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AN EMPIRICAL ANALYSIS OF THE RELATIVE EFFICIENCY OF STOCK AND MUTUAL SAVINGS AND LOAN ASSOCIATIONS

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A number of studies have investigated the comparative performance and behavior of stock and mutual savings and loan institutions (S&Ls). This issue has been explored, among others, by Hester [15], Brigham and Pettit [4], Hadaway and Hadaway [13], Simpson and Kohers [21], and Verbrugge and Goldstein [23]. Although the evidence is inconclusive, in general, the stock S&Ls are more profitable, riskier, and have lower operating costs than their mutual counterparts. Nevertheless, there is little direct empirical evidence on the question of relative efficiency in the S&L industry. The issue is whether institutions of similar risk earn comparable rates of return. For instance, if stock S&Ls are more profitable than mutual S&Ls and both operate at similar risk levels, the stock S&Ls are more efficient.

In one study that directly examines this issue, there is evidence of some differences in the relative efficiency of stock and mutual S&Ls. Using the return on net worth and the amount of loan defaults as the measures of return and risk respectively, Bulmash [5] finds that the small mutual S&Ls are more efficient than the small stock S&Ls. In contrast, among the large S&Ls, the stock organizations are found to be more efficient.

The approach used in this study differs from Bulmash's in several ways. First a measure of total risk as measured by the variation in accounting returns is used rather than a measure of loan quality. Second, the sample in this study is divided into geographical areas so that stock and mutual S&Ls can be examined under similar market conditions. The main research question for this study is to determine if differences do exist in the risk adjusted performance of stock and mutual S&Ls operating in a similar market structure. Since all mutual S&Ls and most stock S&Ls do not have publicly traded common stock, accounting measures of risk and return are used rather than market determined measures.

The Comparative Behavior of Stock and Mutual S&Ls

According to Benston [2], there are two primary reasons for the formation of the mutual organization. First, the mutual form was established to provide the working poor with a safe, convenient place to save. The organizers viewed the institution as serving the poor who were not otherwise served by commercial banks. Second, as Benston indicates, the small depositor desired assurances that his funds would be safely managed. A mutual organization provides minimum incentive for excessive risk taking. For instance, in the mutual form, the owners or depositors provide all of the institution's capital. Loans are made for which the owners accept all the risk of possible losses. In a stock form, owners do not provide all of S&Ls capital. Most of the funds are borrowed from depositors. The owners have an incentive to take risks that they might not take with their own funds. Investment losses are disproportionately borne by depositors. Conversely, if the investments turn out well, the owners receive the disproportionate

benefits.

Jensen and Meckling [16] have discussed at length this potential wealth transfer as an incentive problem associated with highly leveraged firms. Black and Scholes [3] recognized that the common stock of firms that use leverage can be considered to be a call option written on the underlying assets of the firm. According to Jensen and Meckling, if one assumes that the value of the firm is independent of the investment decision, stockholders have an incentive to increase their wealth at the expense of the bondholders by increasing total risk or the variance of expected returns.

Incentives for excessive risk taking are also created by the present deposit insurance structure. Insurance premiums are set without regard to an institution's risk level. An institution has an incentive to take on greater risk than it otherwise would because the insurance premium does not fully reflect the cost of incurring additional risk. This is the classic moral hazard problem [1]. When the price of insurance is independent of the expenditures on self-protection, the insured has less incentive to engage in risk reducing activities. In this instance, the cost of an institution's actions is ultimately shared with the insuring agency and society as a whole. Thus, an institution has less incentive to restrain its risky behavior and may increase its total risk and the risk of bankruptcy at the expense of society.

The mutual institution has less incentive to engage in excessive risk taking and increase total risk because the owner-depositors have little to gain from such actions. Nevertheless, it also has less incentive to be operationally efficient. The management of mutuals has an incentive to appropriate institutional resources in the form of perquisites. Jensen and Meckling refer to these costs as the agency costs of outside equity. Although the mutual management does not own equity in the institution, the circumstances are analagous to a manager with little or no fractional claim on outcomes in the stock firm. As the ownership claim of the manager decreases, the manager has an incentive to appropriate a greater amount of perquisites. Because there are a large number of small depositors, no one individual has sufficient resources to monitor the manager's actions. In addition, as Jensen and Meckling suggest, the manager may have less incentive to be innovative. This problem and how it relates to mutual institutions is discussed by Nichols [19], Brigham and Pettit [4], and Deshmukh, Greenbaum, and Thakor [7]. In summary, theory suggests that stock S&Ls should be riskier and be less operationally efficient than mutual S&Ls. In general, as indicated earlier, the empirical evidence confirms this.

Competition and Relative Efficiency

Although stock and mutual S&Ls overall may exhibit slightly different risk-return behavior, market conditions will dictate their relative efficiency. If a market is competitive, returns are continuously adjusting to reflect underlying risks. A competitive market encourages institutions to use resources efficiently. Therefore, over a period of time, institutions of similar risk should earn comparable rates of return. This assertion assumes that no significant barriers, such as regulation, information or transaction costs, exist that may impede this arbitrage process. For example, an institution with opportunities for excessive risk adjusted profits will find competition from other institutions eager to participate in these attractive opportunities. These risky profits should eventually be bid away by other

institutions. Kane [17] suggests that eventually these subsidies are shifted to both borrowers and lenders. Second, some management may be more efficient and effective than others. If they are not paid what they are worth, the effective manager will be hired away. On the other hand, inefficient management will not be tolerated very long. Although mutual owner-depositors have little incentive to monitor management's actions, some monitoring comes from the managerial labor market. According to Fama [9], a competitive labor market should also provide some monitoring of a manager's performance. Finally, loans and investments should earn approximately similar risk adjusted returns. Costs should also tend to equalize. Therefore, it is hypothesized that institutions of similar risk operating under similar market conditions, regardless of their organizational form should earn similar risk adjusted returns.

Data and Methodology

The sample consists of 165 mutual and 130 stock savings and loan associations in the states of Ohio, Texas, and California, which also include the metropolitan areas Cleveland-Akron, Dallas-Ft. Worth, and Los Angeles-Long Beach, respectively. Data was obtained from the semi-annual financial reports from 1974-1983 provided by the Federal Home Loan Bank Board. Accounting returns are calculated by dividing net income by net worth. These three states contain an adequate number of both types of institutions. Each institution existed for the entire 1974-83 period and was not converted during this period. Separate analyses are done for the 1974-78 and 1979-83 periods. This allows us to determine if the relative efficiency of stock and mutual S&Ls changed during these drastically different time periods. The 1974-78 period was a relatively normal performance period for the S&L industry. On the other hand, profits were abnormally low during the 1979-83 period.

We assume that relative efficiency for each institution is measured by the difference between the actual accounting return and a benchmark or expected accounting return adjusted for each institution's level of risk. This difference is called the residual accounting return, e_{it}, for institution i in period t.

$$e_{it} = R_{it} - E(r_{it})$$

where R_{it} = the realized accounting return for institution i in period t,

$E(r_{it})$ = the expected accounting return in period t for institution i.

Total risk is an important measure of risk for financial institutions. As discussed earlier, shareholders have a strong incentive to increase total risk at the expense of debtholders. In addition, both creditors and the deposit insuring agency are concerned with an institution's total risk, which includes the risk of bankruptcy. The implication is that any empirical investigation of risk adjusted profits for financial institutions should consider the amount of total risk. Capital market theory suggests the following relationship between expected returns and total risk for efficiently diversified portfolios.

$$E(r_p) = r_f + ((E(r_m) - r_f)/SD(r_m))*SD(r_p)$$

A variation of the capital market line equation will be used to predict the expected return for a financial institution. Therefore, for a financial institution, the expected return is assumed to he a function of the risk free rate, r_f, the market return, $E(r_m)$, the standard deviation of market returns, $SD(r_m)$, and the standard deviation of accounting returns, $SD(r_m)$. The following equation is a variation of the capital market line equation.

$$E(r_{it}) = r_{ft} + ((E(r_{mt}) - r_{ft})/SD(r_{mt}))*SD (r_{it})$$

where $E(r_{it})$ = the expected return for firm i in period t,

r_{ft} = the average one year t-bill rate for period t,

$E(r_{mt})$ = the market accounting return for period t,

$SD(r_{mt})$ = the standard deviation of the semi-annual market accounting returns for period t,

$SD(r_{it})$ = the standard deviation of the semi-annual accounting returns for period t and firm i.

The differences between the expected and actual accounting returns are then averaged across all institutions for each year. The average residual return in a given year is

$$AR_t = 1/N * \sum_{i=1}^{N} e_{it}$$

where N = the number of institutions.

If stock and mutual S&Ls are equally efficient, the residuals will not be statistically significantly different across the two groups. The next step is to test the null hypothesis of equal efficiency over both the 1974-78 and 1979-83 periods. First, an average of each institutions annual residuals is calculated for each of the five year periods or

$$AR_i = 1/5 * \sum_{t=1}^{N} e_{it}$$

where N = the number of years.

Next, these five year average residuals, AR_i, are again averaged across the two forms to find the average residual by type of institution or, for example,

$$AR_{74\text{-}78} = 1/N * \sum_{i=1}^{N} AR_i$$

where N = the number of firms.

Univariate t-tests will be employed to test both of the null hypotheses.

Twenty semi-annual accounting returns are calculated for each institution during the 1974-83 period. An average semi-annual accounting return and the standard

deviation of semi-annual accounting returns is calculated for each institution and for each five-year period.

Table 1 contains a summary of the risk and return results by form of organization and geographical location for the 1974-78 and 1979-83 periods, respectively. Notice the obvious difference in the overall performance of the sample during the two time periods. Returns were much lower and total risk much greater during the latter period. Generally, during the 1974-78 period, the stock S&Ls are more profitable than the mutual S&Ls.

Table 1
Average Accounting Returns and Total Risk (SD) Measures

		1974-78			1973-83		
Sample		**Return**	**TValue**	**SIG**	**Return**	**TValue** [a]	**SIG** [b]
Calif.	(M=19)	6.39	−1.10	.140	−3.13	−0.08	.468
	(S=27)	7.40			−2.90		
L.A.	(M=12)	5.93	−0.29	.389	−2.23	0.45	.331
	(S=12)	6.35			−4.39		
Ohio	(M=97)	5.14	−1.85	.037	−1.98	1.26	.108
	(S=23)	5.88			−4.98		
Cleve.	(M=14)	5.37	−0.55	.297	−0.25	0.31	.385
	(S=7)	5.79			−0.80		
Texas	(M=49)	5.85	−2.74	.004	−2.36	−0.43	.334
	(S=80)	7.07			−1.61		
D-Ft. W	(M=5)	6.25	−0.62	.275	2.32	−0.46	.330
	(S=10)	7.16			4.03		
Sample		**SD**	**TValue**	**SIG**	**SD**	**TValue**	**SIG**
Calif.	(M=19)	4.01	−0.22	.414	14.80	−1.23	.114
	(S=27)	4.14			21.88		
L.A.	(M=12)	4.22	0.10	.461	13.37	−0.90	.192
	(S=12)	4.12			21.85		
Ohio	(M=97)	2.18	−1.83	.039	10.11	−0.87	.194
	(S=23)	2.70			13.60		
Cleve.	(M=14)	2.28	0.02	.492	7.18	0.19	.429
	(S=7)	2.27			6.90		
Texas	(M=49)	2.36	−2.05	.022	10.02	−2.88	.003
	(S=80)	2.95			19.08		
D-Ft. W	(M=5)	3.16	−0.91	.190	10.36	−0.08	.468
	(S=10)	4.05			10.59		

[a] T-Values reflect one tail probabilities

[b] level of significance

M refers to the no. of mutual S&Ls; S is the no. of stock S&Ls

However, the null hypothesis of equal profitability can only be rejected for the Ohio and Texas samples at the .05 critical level or better. Similarly, the null hypothesis of equal risk is rejected for the Ohio and Texas samples. For the 1979-83 period, only for the Texas sample is the null hyopthesis of equal total risk rejected.

Generally, the results indicate that the stock S&Ls are riskier and more profitable, especially during the earlier period. But these results are insufficient to determine relative efficiency. Again, the residual return is the difference between the actual accounting return and an expected accounting return adjusted for each institution's total risk. Tables 2, 3, and 4 contain the residual analysis results for the Ohio, Texas, and California samples, respectively. Referring to Table 2, the first residual under the mutual column, −8.95, indicates that on average the sample of mutual S&Ls earned 8.95% less than the total risk adjusted expected return. In other words, if the expected accounting return is 10.00%, the average realized accounting return is 1.05%. In addition, notice how the average residuals throughout each of the samples vary directly with the overall performance of the S&L industry. The lowest average residuals are found during the 1980s.

In the Ohio sample, the stock S&Ls are consistently less efficient. Nevertheless, only in 1974, 1976, and 1982 are the differences in the average residuals statistically significant at the .10 level. For the Cleveland-Akron sample, where market conditions are more similar than at the state level, there are no statistically significant differences. In addition, the two measures of longer term relative efficiency, the five year average residuals, show no statistically significant differences.

Table 3 contains the results for the Texas sample. In 1975 the stock S&Ls are significantly more efficient, but in 1976 the mutuals are significantly more efficient at the .10 level. Significant differences are also evident at the .05 level or better for 1979, 1980, and 1983. Again, the five-year average results indicate no significant difference across the two forms. For the Dallas-Ft. Worth sample, only in 1980, are the residuals statistically significantly different. The results in Table 4 indicate that the null hypothesis of equal relative efficiency cannot be rejected for the Los Angeles sample and in only 1983 for the California sample. The overall results indicate that, especially in the more competitive metropolitan areas, there is little difference in the relative efficiency of the two forms of institutions.

Summary and Conclusion

The purpose of this study has been to examine the relative efficiency of stock and mutual S&Ls. For this sample from three states and three major metropolitan areas, the null hypothesis of equal efficiency or risk adjusted performance between stock and mutual S&Ls cannot be rejected when accounting based measures of total risk are considered. The results lend support for the contention that stock and mutual S&Ls are reasonably competitive within a geographically defined market. Institutions of similar risk earn similar rates of return. Although most evidence indicates that stock institutions in general are more profitable and riskier than mutuals, both forms exhibit similar economic behavior on a risk adjusted basis. If stock institutions take on more risk, then the profits are fair based upon comparisons to similarly risky S&Ls. If mutuals operate at lower risk levels, the profits are comparable to similarly risky S&Ls.

Table 2

Ohio Average Residuals

Year	Mutual (n=97)	Stock (n=23)	T Value	Level of Significance
1974	− 8.95	−11.88	−1.50	.073
1975	− 6.22	− 7.08	−0.62	.269
1976	− 5.88	− 8.58	−1.48	.075
1977	− 6.66	− 7.84	−0.61	.274
1978	− 3.10	− 4.18	−0.74	.234
74-78	− 6.16	− 7.91	−1.20	.120
1979	− 7.94	− 8.85	−0.20	.423
1980	−10.28	−11.86	−0.60	.277
1981	−23.96	−28.28	−1.26	.109
1982	−29.08	−42.09	−1.58	.062
1983	−18.57	−34.34	−0.94	.195
79-83	−17.97	−25.08	−1.21	.118

Cleveland-Akron Residuals

Year	Mutual (n=14)	Stock (n=7)	T Value	Level of Significance
1974	− 9.74	− 9.94	−0.05	.481
1975	− 5.77	− 5.89	−0.04	.486
1976	− 6.74	− 5.39	0.45	.330
1977	− 6.51	− 4.05	0.85	.208
1978	− 2.02	− 0.96	1.10	.143
74-78	− 6.16	− 5.25	0.35	.367
1979	− 4.21	− 4.49	−0.13	.450
1980	− 8.87	− 9.06	−0.10	.460
1981	−24.58	−24.01	0.12	.455
1982	−28.30	−25.87	0.40	.351
1983	− 1.77	− 9.38	−0.90	.200
79-83	−13.54	−14.56	−0.25	.403

[a] one tail probability

Table 3

Texas Average Residuals

Year	Mutual (n=49)	Stock (n=80)	T Value	Level of Significance [a]
1974	− 7.69	− 8.72	−0.82	.209
1975	− 6.27	− 4.80	1.31	.097
1976	− 5.35	− 7.43	−1.34	.092
1977	− 5.27	− 4.08	0.99	.162
1978	− 3.24	− 3.90	−0.56	.289
74-78	− 5.56	− 5.79	−0.20	.421
1979	− 7.17	−17.98	−2.60	.005
1980	−11.00	−20.46	−1.81	.036
1981	−30.21	−39.22	−1.23	.110
1982	−32.49	−20.92	1.21	.115
1983	−12.61	− 2.02	1.76	.040
79-83	−18.70	−20.12	−0.33	.370

Dallas-Ft. Worth Average Residuals

Year	Mutual (n=5)	Stock (n=10)	T Value	Level of Significance
1974	− 9.80	−13.92	−1.04	.160
1975	−11.12	−10.56	0.14	.447
1976	− 8.53	−12.95	−1.04	.159
1977	− 4.98	− 8.16	−0.83	.211
1978	− 7.43	− 7.35	0.02	.494
74-78	− 8.37	−10.59	−0.59	.283
1979	− 6.08	− 2.29	0.75	.233
1980	− 2.67	− 9.77	−1.54	.075
1981	−23.18	−27.55	−0.44	.333
1982	−14.94	− 1.01	0.90	.195
1983	− 0.31	−10.11	0.64	.276
79-83	− 9.44	− 6.10	0.47	.325

[a] one tail probability

Table 4

California Average Residuals

Year	Mutual (n=19)	Stock (n=27)	T Value	Level of Significance
1974	−19.01	−19.25	−0.07	.473
1975	−12.99	−11.47	0.39	.351
1976	−11.01	− 8.20	0.60	.277
1977	−11.85	− 9.60	0.68	.251
1978	− 4.88	− 3.98	0.42	.340
74-78	−11.95	−10.50	0.43	.336
1979	− 4.70	−10.77	−0.88	.192
1980	−14.55	−17.25	−0.44	.331
1981	−37.80	−46.15	−0.84	.203
1982	−39.53	−42.63	−0.17	.434
1983	−12.29	− 1.23	1.32	.097
78-83	−21.78	−23.61	−0.25	.402

Los Angeles Average Residuals

Year	Mutual (n=12)	Stock (n=12)	T Value	Significance
1974	−20.70	−21.24	−0.10	.462
1975	−15.07	−13.98	0.18	.431
1976	−14.83	−10.25	0.64	.267
1977	−14.01	−10.47	0.70	.247
1978	− 4.50	− 6.67	−0.69	.251
74-78	−13.82	−12.52	0.25	.404
1979	− 2.11	− 9.62	−0.76	.231
1980	− 8.76	−15.05	−0.88	.197
1981	−30.62	−42.73	−0.96	.178
1982	−46.06	−59.18	−0.43	.339
1983	− 8.54	− 3.86	0.40	.348
79-83	−19.22	−26.09	0.561	.294

[a] one tail probability

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