find the same is true for banks.

Although the regulators understood the owner/manager conflict and its effect on firm value, they did not understand the fixed/residual claimant conflict or its effect on firm value (FHLBB, 1983, pp. 55–56):

... managerial self-discipline is present in both mutual and stock associations, but the discipline may be better defined in stock associations because of equity ownership by management ... (as a result) managers discipline themselves against excessive risk taking because of their vested interest in preserving their jobs and the value of any stock options they may own .... Thus stock associations provide a wider array of incentives for effective management and the avoidance of risk. (emphasis added)

Based on this set of beliefs, Congress and the regulators made several policy changes to promote stock ownership. For example, Congress passed the Garn–St Germain Act of 1982, which legalized stock ownership and mutual-to-stock conversions for federally chartered thrifts. Prior to 1982, federally chartered thrifts were not permitted stock ownership. In addition, the regulators encouraged insider ownership by increasing the amount of stock that insiders could buy during conversions and by reducing the minimum number of shareholders from 400 to one.

These changes led to the creation and growth of a new breed of institutions with vastly different incentive structures from those of the traditional mutual thrift. Between 1979 and 1988, the percentage of industry assets in stock thrifts increased from 25% to 74%. This transformation to stock ownership and insider control increased the probability that risk shifting would occur. As the incentives for risk shifting grew stronger, only discipline by the fixed claimants would prevent it from happening.
3. Increased ability to take risks

Thrifts’ fixed claimants fall into two broad categories: insured depositors and uninsured debtholders, neither of which exert much influence on the selection of financial strategies. Insured depositors held claims worth 74% of industry assets in 1982, but because their claims were fully insured by the Federal Savings and Loan Insurance Corporation (FSLIC), they had no incentive to monitor. Similarly, the various uninsured debtholders, including the Federal Home Loan Banks (FHLBs), uninsured depositors, and subordinated debtholders, had little incentive to monitor. The FHLBs made short-term, fully collateralized loans (called FHLB advances) worth approximately $150 billion in 1982, or about 14% of assets. Their overcollateralized position provided sufficient protection from losses and eliminated the need for monitoring. In fact, despite the enormous losses to the deposit insurance fund in recent years, the FHLBs have never experienced a loss on an advance. Uninsured depositors could have been an important countervailing force, but they held a small proportion of total claims (9% of assets) and were the fact insured because FSLIC provided coverage for all deposits through most of the 1980s. Even before the Money Control Act of 1980 raised the deposit insurance limit from $40,000 to $100,000, uninsured deposits were only 5.4% of total industry assets. Goldberg and Hudgins (1993) find that troubled thrifts could easily replace uninsured deposits with insured deposits by offering higher rates. The final type of uninsured debtholder, subordinated debtholders, held only a tiny fraction of industry assets: only nine thrifts had subordinated debt in 1982. Thus none of these claimants provided effective discipline against risk taking.

Deposit insurance made the government the largest fixed claimant. The FSLIC and state regulatory agencies delegated day-to-day regulation to the Federal Home Loan Bank Board (FHLBB), even though the FSLIC was ultimately responsible for any losses.3 To limit risk taking, the FHLBB restricted asset and liability powers, set minimum net worth requirements, and enforced these regulations with supervision. During the 1980s, however, Congress and the regulators removed many of the restrictions and reduced the level of supervision (see Barth, 1991, or Kane, 1989, for a more complete description).

The policy changes began with the passage of the Money Control Act of 1980 and the Garn-St Germain Act of 1982, which together expanded thrifts’ funding and investment powers. Thrifts regained the ability to compete for deposits

3 There is an interesting agency conflict associated with this delegation of responsibilities. The FHLBB is responsible for monitoring and supervision, yet is not responsible for paying off depositors if an institution fails. As a creditor, the FHLBs have never suffered a loss; as a monitor, thrifts under its supervision have lost $130 billion.
based on price and to invest in a broader array of assets. After 1982, thrifts could invest up to 55% of their assets in commercial loans, including unsecured commercial loans and leases, and could make direct investments in real estate (essentially, equity investments), none of which had been permitted before 1980. Although the architects of deregulation hoped thrifts would use these new powers to rebalance their portfolios to minimize interest-rate risk, the new powers could easily be used to increase asset risk.

Esty (1997), for example, shows how one thrift grew from $17 million to $154 million in assets in only two years. Rather than investing in one-to-four-family residential mortgages, the managers invested in commercial loans, development loans, and development projects, all of which increased the volatility of firm value. Because of the liquidity inherent in financial assets, the managers were able to restructure the balance sheet quickly at very low cost.

At the same time that the regulators were expanding asset powers, they lowered the regulatory capital requirement from 5% to 3% and moved the industry from Generally Accepted Accounting Principles (GAAP) to Regulatory Accounting Principles (RAP). Both changes allowed thrifts to operate with even greater leverage. RAP affected leverage by expanding the definition of net worth. The FHLBB allowed many thrifts with positive RAP net worth to remain open even though they had negative GAAP net worth.

As the opportunities for risk shifting increased, there was a net reduction in the number of FHLB examiners. The ratio of assets per examiner doubled from 1979 to 1985 as the number of examiners fell (see Kane, 1989, p. 101; Strunk and Case, 1988, p. 139). Wang, Sauerhaft, and Edwards (1987) note that hundreds of thrifts were never examined between 1984 and 1986, permitting them to pursue high-risk financial strategies with relative impunity.

Despite the absence of monitoring by the regulators and the various fixed claimants, there was the possibility that other sources of discipline such as managerial labor markets might constrain risk taking. Cannella, Fuerer, and Lee (1995) provide evidence that labor markets penalized managers of failed banks. But such discipline was probably less effective in the S&L industry. Whereas only 7% of banks failed between 1986 and 1991, almost one-third of S&Ls failed, and more than 75% were unprofitable during the early 1980s. Because such a large fraction of the thrift industry was either losing money or failing, firm performance was a less informative signal of managerial quality.

In summary, the policy changes in the early 1980s had two interrelated effects on the thrift industry. Changes in ownership regulations created more stock thrifts while deregulation expanded thrifts’ asset and liability powers. The former gave thrifts the incentive to take risks, the latter, combined with lax monitoring by fixed claimants, gave them the ability to take risks. An unintended, but not predictable, consequence of these changes was a dramatic increase in risk taking by thrifts.
4. Empirical analysis

I test the hypothesis that stock thrifts exhibit greater risk taking than mutual thrifts by regressing two risk measures on organizational form and a number of control variables. I also test whether conversions from mutual to stock ownership lead to increases in risk. In both sets of tests, I use a regression specification that treats organizational form as an exogenous variable. To check this assumption, I also test whether the choice of organizational form is a function of opportunities for risk taking. Despite some weaknesses in each of these tests together, together they provide a consistent set of results showing that organizational form is an important determinant of risk taking.

The data used in this analysis come from the FHLBB’s Thrift Financial Reports, which are mandatory quarterly reports containing balance sheet, income statement, and supplementary information (for a more complete description of the data sources and data set, see the Appendix). The sample period begins in 1982, the year Congress expanded thrifts’ investment powers, and ends in 1988, the year the regulators began closing thrifts in large numbers. Because I measure risk taking over the entire period, the sample includes only thrifts that survived until 1988. Extending the study beyond 1988 would have reduced the number of observations significantly. Nevertheless, I still lose 13.4% of the sample because of failure by 1988. For this reason, I use Heckman’s (1979) two-stage regression procedure, described below, to correct for survivorship bias. At the same time, I exclude thrifts created between 1983 and 1988. According to Cordell et al. (1993), 99% of these thrifts were stock-owned and so I assume they would have performed as did other stock thrifts in the sample.

4.1. Cross-sectional and time-series risk measures

Although a market-based risk measure such as the variance of stock returns is preferable, mutual thrifts do not have traded equity. Instead, I use two measures of profit variability (one cross-sectional and one time-series) as proxies for the variability of firm value. Esty and Baldwin (1993) create a risk measure based on the cross-sectional distribution of return on assets which I use in this paper. For each thrift, I calculate its adjusted cumulative return on assets to approximate the income portion of total returns to 1982 residual claimants. I compute cumulative net income as the difference between 1982 and 1988 retained earnings plus dividends paid between 1983 and 1988. Because this measure is based on net income, it incorporates the effects of both financing and investment. Thus it captures not only asset risk, but also portfolio risk resulting from asset/liability mismatches. To adjust for equity infusions, I calculate a capital-adjustment factor equal to the ratio of capital stock (including paid-in capital) in 1982 to capital stock in 1988. For the adjusted cumulative net income due to 1982 residual claimants, I multiply cumulative net income by the capital-adjustment
factor. Finally, I divide by total 1982 assets to normalize the data. I cannot normalize by total equity because many thrifts had either small amounts of equity (which would produce enormous returns) or negative equity. The measure is thus defined as:

\[
\text{Adjusted Cumulative Return on Assets} = \frac{[\text{Cumulative Net Income}] \cdot [\text{Capital-Adjustment Factor}]}{1982 \text{ Assets}}
\]

where

\[
\text{Cumulative Net Income} = 1988 \text{ Retained Earnings} + 1983-88 \text{ Dividends} - 1982 \text{ Retained Earnings}
\]

and

\[
\text{Capital-Adjustment Factor} = \frac{[1982 \text{ Stock} + \text{Paid-in Capital}]}{[1988 \text{ Stock} + \text{Paid-in Capital}]}.
\]

I then aggregate all of the observations into subgroups based on organizational form. The problem with defining organizational form is that 494 thrifts converted from mutual to stock ownership during the sample period (no thrifts voluntarily converted from stock to mutual ownership). Because converting thrifts exist under both forms of ownership during the sample period, I classify them as a distinct subgroup.

Under the assumption of identically distributed observations, the cross-sectional distribution of ex post returns will converge to the true underlying ex ante distribution as the number of thrifts in the sample becomes large. I assume that a larger variance for the ex post distribution signifies greater risk and predict that stock thrifts will exhibit greater risk than converting thrifts which, in turn, will exhibit greater risk than the mutual thrifts.

Fig. 1 shows the cross-sectional distribution of cumulative returns for 1,572 mutual thrifts, 494 converting thrifts, and 451 stock thrifts. Whereas the distribution for the mutual thrifts has a positive mean of 3.3% and a relatively low standard deviation of 8.3%, the distribution for the stock thrifts has a negative mean of -10.2% and a standard deviation more of 46.5%. As expected, the converting thrifts' standard deviation of 26.7% is between the other two standard deviations. Both the converting and stock thrifts' variances are significantly different from the mutual thrifts' variance at the 1% level using both parametric and nonparametric tests.

Visually, these distributions show that higher risk reflects a higher probability of extreme outcomes. For example, the probability that the absolute value of the cumulative return on assets is greater than 15% is 21.1% for stock thrifts and only 2.2% for mutual thrifts. Moreover, there is a greater percentage of stock
Fig. 1. Adjusted cumulative return on 1982 assets.

These figures show the distribution of the adjusted cumulative return on assets by organizational form (a cross-sectional measure of profit variability). The adjusted cumulative return equals total 1982 net income plus dividends adjusted for capital infusions to get the income portion of total returns due to 1982 residual claimants. The adjusted cumulative returns are scaled by 1982 total assets. The dark vertical line in each figure shows 0% return.
Fig. 2. Standard deviation of quarterly total return on average assets.

These figures show the distribution of time-series profit variability by organizational form. Time-series profit variability is defined as the standard deviation of quarterly total return on average assets measured over 20 quarters from 1984 to 1988. Total return is defined as total income before interest or operating expenses. Converting mutual thrifts includes all mutual-to-stock conversions over the period from 1982 to 1988.

 thrifts in both the left and right tails of the distribution. This finding indicates that some stock thrifts gambled and won even though a larger percentage ended up with negative outcomes.
The second risk measure is time-series profit variability which is defined as the standard deviation of return on average assets over 20 quarters from 1984 to 1988. Return is defined as the firm's total income before interest or operating expenses. The reason for using total income rather than net income is that leverage affects the variability of net income: for a given stream of profits, net income variability increases with leverage. This analysis begins in 1984 rather than 1982 because quarterly data were not available until 1984. I also analyze the return on end-of-quarter assets, which for growing thrifts will reduce the variance of the return on assets, and get similar results.

The distributions of time-series profit variability appear in Fig. 2. The mean standard deviation of quarterly returns is 1.1% for mutual thrifts, compared to 2.2% for stock thrifts. The difference is significant at the 1% level. The mean standard deviation for the converting thrifts is 1.3% and it, too, is significantly different from the mean for the mutual thrifts at the 1% level. Like the cross-sectional risk measure, the time-series risk measure shows that stock thrifts exhibit significantly more profit variability.

4.2. Explaining risk taking as a function of organizational form

Other factors such as leverage, age, or location can explain the differences between the distributions in Figs. 1 and 2. To control for these other effects on risk, I estimate cross-sectional regressions using several control variables. In particular, I estimate Heckman's (1979) two-stage regression, where the first stage is a probit regression on failure using all thrifts and the second stage is an ordinary least squares (OLS) regression on profit variability using only the surviving thrifts. I use this two-stage procedure to correct for survivorship bias resulting from the high failure rate. The purpose of the first stage is to produce a new independent variable called the inverse Mills ratio which, when included in the OLS regression on the censored sample, will produce consistent and efficient parameter estimates. It will also indicate, through its significance, the importance of selection bias in the sample.

The independent variables in both stages include organizational-form dummy variables, leverage, and control variables. In addition to the three organizational form subgroups - mutual, converting mutual, and stock thrifts - I also classify the Texas stock thrifts as a distinct subgroup because of their extreme performance over the period. Texas stock thrifts failed at three times the rate of other thrifts in the country over the 1983-88 period (42.4% versus 13.4%) and accounted for a disproportionate share of resolution costs. If stock thrifts

Barth (1991) shows that Texas had the highest failure rate of any state with more than six thrifts in existence as of 1980 and accounted for 52% of all estimated resolution costs over the 1980-88 period. Texas's estimated resolution costs ($21.9 billion) were more than three times that of the next state (California with $6.7 billion).
exhibit greater risk, then the coefficients on the converting mutual, stock, and Texas stock dummy variables should be positive.

The next variable, leverage, is important to include because of its effect on risk taking, although it is difficult to measure. According to contingent claims theory, risk taking is positively correlated with leverage (negatively correlated with net worth), with leverage measured in market value terms. But in a regulated industry, with minimum net worth requirements and closure policy based on book values, risk shifting is also a function of regulatory policy. (Prior to the passage of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989, the regulators did not have legal authority to seize thrifts with positive RAP net worth.) As a result, a thrift manager might have the incentive to gamble if either the book value or market value of net worth were low. This raises the question of whether to use market or book values to measure leverage. Kane and Yu (1992) develop a system for approximating market values based on accounting data. Although the resulting net worth measures are more accurate than book value measures in predicting failure, it is not clear how close these alternative measures are to true market values or what biases are introduced through their method. Instead, I use book values since mutual thrifts do not have traded equity.

One measure of book equity is RAP net worth. More conservative measures, in that they exclude items counted as net worth under RAP accounting, would be either GAAP net worth or tangible net worth. I use the most conservative measure, tangible net worth, averaged over three years from 1982-84, although the results using GAAP net worth are virtually the same and those using RAP are similar yet less significant because RAP introduces more noise into the definition of net worth. Tangible net worth equals GAAP net worth less goodwill and other intangible items. According to Barth, Page, and Brumbaugh (1992), tangible net worth has the highest correlation with intrinsic value, defined as a thrift's market value minus the value of a put option due to deposit insurance. I also use 1982 net worth instead of the three-year average, with similar results. To the extent that measurement error is correlated with organizational form, the results can be misleading. However, unlike RAP or GAAP net worth, there is no obvious reason that tangible net worth would be correlated with organizational form.

Finally, the regressions contain several control variables to measure other sources of ex ante heterogeneity besides organizational form and leverage:

1) Size (natural logarithm of total 1982 assets). Because larger thrifts are subject to closer regulatory scrutiny and are likely to have had more diversified asset portfolios, the predicted effect on risk is negative.

2) Age (number of years as a FHLBB member). The predicted effect on risk is negative for two reasons. First, younger thrifts had larger cash balances available to invest in the high-risk assets permitted by the 1980 and 1982
deregulatory acts. Second, some thrift managers prefer survival over profit maximization, which can be accomplished by taking suboptimal levels of risk.

3) **Charter** (equal to one for state-chartered thrifts and zero otherwise). Strunk and Case (1988) argue that state regulators granted broader investment powers and provided less oversight than the federal regulators, thereby allowing thrifts to adopt higher-risk strategies. For this reason, the predicted effect on risk is positive.

4) **Location** (49 state dummy variables). I include these variables to control for local economic conditions and for thrifts' investment opportunities. Because certain states, specifically Texas, experienced severe regional economic shocks during the 1980s, thrifts in these areas should exhibit greater risk and therefore positive coefficients. Other states with less risky local economies should have negative coefficients. I report only the Texas coefficient in the tables.

4.2.1. **First stage - Probit regression on failure**

The results from the first stage, the probit regression, appear in regression 1 in Table 1. The dependent variable equals one if the thrift survived to 1988 and zero otherwise. The regression shows that stock thrifts were more likely to fail than mutual thrifts and poorly capitalized thrifts were more likely to fail than well-capitalized thrifts. Although both findings are consistent with theory, they must be interpreted with caution because failure is not necessarily an indication of risk. Not all high-risk thrifts failed. Indeed, some had good outcomes as seen in Fig. 1. At the same time, some low-risk thrifts succumbed due to economic shocks.

There are two coefficients in the probit regression with counterintuitive signs. The coefficient on the converting-thrift dummy variable is positive and significant, indicating that converting thrifts were less likely than mutual thrifts to fail. Because converting thrifts are stock owned for at least part of the period, one might expect the opposite, especially given the negative sign on the coefficient for stock thrifts. However, high-quality mutual thrifts found it easier to convert, and the added equity infusion at conversion decreased the probability of failure, at least in the short run. When I rerun the regression with a dummy variable for 1981-83 conversions (results not shown), I find that the early converting thrifts failed at a significantly higher rate than the mutual thrifts and the later converting thrifts.

The other counterintuitive result is the positive coefficient on the Texas stock thrift dummy variable, given the very high failure rate for stock thrifts overall. However, the true coefficient for the Texas stock thrifts is not the single coefficient on the Texas stock thrift dummy variable, but rather the sum of the coefficients for stock thrifts ( - 0.4511), Texas stock thrifts (0.6060), and Texas
thrifts (−0.8613), which equals −0.7064. Log-likelihood ratio tests show that
Texas stock thrifts had a significantly greater probability of failure than mutual
thrifts or non-Texas stock thrifts, but an insignificantly different probability of
failure from the Texas mutual thrifts. Apparently, the severe economic shocks in
Texas caused both mutual and stock thrifts to fail at equal rates.

4.2.2. Second stage - OLS regression on cross-sectional profit variability:
In the second stage, which is the OLS regression on the subgroup of surviving
thrifts, the dependent variable is profit variability. For a given subgroup of
thrifts, I take the absolute value of the firm-specific deviation from the mean
return for the subgroup. For example, for a mutual thrift with an adjusted
cumulative return on assets equal to 5%, the dependent variable would be equal
to 1.66% because 3.34% is the mean return for the mutual thrifts.

The results appear in regression 2 in Table 1. The coefficient on the inverse
Mills ratio is not significant, which indicates that sample selection bias does not
have a significant effect on this regression, a somewhat surprising result. Never-
theless, I include it in the regression because it does have some effect. The
coefficients on the converting, stock, and Texas stock dummy variables are all
positive and significant at the 1% level, consistent with stock thrifts exhibiting
greater risk than mutual thrifts. The significant positive coefficient on the Texas
stock dummy variables indicates that Texas stock thrifts were riskier than Texas
mutual thrifts even if they did not fail with significantly greater probability. The
coefficient on the net worth variable is negative, as predicted, but not significant.
The coefficients on the control variables have the predicted signs and are all
significant at the 1% level, with the exception of the negative coefficient on the
state-charter variable which runs contrary to Strunk and Case (1988) theory of
expanded powers and loose oversight at the state level. One explanation for this
finding is that risk taking is strongly associated with organizational form.
Studie that fail to control for organizational form will confuse the effects of
chartering with the effects of organizational form because a greater percentage
of stock thrifts are state-chartered.

Although these results support the predictions about the effects of stock
ownership on risk taking, there are three problems with the cross-sectional
analysis that are addressed by the time-series analysis. First, the cross-sectional
test does not control for firm-specific sources of ex ante heterogeneity such as
management quality. The time-series analysis is based on variations around

*I removed two thrifts (Oak Tree S&L in New Orleans, LA, and Spindlecap S&L in Beaumont, TX) from the sample because they are such extreme outliers (one is a converting thrift and one is a Texas stock thrift). Each has a deviation from its group mean more than three times larger than the next-largest deviation. In addition, the Resolution Trust Corporation filed and won convictions for criminal wrongdoing at both thrifts (RTC, 1994). The results in the Probit regression do not change significantly when these two thrifts are removed.
Table 1
Risk taking and organizational form

This table shows the results from a Heckman two-stage regression. Regression 1 is a probit regression in which the dependent variable equals one if the thrift survived to 1988 (and existed at year-end 1982) and equals zero if the thrift failed between 1983 and 1988. Regression 2 is an OLS regression in which the dependent variable is the absolute value of the deviation of a thrift's adjusted cumulative return on assets (described below) from the mean for thrifts within the same class. There are four classes of thrifts with four different means: mutual, converting mutual, non-Texas stock, and Texas stock thrifts. Regression 3 is an OLS regression in which the dependent variable is each thrift's standard deviation of quarterly return on average assets (where return is total income) over 20 quarters from 1984 to 1988. The table shows the coefficients, t-statistics, and slope coefficients for the probit regression.

<table>
<thead>
<tr>
<th>Regression 1: Probit</th>
<th>Regression 2: OLS</th>
<th>Regression 3: OLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>Slope coefficients</td>
<td>Dependent variable:</td>
</tr>
<tr>
<td>Survival = 1</td>
<td>at the mean</td>
<td>Deviation of the</td>
</tr>
<tr>
<td>Failure = 0</td>
<td></td>
<td>adjusted cumulative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>return on assets</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.4244</td>
<td>0.2857***</td>
</tr>
<tr>
<td></td>
<td>0.84</td>
<td>4.56</td>
</tr>
<tr>
<td>Converting mutual dummy variable</td>
<td>0.4898***</td>
<td>0.0430***</td>
</tr>
<tr>
<td>= 1 if converted between 1983 and 1988</td>
<td>4.24</td>
<td>3.86</td>
</tr>
<tr>
<td>Stock thrift dummy variable</td>
<td>-0.4511***</td>
<td>0.0445***</td>
</tr>
<tr>
<td>= 1 if stock owned</td>
<td>-3.72</td>
<td>2.79</td>
</tr>
<tr>
<td>Texas stock dummy variable</td>
<td>0.6060***</td>
<td>0.2675***</td>
</tr>
<tr>
<td>= 1 if stock owned and in Texas</td>
<td>2.81</td>
<td>3.38</td>
</tr>
<tr>
<td>1982-84 average tangible net worth ratio</td>
<td>9.3982***</td>
<td>-0.0902</td>
</tr>
<tr>
<td>Size: Ln(1982 assets)</td>
<td>11.85</td>
<td>-0.66</td>
</tr>
<tr>
<td></td>
<td>0.0289</td>
<td>-0.0162***</td>
</tr>
<tr>
<td></td>
<td>0.84</td>
<td>-4.15</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>Std. Error</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>State charter dummy variable 1 if state-chartered</td>
<td>-0.2541***</td>
<td>4.2%</td>
</tr>
<tr>
<td>Age (# years as FHLLB member)</td>
<td>0.0092***</td>
<td>0.2%</td>
</tr>
<tr>
<td>Texas state dummy variable 1 if in Texas</td>
<td>-0.8613**</td>
<td>14.2%</td>
</tr>
<tr>
<td>Inverse Mills ratio (for sample selection bias)</td>
<td>0.0273</td>
<td></td>
</tr>
</tbody>
</table>

State dummy variables (not shown)

- Log of Likelihood Function: -875.30
- F statistic: 11.92***
- Adj. R-squared: 19.84%*
- # of observations: 2906
- # of surviving thrifts: 2515

Standard errors are calculated using a consistent covariance matrix (White, 1980).

**Significantly different from zero at the 5% level (two-tailed test)
***Significantly different from zero at the 1% level (two-tailed test)

*This is the change in the probability of survival for a 1% change in the net worth ratio (e.g., from 3% to 4%).

A definition of the adjusted cumulative return on assets:

Adjusted cumulative return on assets = (adjustment factor * cumulative income) 1982 assets
a mean level of profitability for each thrift, thereby controlling for firm-specific factors. Second, the adjusted cumulative return incorporates the effects of both investment and financing because it analyzes cumulative net income. The time-series measure, as noted earlier, is based on total income before interest and operating expenses and, therefore, excludes financing effects. Finally, the time-series analysis answers a different question. Whereas the cross-sectional analysis looks at cumulative returns over the observation period, the time-series analysis looks at paths to those outcomes. The cross-sectional test would classify a thrift with an extreme outcome, but consistent positive or negative profitability, as high-risk even though it had little profit variability and possibly little risk. At the same time, the cross-sectional test would classify a thrift with large, off-setting positive and negative returns as low-risk despite the volatility of its returns. The time-series analysis discriminates between these two types of outcomes.

4.2.2. Second stage OLS regression on time-series profit variability

The results from the second-stage OLS regression on time-series profit variability appear in regression 3 in Table 1. In this case, the inverse Mills ratio is significant which means selection biases would affect the results absent the two-stage procedure. Again, stock thrifts exhibit greater risk: the coefficients on the converting, stock, and Texas stock thrift dummy variables are all positive and significant. On average, the stock thrifts' standard deviation is 0.48 percentage points greater than the mutual thrifts' standard deviation: an increase of 21% over the constant term. The leverage variable is also significant: highly leveraged thrifts, or those with low tangible net worth, had more variable income. Consistent with the results in regression 2, the coefficients on the control variables all are negative and significant at the 1% level.

Using this same time-series risk measure and a similar regression specification, I conduct a more powerful test by studying thrifts that convert from mutual to stock ownership. Mayers and Smith (1986) develop this method to study the effects of conversion in the insurance industry. The advantage to using this experimental design is that it tracks the same firm operating under two distinct organizational forms.

I compare 82 thrifts that converted to stock ownership in 1986 with 1,572 non-converting mutual thrifts and 451 stock thrifts. I choose 1986 conversions because I need at least two years of data before and after conversion to calculate time-series profit variability. Because quarterly data do not begin until 1984 and the sample period ends in 1988, no other year has sufficient data to run the analysis. I hypothesize that prior to conversion, the converting mutual thrifts' profit variability should be indistinguishable from that of the nonconverting mutual thrifts and significantly lower than the stock thrifts' profit variability. After conversion, the reverse should be true.

Regressions 1 and 2 in Table 2 compare the time-series profit variability of the converting mutual thrifts with that of the nonconverting mutual thrifts. Prior to
### Changing organizational form and risk-taking

These regressions test the 1986 converting mutual thrifts against the nonconverting mutual thrifts and the stock thrifts in two time periods: pre-conversion is 1984-85 and post-conversion is 1987-88. The converting thrift dummy variable equals one if the thrift converted in 1986, and equals zero otherwise. The dependent variable in all four regressions is the time-series profit variability which is defined as the standard deviation of quarterly total income divided by average assets over eight quarters in both the pre- and post-conversion periods. Regressions 1 and 2 compare 82 converting thrifts with the 1,572 mutual thrifts. Regressions 3 and 4 compare the 42 converting thrifts with the 451 stock thrifts. The table shows the coefficient and t-statistic for each variable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mutual thrifts vs. converting thrifts</th>
<th>Stock thrifts vs. converting thrifts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression 1</td>
<td>Regression 2</td>
</tr>
<tr>
<td></td>
<td>Pre-conversion</td>
<td>Post-conversion</td>
</tr>
<tr>
<td>Number of thrifts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutual thrifts</td>
<td>1,572</td>
<td>1,572</td>
</tr>
<tr>
<td>Converting mutual thrifts</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Stock thrifts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.017***</td>
<td>0.0149***</td>
</tr>
<tr>
<td></td>
<td>5.74</td>
<td>4.16</td>
</tr>
<tr>
<td>Converting mutual dummy variable</td>
<td>0.0006</td>
<td>0.0034**</td>
</tr>
<tr>
<td>= 1 if converted in 1986</td>
<td>0.074</td>
<td>2.70</td>
</tr>
<tr>
<td>Tangible net worth ratio</td>
<td>-0.0356***</td>
<td>-0.0374***</td>
</tr>
<tr>
<td>Pre models = 1983</td>
<td>-5.14</td>
<td>-4.90</td>
</tr>
<tr>
<td>Post models = 1986</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State charter dummy</td>
<td>-0.0006***</td>
<td>-0.0006**</td>
</tr>
<tr>
<td>= 1 if state chartered</td>
<td>-2.82</td>
<td>-2.25</td>
</tr>
<tr>
<td>Age</td>
<td>-0.0011***</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>-2.74</td>
<td>0.48</td>
</tr>
<tr>
<td></td>
<td>-3.06</td>
<td>-0.76</td>
</tr>
<tr>
<td>State dummy variables (not shown)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Statistic</td>
<td>4.64***</td>
<td>4.48***</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>10.43*</td>
<td>10.03*</td>
</tr>
<tr>
<td># of observations</td>
<td>1,654</td>
<td>1,654</td>
</tr>
</tbody>
</table>

*Significantly different from zero at the 10% level (two-tailed test). **Significantly different from zero at the 5% level (two-tailed test). ***Significantly different from zero at the 1% level (two-tailed test).
Table 3
Changing organizational form and asset mix

These regressions test the 1986 converting mutual thrifts against the nonconverting mutual thrifts and the stock thrifts at two dates: the pre-conversion date is December 1984 (one year prior to the conversion year) and the post-conversion date is December 1987 (one year after the conversion year). The converting thrift dummy variable equals one if the thrift converted in 1986, and equals zero otherwise. The dependent variable in all four regressions is the sum of commercial loans plus direct investments in real estate divided by total assets. Regressions 1 and 2 compare 82 converting thrifts with the 1,572 mutual thrifts. Regressions 3 and 4 compare the 82 converting thrifts with the 451 stock thrifts. The table shows the coefficient and t-statistic for each variable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mutual thrifts vs. converting thrifts</th>
<th>Stock thrifts vs. converting thrifts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression 1</td>
<td>Regression 2</td>
</tr>
<tr>
<td></td>
<td>Pre-conversion</td>
<td>Post-conversion</td>
</tr>
<tr>
<td></td>
<td>December 1984</td>
<td>December 1987</td>
</tr>
<tr>
<td>Number of thrifts:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutual thrifts</td>
<td>1,572</td>
<td>1,572</td>
</tr>
<tr>
<td>Converting mutual thrifts</td>
<td>62</td>
<td>82</td>
</tr>
<tr>
<td>Stock thrifts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0082</td>
<td>-0.0104</td>
</tr>
<tr>
<td>Converting mutual dummy variable</td>
<td>0.99</td>
<td>-0.68</td>
</tr>
<tr>
<td>= 1 if converted in 1986</td>
<td>0.0017</td>
<td>0.0090**</td>
</tr>
<tr>
<td></td>
<td>1.26</td>
<td>2.65</td>
</tr>
<tr>
<td></td>
<td>Pre models = 1984</td>
<td>Post models = 1987</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Tangible net worth ratio</td>
<td>-0.0108</td>
<td>-0.0486***</td>
</tr>
<tr>
<td></td>
<td>-1.51</td>
<td>-4.94</td>
</tr>
<tr>
<td>Size: Ln/assets</td>
<td>0.0018***</td>
<td>0.0026***</td>
</tr>
<tr>
<td></td>
<td>4.43</td>
<td>5.49</td>
</tr>
<tr>
<td>State charter dummy</td>
<td>0.0012*</td>
<td>0.0023**</td>
</tr>
<tr>
<td>Age</td>
<td>-0.0001**</td>
<td>-0.00005</td>
</tr>
<tr>
<td></td>
<td>-2.49</td>
<td>-1.86</td>
</tr>
<tr>
<td>State dummy variables (not shown)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Statistic</td>
<td>2.91***</td>
<td>4.48***</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>5.79%*</td>
<td>10.04%*</td>
</tr>
<tr>
<td># of observations</td>
<td>1654</td>
<td>1654</td>
</tr>
</tbody>
</table>

Standard errors are calculated using a consistent covariance matrix (White, 1980).

*Significantly different from zero at the 10% level (two-tailed test). **Significantly different from zero at the 5% level (two-tailed test). ***Significantly different from zero at the 1% level (two-tailed test).
conversion, the coefficient on the converting thrift dummy variable is not significant, but after conversion, it is significant and positive. The coefficient in the post-conversion period is also significantly different from the coefficient in the pre-conversion period. These findings are consistent with the hypothesis that stock thrifts exhibit greater risk than mutual thrifts and indicate that risk taking increases after conversion to stock ownership. An alternative interpretation, and one that leads to a different conclusion, is that state charter and age are both correlated with conversion and are serving as proxies for risk taking. This could explain why they are significant in regression 1 but not in regression 2, while the converting mutual dummy variable exhibits the reverse pattern of significance. However, in both cases, the correlation coefficients are low and not significantly different from zero.

When I compare the profit variability of the converting mutual thrifts with that of the stock thrifts, I find additional evidence that stock ownership affects risk taking. In the pre-conversion period, the converting mutual thrift dummy variable is negative and significant at the 1% level (regression 3); however, in the post-conversion period (regression 4), the converting thrift dummy variable is not significant. Thus, converting thrifts' profit variability increases after conversion to the point that it is indistinguishable from that of the stock thrifts.

Although profit variability increases after conversion, it is not clear why. To answer this question, I check to see if the converting thrifts change their asset mix after conversion. Cordell et al. (1993) and Barth et al. (1990) examine asset mix, in particular the investment in nontraditional assets, as a way to measure risk taking. They define nontraditional assets as those that thrifts were not allowed to hold prior to the Money Control Act of 1980 and Garn–St Germain Act of 1982. Similarly, I define nontraditional assets to include commercial loans and direct investments in real estate.

In Table 3, I regress nontraditional assets as a percentage of total assets on the ownership variables and the control variables before and after conversion. I find that asset mix changes after conversion to stock ownership. In the pre-conversion period, the percentage of nontraditional assets held by converting mutual thrifts is not significantly different from the percentage held by nonconverting mutual thrifts (regression 1). However, the converting mutual thrifts hold a significantly lower percentage than the stock thrifts (regression 3). In the post-conversion period, the converting mutual thrifts increase their investment in nontraditional assets to a percentage that is significantly greater than that of the nonconverting mutual thrifts (regression 2) and indistinguishable from that of the stock thrifts (regression 4).

One can draw several conclusions from these results. First, changes in organizational form to stock ownership are followed by proportionally greater investment in nontraditional assets and greater profit variability. Previous analysis of risk taking by thrifts has made neither this connection between asset mix and
profit variability nor the connection between changing organizational form and changing risk. Second, the performance of converting thrifts is not consistent with a simple leverage explanation of risk taking. Barth (1991), Brumbaugh (1988), Karr (1989), Kormendi et al. (1989), and White (1991) assert that risk taking is a function of leverage alone and ignore the effects of organizational form. If this leverage hypothesis were correct, then risk taking should decrease after conversion because of the infusion of new equity. In my sample of converting thrifts, the average thrift almost doubles its tangible net worth as a percentage of assets from 2.86% to 5.37%. Despite this increase, converting thrifts' profit variability actually increases relative to the nonconverting mutual thrifts. To explain this result requires incorporating the role of organizational form. Finally, these findings are not consistent with the hypothesis that mutual thrift managers increased risk prior to conversion and then converted to capture the profits (if there were any). The changes in asset mix and in profit variability do not occur until after conversion.

4.3. Determination of organizational form

Like Mayers and Smith (1986, 1988), Lamm-Tennant and Starks (1993), Cordell et al. (1993), and Benston et al. (1992), I assume that risk taking is determined by organizational form. Instead, the opposite may be true: risk-taking opportunities may explain the choice of organizational form. According to this alternative view, the relation between risk taking and stock ownership is merely evidence that people created stock thrifts in high-risk locations. Although this hypothesis changes the interpretation, it does not negate the existence of a relation between organizational form and risk taking—people choose stock ownership when the benefits of risk taking are high. Nevertheless, the endogeneity of organizational form can, to the extent it exists, create econometric problems. Using ordinary least squares on endogenous variables results in biased and inconsistent estimates. I check whether endogeneity is a problem by testing for a relation between the formation and presence of stock thrifts and measures of local economic risk.

In particular, I use a Tobit regression specification with three dependent variables for each state, including the District of Columbia:

1) **percentage of stock thrifts**, or the number of stock thrifts as a percentage of total thrifts in 1982;

2) **stock entry rate**, or the number of de novo stock thrifts during 1980 to 1984 as a percentage of the total number of thrifts in 1982—the same variable used by Lindley et al. (1992); and

3) **stock conversion rate**, or the number of mutual-to-stock conversions during 1980-84 as a percent of the total number of mutual thrifts in 1982—a similar variable to the one used by Masulis (1987).
Table 4  
Organizational form and macroeconomic risk

This table presents the results from Tobit regressions on the relationship between organizational form and measures of macroeconomic risk. Each state is an observation and the dependent variables measure the existence or creation of stock thrifs in each state. The independent variables measure past, current, and future macroeconomic conditions in each state. The table reports the coefficient and t-statistic for each variable.

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Regression 1</th>
<th>Regression 2</th>
<th>Regression 3</th>
<th>Regression 4</th>
<th>Regression 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.0870***</td>
<td>-0.4209***</td>
<td>-0.3081***</td>
<td>-0.2149*</td>
<td>-0.2371*</td>
</tr>
<tr>
<td>5.27</td>
<td></td>
<td>3.17</td>
<td>3.20</td>
<td>-1.54</td>
<td>-1.77</td>
</tr>
<tr>
<td>4.36</td>
<td>3.46</td>
<td>3.15</td>
<td>3.14</td>
<td>4.39</td>
<td>4.19</td>
</tr>
<tr>
<td>Liberal state dummy variable</td>
<td>0.1265*</td>
<td>0.0528</td>
<td>0.1078**</td>
<td>-0.0360</td>
<td>-0.0204</td>
</tr>
<tr>
<td>= 1 if state has liberal regulations</td>
<td></td>
<td>1.14</td>
<td>2.31</td>
<td>-0.80</td>
<td>-0.47</td>
</tr>
<tr>
<td>3.14</td>
<td>3.15</td>
<td>1.86</td>
<td>1.08</td>
<td>1.64</td>
<td>1.64</td>
</tr>
</tbody>
</table>

Past risk measures

Coefficient of variation of 1979-83:
1) Quarterly personal income $ 
  - 5.6506
  - 0.6068
  - 1.3240
  - 0.67
2) Monthly unemployment rate
  - 5.6317
  - 0.3147
  - 1.3254
  - 0.51
3) Commercial construction starts
  - 0.0135
  - 0.2311**
  - 0.0190
  - 0.38
<table>
<thead>
<tr>
<th>Current risk measures</th>
<th>Log of likelihood function</th>
<th># of observations</th>
<th># observations &gt; 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983 Business failure rate</td>
<td>- 5.29</td>
<td>51</td>
<td>33</td>
</tr>
<tr>
<td>per 10,000 establishments</td>
<td>10.21</td>
<td>51</td>
<td>27</td>
</tr>
<tr>
<td>1983 S&amp;L residential mortgage foreclosure rate</td>
<td>5.72</td>
<td>51</td>
<td>27</td>
</tr>
<tr>
<td>1983 unemployment rate</td>
<td>19.15</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>20.94</td>
<td>51</td>
<td>43</td>
</tr>
</tbody>
</table>

Standard errors are calculated using a consistent covariance matrix (White, 1980).

*Significantly different from zero at the 10% level (two-tailed test). **Significantly different from zero at the 5% level (two-tailed test). ***Significantly different from zero at the 1% level (two-tailed test).

aNumber of stock thrifts as a percentage of total thrifts in 1982.

bNumber of de novo (newly chartered) thrifts from 1980 - 84 as a percentage of the total number of thrifts in 1982.

cNumber of mutual-to-stock conversions from 1980 - 84 as a percentage of the total number of mutual thrifts in 1982.

dLiberal thrift powers for state chartered thrifts according to Benson (1983).

The coefficient of variation is calculated using the residuals from an OLS regression of the quarterly state personal income on time.

Dollar value of commercial construction starts in real 1982 dollars.
The independent variables include measures of each state's historical or current economic risk (see the Appendix for a complete description of the data). The historical risk measures include the coefficients of variation for the 1979-83 monthly unemployment rate, monthly commercial construction starts in real dollars, and quarterly personal income. To account for growth in nominal personal income data, I regress quarterly personal income on time and calculate the coefficient of variation using the residuals. The current risk measures include the 1983 business failure rate per 10,000 establishments, the residential mortgage foreclosure rate, and the unemployment rate. Because the past and current risk measures are highly correlated, I do not include them in the same regression. I also include the actual 1978-83 compound annual growth rate of S&L deposits and the Commerce Department's projected (as of 1983) 1983-90 compound annual growth rate of income in the finance, insurance, and real estate sectors. Finally, I include a dummy variable for states with the most liberal investment powers, as determined by Benston (1985).

The results appear in Table 4. In regression 1, none of the past risk measures are significantly related to the percentage of stock thrifts as of 1982. I do not run this regression on the current risk measures because the majority of these thrifts were formed well before 1983. Regressions 2 and 3 show that the entry rate is positively related to deposit growth, future financial income growth, and to liberal state regulations. It is not, however, positively related to any of the historical or current risk measures. In fact, it is negatively related to the variability of commercial construction starts. Regressions 4 and 5 show that the conversion rate is significantly related to past deposit growth, but not to future financial income growth. Again, none of the historical or current risk measures are positively associated with conversion activity. The only significant finding is that conversions are less likely in states with higher foreclosure rates. To check these results, I reran the regressions using other risk measures such as residential construction starts and bank profit variability, the number of entrants or conversions instead of percentages, and different time periods. These changes do not affect the results.

Although one could argue that these variables do not measure risk-taking opportunities, it does not appear that local risk-taking opportunities explain the formation or presence of stock thrifts. If not the opportunities for risk taking, then what does determine organizational form? Absent a structural model, we can only surmise that the choice is based on a variety of factors including regulation, cost, and managerial quality. For many years, federal and state regulations prohibited stock ownership. Even after stock ownership became legal, administrative costs deterred conversions. The FHLBB (1979) estimates that conversion costs equal 12.8% of the new equity proceeds and 0.41% of total assets. Finally, managerial quality plays a role because risk taking increases the ex ante probability of failure. As a result, low-quality managers might prefer to
consume perquisites rather than risk the possibility of failure and the need to find a new job.

While these factors are important, I believe that overall opportunities for risk taking and managerial preferences have a greater effect on the choice of organizational form. Rather than the conditions in the local economic environment, it is the enhanced opportunities for high-risk investment and the decreased creditor oversight that existed throughout the country that encouraged managers to choose stock ownership. These regulatory changes explain not only the dramatic shift towards stock ownership, but also why the shift occurred during the 1980s and why risk taking followed shortly thereafter.

Esty (1997) provides some support for this hypothesis. That study analyzes the performance of two thrifts, one stock and one mutual, located in the same parish (county) in Louisiana and facing, presumably, the same opportunity set with regard to risk. The stock thrift adopted a riskier financial strategy and did so only after converting to stock ownership. While the mutual thrift could have adopted a similar strategy, it chose not to.

5. Conclusion

This paper investigates the relation between organizational form, residual claims, and risk taking and has two important findings. First, stock thrifts exhibit greater risk than mutual thrifts. Second, converting from mutual to stock ownership is associated with increased risk taking. Based on these findings, and the absence of a relation between local economic risk measures and the creation or presence of stock thrifts, I conclude that organizational form is an important determinant of risk taking and, therefore, firm performance in the savings and loan industry. Lee, Mayers, and Smith (1997) show that this relation between organizational form and risk taking exists in the insurance industry as well.

By establishing a connection between organizational form and risk taking, this paper builds on Fama and Jensen’s (1983) theoretical work on organizational form and adds to a growing empirical literature on the how the nature of residual claims affects firm performance. For example, Karpoff and Rice (1989) find that restrictions on share transferability decrease the incentive to maximize equity value. Similarly, the inability to sell mutual thrifts’ residual claims helps explain why risk shifting is less attractive in mutual thrifts. Mayers and Smith (1988), who find that business activity differs by organizational form depending on the separability of fixed and residual claims, provide another example. In the thrift industry, the separability of fixed and residual claims not only distinguishes stock from mutual thrifts, but also encourages stock thrifts to adopt riskier strategies. As a result, stock thrifts are more likely to enter riskier lines of business such as commercial lending rather than residential mortgage lending.
Together, these papers show that organizational form affects productive efficiency, business strategy, and risk taking.

My study also improves our understanding of the thrift crisis. While it is true that other factors such as leverage, fraud, macroeconomic shocks, and political failure contributed to the thrift crisis, most of these factors have been recognized and are being addressed in various reform proposals. What has not been recognized, however, is the role that organizational form played in facilitating risk shifting. The regulatory changes made in the early 1980s involving organizational form and oversight were not based on a consideration of agency conflicts. Instead, Congress and the regulators focused only on the benefits of stock ownership with respect to bolstering capital and improving efficiency. It is ironic that these changes were implemented to save the industry, for in the end, they significantly contributed to its collapse.

Appendix: Data sources and data sets

Data sources for profit-variability analysis

The data used in the study come from two reports published by the Federal Home Loan Bank Board: the quarterly Thrift Financial Report contains detailed balance sheet and income statement information (published semiannually prior to 1984), and the List of Mergers and Deletions (1989) provides data on all mergers, liquidations, and FSLIC-assisted mergers. A FSLIC-assisted merger is a merger arranged by the FSLIC between a failed and a healthy thrift. Often, FSLIC had to contribute additional funds or provide guarantees to make the deal attractive to the acquirer.

Universe of thrifts

Number of thrifts in 1982 report: 3,287

Reasons for disappearance by 1988:
- Voluntary merger 212
- Unclassified merger 153
- FSLIC assisted merger 306
- Liquidation 85
- Insufficient Data 14

Total 770

Thrifts in existence in 1988: 2,517 (76.6% of total)
Sources of state economic data

Dependent variables:

1) The list of mutual to stock conversions is from Cordell et al. (1993).
2) The list of de novo stock thrifts is from Lindley et al. (1992).
3) The number of stock, mutual, and total thrifts comes from the Thrift Financial Reports (described above).

Independent variables:

1) Deposit growth rates are from the Office of Thrift Supervision (1989).
2) Monthly unemployment rates are from the Bureau of Labor Statistics, a division of the U.S. Department of Labor.
3) Quarterly personal income numbers are from the Survey of Current Business published by the U.S. Department of Commerce.
4) Monthly commercial construction starts are from F.W. Dodge, a division of McGraw-Hill.
5) Monthly residential construction starts are from F.W. Dodge, a division of McGraw-Hill.
6) 1983 business failure rates are from the Dun & Bradstreet Business Failure Record (1985).
7) Commercial bank profitability is based on Bank Call Reports from the Federal Deposit Insurance Corporation.
8) S&L residential mortgage foreclosure rates are from the Office of Thrift Supervision (1989).
10) Projected growth rates of finance, insurance, and real estate (FIR) income are from the 1985 OBER'S BEA Regional Projections, published by the U.S. Department of Commerce.

References


Kane, Edward J. and Min-Teh Yu, 1992. Measuring the true profile of taxpayer losses in the S&L insurance mess. Working paper (College of Business, Ohio State University, Columbus, OH).


