Does Corporate Governance and Ownership Structure Influence Performance? Evidence from Taiwan Life Insurance Companies

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Abstract: This study examines the relation between corporate governance and performance and the relation between ownership structure and performance in the Taiwanese life insurance industry. We use the value-added approach of data envelopment analysis (DEA) to measure performance. For our first performance measure, which uses premium income as the output variable, we find evidence that proportion of management shareholding, family-controlled insurers, foreign branch insurers, and insurer age are generally significantly positive related to technical efficiency. The relation between the above variables and allocative efficiency and cost efficiency is similar, but very weak. For our second performance measure, which uses claim benefit as output variables of the value-added approach, the results are similar but weaker. The two most consistent variables that have a positive impact on efficiency are family-controlled insurer and insurer age.

INTRODUCTION

Corporate governance can be defined as the set of institutional arrangements affecting corporate decision-making (Ball, 1998). The corporate governance concept first appeared in the 1930s, and was not broadly discussed until the outbreak of the Asian finance crisis in the 1990s. According to Rajan and Zingales (1998) and Prowse (1998), one of the main

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causes that triggered the occurrence of the Asian financial crisis in the years 1997 and 1998 was poor corporate governance.

Various recent scandals around the world (*e.g.*, the Enron case in the US in 2001 and the Procomp Informatics Ltd. case in Taiwan in 2004) caused many nations to aggressively mandate "corporation governance" to make sure that investors, vendors, creditors, and other stakeholders are treated fairly. Another reason for corporate governance is to sustain or rescue investor confidence. Establishing an internal control system, electing honest and ethical directors, supervisors, and management, and avoiding related parties' transactions are the key components of "corporation governance."

Many recent studies examine the relation between corporate governance and performance. The convergence-of-interest hypothesis (Jensen and Meckling, 1976) suggests that the greater number of shares held by directors of the board, the more profits those directors can obtain, and thus they have greater incentives to put their effort toward maximizing company profits. Morck, Schleifer, and Vishny (1988) estimate a piecewise-linear relation between board ownership and Tobin's Q and find that Tobin's Q increases with managerial ownership. Klapper and Love (2003) use firm-level data from fourteen emerging stock markets and report that better corporate governance is highly correlated with better operating performance and with higher market valuation. While much public and academic interest has been directed at corporate governance issues in non-insurance companies, little interest has been directed at the issue in insurance companies, with a few exceptions. Diacon and O'Sullivan (1995) and Hardwick *et al.* (2003) examine the impact of a variety of governance instruments on the performance of UK life insurance companies.

The purpose of this research is to examine the impact of ownership structure on corporate performance and the interrelation between corporate governance and performance, using evidence from Taiwan's life insurance industry. The relation between corporate governance and performance in Taiwan is an important research issue because Taiwanese insurance companies have some distinct characteristics.

First, according to Taiwan Company Law (2001), the minimum number of directors is three. The directors are elected by shareholders at the shareholders meeting and are required to hold shares in the company. Supervisors also are members of the board of directors. The role of supervisors is to monitor the company and prevent illegal activities. This is a unique feature of Taiwanese boards. Board organization and function in Taiwan are clearly a departure not only from the US and UK, but also from Japan and neighboring countries such as Hong Kong and Singapore (Filatotchev *et al.*, 2004).

Second, the process of maturity and globalization of Taiwanese capital markets is accompanied by an increase in importance of foreign institutional investors, particularly in the insurance industry. Some of the insurance companies are branches[1] of large foreign insurance companies. We believe that a foreign branch insurance company would have lower agency costs than a local independent insurance company because the headquarters of large foreign companies can monitor the branch better. Foreign investors may have a wealth of experience dealing with managerial opportunism and principal-agent problems in various national and cultural settings. This may make them better and more experienced monitors than domestically oriented investors (Thomsen and Pedersen, 2000). Thus, we are interested in whether a foreign branch insurance company performs differently than a local independent insurance company when we control all other types of ownership structure. Relatively few studies on this issue have investigated the Taiwanese case.

Third, some families in Taiwan own substantially large percentages of total shares in insurance companies. Thus, we are also interested in whether an insurance company with a substantial percentage of ownership by certain families performs differently than an insurance company without any family connection. The results of this study can contribute to our understanding of the relation between family ownership and corporate performance.

Our paper differs from the prior research in several ways. First, this is one of the few studies in the literature that investigates the relation between corporate governance and performance, where the performance is measured by efficiency scores.[2] The traditional performance measurements used in the study of the life insurance industry are conventional financial ratios such as the return on equity, return on assets, and expenses to premium ratio. For example, Diacon and O'Sullivan (1995) use two measures of performance—the annual percentage change in the company's life fund and the annual percentage change in the market value of total investment. None of the studies use efficiency scores in the corporate governance studies. This paper uses data envelopment analysis (DEA) to measure efficiency.[3] The DEA approach considers both inputs and outputs in the analyses. It explicitly considers cost efficiency, technical efficiency, and allocative efficiency.

Second, this paper uses the Malmquist index to measure productivity changes over the years, whereas prior studies did not analyze productivity changes. Third, while numerous studies have used the DEA approach to examine the bank branch (Charnes *et al*., 1990; Oral and Yolalan, 1990; Schaffnit *et al*., 1997; Sherman and Gold, 1985; Sherman and Ladino, 1995; and Cook *et al*., 2000), there is no study that we know of examining the

impact of corporate governance and ownership structure (such as branch insurers) on performance. Fourth, we examine whether family-controlled life insurers in Taiwan operate better than life insurers with other ownership structure. The characteristic of family-control is of particular interest because it not only is a categorization of insurer, but also serves as a governance mechanism. Finally, a unique feature of the supervisor function is that it provides a chance to examine whether supervisors on a Taiwan insurance company board serve as a mechanism for good governance.

The study proceeds as follows: Section II develops our hypotheses. Section III describes data and methodology. Section IV discusses empirical results. Section V concludes the paper.

HYPOTHESES DEVELOPMENT

The following section develops six hypotheses to test the relation between corporate governance and corporate performance and the relation between ownership structure and performance. The corporate governance measures comprise: proportion of board of directors and supervisors (Morck, Shleifer, and Vishny, 1988), proportion of block shareholding (Gorton and Schmid, 1996), and proportion of management shareholding (McConnell and Servaes, 1990). The three types of ownership structure are foreign branch insurers, family-controlled insurers, and local insurers.

According to Jensen and Meckling's (1976) convergence-of-interest hypothesis, the more shares the members of the board of directors hold, the greater their potential profits and the greater their incentive to increase their efforts toward maximizing company profits. Sarkar and Sarkar (2000) examine the roles of large shareholders in corporate performance in India. They find that performance is positively related to ownership by directors, foreigners, and lending institutions. Hence:

H1: There would be a positive relationship between the proportion of board of directors and supervisor shareholding and corporate performance.

Blockholders play an important role in reducing agency costs in corporations. Large blockholders want to obtain sufficient returns to make their participation in corporate governance cost-effective. Public corporations with concentrated ownership are thought to enjoy lower agency costs (Fama and Jensen, 1983, and Jensen, 1993). Gorton and Schmid (1996) show that bank blockholders improve the performance of German companies in their 1974 sample, and also find that both bank and non-bank blockholders improve performance in a 1985 sample. Hence:

H2: There would be a positive relation between the proportion of block shareholding and corporate performance.

Vance (1964) and Pfeffer (1972) suggest that managerial ownership is positively and significantly related to profit margin and return on equity. The convergence-of-interest hypothesis proposed by Jensen and Meckling (1976) suggests that the conflict between the goals of management and the goals of the company—that is, the agency problem—is lower as management shareholding is higher. Kesner (1987) finds that there is a positive relation between managerial ownership and firm performance. Hence:

H3: There would be a positive relation between the proportion of management shareholding and corporate performance.

Grabowski et al. (1993) find that branch banking is more efficient than a bank holding company structure. Chhibber and Majumdar (1999) examine the relation between performance and foreign ownership in Indian enterprise, which allow foreign majority ownership. They find that only when foreign owners' control exceeds 51 percent do firms display superior accounting performance. Filatotchev *et al*. (2004) suggests that share ownership by foreign financial institutions is associated with better performance. Hence:

H4: There would be a positive relation between foreign branch insurers and corporate performance.

Family shareholders have a very strong incentive to monitor their firm's management and maximize firm performance. They also tend to have a long-term view of their business strategy and of their treatment of their employees, customers, and other important stakeholders. The long-term view, rather than short-term, seems to encourage maximization of efficiency of the company. DeAngelo and DeAngelo (1985) suggest that family shareholders are more conscious of their firm's performance, as it affects their family reputation and their standing in society. Unlike a typical US or UK company where shares usually are diffusely held, shares are tightly held by one or several members of a family in a typical Asian corporation. McConaughy *et al.* (1998) found that family control is associated with higher firm performance. Wiwattanakantang (2001) argues that the positive performance associated with family ownership is in part due to lower agency problems of Thai firms. Kang (2000) and McConaughy *et al.* (2001) suggest that firms controlled by the founding family have greater value and are operated more efficiently. Ng (2005) examines the relationship between family ownership and firm performance in a family-based corporate environment. The results show that family ownership affects

firm performance and board structure is found not to affect performance after controlling for ownership. Hence:

H5: There would be a positive relation between family-controlled insurers and corporate performance.

It takes time for an insurer to establish its distribution system. Thus, the longer an insurer exists, the more efficient the insurer will be because it produces more outputs, other things being equal. Hence:

H6: There would be a positive relation between insurer age and corporate performance.

DATA AND METHODOLOGY

We provide a discussion of data and methodology in this section.

Data

The sample companies used in this research are life insurance companies in Taiwan from 1996 to 2003. A total of 24 firms represent the complete population of Taiwan life insurers with data available throughout eight sample years.[4] Among the 24 companies, 12 are foreign branch insurers, 7 are family-controlled insurers, and 5 are local independent insurers. We obtain data from the annual reports of insurance companies from the Taiwanese Security Exchange Committee, Taiwan Economic Journal databases, the Financial Intelligence Bank databases, and the Annual Statistics Report of Taiwan Life Insurance Business published by the Life Insurance Association of The Republic of China over 1996–2003.

The reason that our sample period stops in 2003 is stated below. Upon joining with the World Trade Organization in 2002, the Taiwanese government implemented the first stage of financial reformation. Following the establishment and implementation of the "Financial Institution Merger Act" and "Financial Holding Company Law," fourteen financial holding companies have been established in Taiwan. Consequently, the financial institutions are permitted to operate across different fields of businesses, such as banking, securities, life insurance, property and liability insurance, and other related businesses. The Taiwanese government implemented the second stage of financial reformation in 2004. Through this second stage of financial reformation, fourteen financial holding companies were planned to merge into seven or less financial holding companies to increase the market share of each financial holding company and improve its competitiveness in a global economy. We believe that inclusion of years after 2003 is not appropriate because these insurers would be part of financial holding

companies. To maintain the consistency of ownership structure of the sample, we choose the sample period that spans 1996–2003.

Methodology

Modern frontier efficiency methodologies have become a dominant approach to measuring firm performance. There are two principal types of efficiency methodologies: the econometric (parametric) approach, and the mathematical programming (non-parametric) approach (see Cummins and Weiss, 2000). The econometric approach requires the specification of a production, cost, revenue, or profit function as well as an assumption about the error term. The non-parametric programming approach requires less specification of the optimization problem. We chose the non-parametric programming approach because it makes the work less vulnerable to the specification errors that are common in the econometric approach.

This study uses the non-parametric frontier efficiency methods of data envelopment analysis (DEA) to measure corporate performance. To save space, we do not provide the specific methodology here. For details, see Cummins and Weiss (2000).

We next discuss the outputs and inputs of the value-added approach.

Outputs

Following Fecher *et al*. (1993), Donni and Fecher (1997), and Toivanen (1997), we use various premium incomes as our output variables. We further segregate the premium incomes into three categories: life annuity premium income, health and accident premium income, and group insurance premium income. For robustness, we also use claim benefits as another output proxy.

Inputs

We classify insurance inputs into two different groups: labor and capital. Labor input refers to personnel expenses for each firm, and its input price equals personnel expenses per person. The capital input of insurers incorporates equity capital of the insurer. The price of capital input equals the ratio of debt to equity.[7]

EMPIRICAL RESULTS

Table 1 provides descriptive statistics for both inputs and outputs for all insurers. The evidence shows that average life annuity premium income is the highest and group insurance premium income is the lowest. Table 2 shows the descriptive statistics for both inputs and outputs by the type of

Table 1. Descriptive Statistics for Output and Input Variables[a]

	Minimum	Maximum	Average	Standard deviation
Output variables:				
Life annuity premium income (in number)	32,431	234,680,777	20,765,801	2,888,823
Health and accident premium income (in number)	11,419	44,630,720	4,524,715	603,994
Group insurance premium income (in number)	0	4,962,912	640,290	64,414
Input variables:				
Personnel expenses (in number)	117,845	37,169,896	5,496,631	8,806,988
Personnel expenses per person (in number)	130	6,762	912	55
Equity (in number)	0	71,101,110	6,006,925	12,990,725
Ratio of debt to equity	0.0055	104.99	3.65	0.60

[a]Data source: The Annual Statistics Report of Taiwan Life Insurance Business published by the Life Insurance Association of The Republic of China, over 1996–2003.

ownership structure. We categorize the ownership structure by three types: foreign branch insurers, family-controlled insurers, and local insurers. Table 2 shows the differences in variables of inputs and outputs among foreign branch insurers, family-controlled insurers, and local insurers. The overall results indicate outputs of family-controlled insurers are the largest, local insurers are next, and those of foreign branch insurers are the smallest. Interestingly, foreign insurers pay more personnel expenses per employee than family-controlled insurers and local insurers. Finally, it should be noted that all the pair comparisons in Table 2 for the input and output variables and other variables are statistically significant at the 10% level or less.

Table 3 shows the descriptive statistics for technical efficiency scores, allocative efficiency scores, and cost efficiency scores for all insurers. The results of technical efficiency scores in Table 3 show that, on average, insurers could have produced their outputs using 62.2 percent of the

Table 2. Analysis of Input and Output Variables Among Different Ownership Structures

Panel A: Foreign Branches Versus Family-Controlled Insurers

Outputs	Foreign branches	Family-controlled	t-value	p-value
Life annuity premium income (in number)	5,684,014	42,853,159	4.4684	0.000
Health and accident premium income (in number)	2,001,144	7,930,293	3.7980	0.000
Group insurance premium income (in number)	209,596	965,200	4.4916	0.000
Inputs				
Personnel expenses (in number)	4,087,869	10,250,542	-3.2510	0.000
Personnel expenses per person (in number)	3,692	20,430	4.8490	0.000
Equity (in number)	1,009,533	13,927,365	4.6282	0.000
Ratio of debt to equity	1.4222	6.7397	2.7325	0.004

Panel B: Foreign Branches Versus Local Insurers

Outputs	Foreign branches	Local	t-value	p-value
Life annuity premium income (in number)	5,684,014	20,223,854	3.7161	0.000
Health and accident premium income (in number)	2,001,144	4,724,238	2.2115	0.014
Group insurance premium income (in number)	209,596	930,657	6.3896	0.000
Inputs				
Personnel expenses (in number)	4,087,869	2,985,518	-2.9250	0.000
Personnel expenses per person (in number)	3,692	9,306	2.8406	0.002
Equity (in number)	1,009,533	5,225,617	4.5106	0.000
Ratio of debt to equity	1.4222	3.7480	4.5358	0.000

Table continues

Table 2. *Continued*

Panel C: Family-Controlled Versus Local Insurers

Outputs	Family-controlled	Local	t-value	p-value
Life annuity premium income (in number)	42,853,159	20,223,854	–2.5086	0.007
Health and accident premium income (in number)	7,930,293	4,724,238	1.7359	0.042
Group insurance premium income (in number)	965,200	930,657	–0.1789	0.429
Inputs				
Personnel expenses (in number)	10,250,542	2,985,518	2.6790	0.001
Personnel expenses per person (in number)	20,430	9,306	–2.9283	0.002
Equity (in number)	13,927,365	5,225,617	–2.9631	0.002
Ratio of debt to equity	6.7397	3.7480	1.7545	0.041

Table 3. DEA Efficiency Score Results (1996–2003)

	Minimum	Maximum	Average	Standard deviation
Technical efficiency	0.023	1	0.6224	0.3201
Allocative efficiency	0.084	1	0.7457	0.2489
Cost efficiency	0.023	1	0.4718	0.3277

inputs. Table 3 also shows that insurer allocative efficiency scores and cost efficiency scores averaged 74.6 percent and 47.2 percent, respectively.

Panel A of Table 4 shows that the average of all efficiency scores (technical efficiency, allocative efficiency, and cost efficiency scores) of family-controlled insurers are higher than those of foreign branch insurers. For example, the average of technical efficiency scores of family-controlled insurers is 61.2 percent, while that of foreign branch insurers is 53.3 percent. Panel B indicates that the differences in technical and allocative efficiency between foreign branch insurers and local insurers are statistically significant. Specifically, the average of technical efficiency scores of local insurers

Table 4. Analysis of Efficiency Scores Among Different Ownership Structures (Premium Income as Dependent Variable)

Panel A: Foreign Branches Versus Family-Controlled Insurers

	Foreign branches	Family-controlled	t-value	p-value
Technical efficiency	0.533	0.612	–1.240	0.109
Allocative efficiency	0.733	0.791	–1.476	0.071
Cost efficiency	0.406	0.492	–1.413	0.081

Panel B: Foreign Branches Versus Local Insurers

	Foreign branches	Local	t-value	p-value
Technical efficiency	0.533	0.738	1.967	0.026
Allocative efficiency	0.733	0.730	–1.294	0.099
Cost efficiency	0.406	0.538	0.705	0.241

Panel C: Family-Controlled Versus Local Insurers

	Family-controlled	Local	t-value	p-value
Technical efficiency	0.612	0.738	–4.293	0.000
Allocative efficiency	0.791	0.730	0.058	0.477
Cost efficiency	0.492	0.538	–2.499	0.007

is higher than that of foreign branch insurers. On the other hand, the average allocative score of foreign branch insurers is higher than that of local insurers. Panel C indicates that differences in technical and cost efficiency between family-controlled insurers and local insurers are statistically significant. Local insurers are more efficient than family-controlled insurers.

In summary, the evidence provided by univariate analysis indicates that, in general, the efficiency scores are different for different types of ownership structures. The disadvantage of univariate analysis is that it

does not control for other variables. Thus, we perform regression analyses next.

We use the following regression model to test the hypotheses developed above.

$$ES_{it} = \alpha + \beta_1 BD_{it} + \beta_2 MH_{it} + \beta_3 BH_{it} + \beta_4 FAM_{it} + \beta_5 BRAN_{it} + \beta_6 AGE_{it} + \varepsilon_{it}$$

Dependent variable:

ES_{it}: Efficiency scores for firm i in year t.

Three efficiency scores (technical efficiency, allocative efficiency, and cost efficiency) are used as dependent variables.

Independent variables:

(1) BD_{it}: Shares held by board of directors and superiors divided by the outstanding shares for firm i in year t.

(2) MH_{it}: Shares held by management divided by the outstanding shares for firm i in year t.

(3) BH_{it}: Shares held by block shareholders divided by the outstanding shares for firm i in year t.

(4) FAM_{it}: Dummy variable that takes the value of 1 if firm i has two or more family members on the board or serving in management in year t and takes the value of zero, otherwise (Handler, 1989).

(5) $BRAN_{it}$: Dummy variable that takes the value of 1 if firm i in year t is a foreign branch insurer and takes the value of zero, otherwise.

(6) AGE_{it}: The number of year that firm i has operated in Taiwan in year t.[6]

Descriptive Statistics of Independent Variables

Table 5 contains descriptive statistics for the independent variables used in this study. As shown in Table 5, the average proportion of shares held by the board of directors is 19.3 percent. The proportion of block shareholding ranges from 10 percent to 100 percent, revealing that there are big differences in the shareholding structures among the sample companies. The main reason is that the Taiwan government's Law of Financial Holding Companies substantially relaxed the limitation of a single management for financial institutions.

To perform the regression analysis, there are two principal econometric issues that need to be resolved. The first is that our data are panel data. We conduct the analyses using both fixed effects and random effects models. The fixed effects model includes time and company dummies to pick up those influences on performance that are company-invariant and time-invariant, respectively.

The random effects model is specified as follows:

Table 5. Descriptive Statistics for All Independent Variables[a]

	Minimum	Maximum	Average	Std. Deviation
BD_{it}	0	1	0.193	0.289
MH_{it}	0	0.02	0.002	0.006
BH_{it}	0.1	1	0.526	0.283
FAM_{it}	0	1	0.563	0.499
$BRAN_{it}$	0	1	0.458	0.036
AGE_{it}	3	56	20.2	17.582

Note: BD_{it} = shares held by the board of directors and superiors divided by the outstanding shares; MH_{it} = shares held by the management divided by the outstanding shares; BH_{it} = shares held by block shareholders divided by the outstanding shares; FAM_{it} = a dummy variable that takes the value of 1 if firm i has two or more family members on the board or serving in management in year t and takes the value of zero, otherwise; $BRAN_{it}$ = a dummy variable that takes the value of 1 if firm i in year t is a foreign branch and takes the value of zero, otherwise; AGE_{it} = age of firm i in year t.
[a]Data source: The annual reports of insurance companies from Taiwanese Security Exchange Committee and Taiwan Economic Journal databases and Financial Intelligence Bank databases.

$$Y_{it} = \alpha + \beta' X_{i,t} + \varepsilon_{i,t} + u_i$$

where $E[u_i] = 0$, $Var[u_i] = \sigma \wedge 2(u)$, $Cov[\varepsilon_{i,t}, u_i] = 0$,

$Y_{i,t}$ = dependent variable for firm i in year t,

$X_{i,t}$ = vector of regressors,

α, β = regression intercept term and regression parameter vector, respectively.

u_i = random disturbance characterizing the i^{th} firm in the sample, and

$\varepsilon_{i,t}$ = random error term assumed to be uncorrelated with u_i.

The primary difference between the fixed effects and random effects model is that the fixed effects model allows the intercepts of the regression to vary by firm, whereas the random effects model allows for differences among firms using the firm-specific error component, u_i. The random effects model requires the assumption that the individual firm effect is

independent of the regressors, while the fixed effects model does not impose this requirement on the model.

In order to determine which model to use, we conduct Breusch and Pagan Lagrange Multiplier tests (Greene, 1997) to determine whether the intercepts are different from one another. This null hypothesis is rejected at high levels of significance. These results give a clear indication that firm effects are present, but do not necessarily convey information about the appropriateness of fixed versus random effects. To investigate the latter issue, we conduct a Hausman test of the null hypothesis that the firm-specific error term is uncorrelated with the residuals (Greene, 1997). If the null hypothesis is rejected, the implication is that the random effects model is not appropriate and the fixed effects model should be used. The combined results of the Bruesch-Pagan and Hausman test thus suggest which model is appropriate. There are several models in this paper; some regression results are based on the fixed effects model and some are based on the random effects model. The fixed effects estimator requires that there be group variation in all variables for at least some groups, hence, we drop the family variable from the fixed effects model. The second estimation issue arises because the dependent variables in the regressions are censored at the maximum efficiency score of 1. The use of ordinary least squares would not be appropriate. Therefore, we conduct our regressions using the Tobit maximum likelihood procedure.

Table 6 reports the Pearson correlations of the variables. This table suggests that there are significantly positive relations between the proportion of block shareholdings and the proportion of board of director and superior shareholdings. On the contrary, the relation between the proportion of block shareholdings and the proportion of management shareholdings is negative. To avoid the potential problem of multicollinearity, we regress performance on the proportion of block shareholdings separately.

Table 7 presents the regression results.[7] The results of technical efficiency, allocative efficiency, and cost efficiency regressions are presented in Panel A, Panel B, and Panel C, respectively. The results of all sample firms (family-controlled insurers, foreign branch insurers, and local independent insurers) are reported in column (1). We report the results of family-controlled insurers and local independent insurers in column (2) because the corporate governance data are not available for foreign branch insurers. The independent variables used in columns (3) and (4) are different from those in equation (2). The reason is that some variables suffer from multicollinearity problems.

Panel A in Table 7 shows that the coefficient of family-controlled insurers (family) and foreign branch insurers (branch) are significant at the 10% and 5% level in equation (1). That is, family-controlled insurers and

Table 6. Pearson Correlation of the Independent Variables

	BD_{it}	MH_{it}	BH_{it}	FAM_{it}	AGE_{it}
BD_{it}	1				
MH_{it}	0.03 0.792	1			
BH_{it}	0.413* 0.000	–0.359** 0.001	1		
FAM_{it}	0.285* 0.010	0.022 0.843	–0.037 0.743	1	
AGE_{it}	0.138 0.222	0.166 0.124	–0.127 0.263	–0.196 0.081	1

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Note: BD_{it} = shares held by the board of directors and superiors divided by the outstanding shares; MH_{it} = shares held by the management divided by the outstanding shares; BH_{it} = shares held by block shareholders divided by the outstanding shares; FAM_{it} = a dummy variable that takes the value of 1 if firm i has two or more family members on the board or serving in management in year t and takes the value of zero, otherwise; $BRAN_{it}$ = a dummy variable that takes the value of 1 if firm i in year t is a foreign branch and takes the value of zero, otherwise; AGE_{it} = age of the firm i in year t.

foreign branch insurers are more technically efficient than local independent insurers. The evidence also shows age is a significant factor in determining the technical efficiency. In other words, older firms are more efficient. Column (2) of Panel A shows the results of family-controlled insurers and local insurers only. We find the coefficient of the proportion of board of director and superior shareholdings is negative and significant at the 1% level. The result is surprising because we predicted a positive sign. One possible reason is that the proportion of board of director and superior shareholdings is highly and statistically significantly correlated with block shareholding and the family-controlled insurer variable, respectively. The evidence shows that management holding is positively related to technical efficiency scores. We also find the coefficient of the age variable is positive and significant at the 1% level.

We dropped BH from column (2) and present the results in column (3). The evidence shows that the coefficient of BD becomes insignificant and the coefficient of family becomes positive and significant at the 5% level. We only include three variables (BH, FAM, and AGE) in column (4) and

Table 7. Maximum Likelihood Tobit Regressions (Premium Income as Dependent)

Panel A: Dependent Variable = Technical Efficiency

	(1) Coefficient	(2) Coefficient	(3) Coefficient	(4) Coefficient
Intercept	0.136	0.426	0.338	0.171
BD_{it}		–1.053***	0.039	
MH_{it}		20.192***	6.226*	
BH_{it}		0.109		0.220***
FAM_{it}	0.283*	0.016	0.151**	0.226***
$BRAN_{it}$	0.335**			
AGE_{it}	0.017***	0.106***	0.011***	0.006***
Lagrange Multiplier test	124.99***	73.99***	148.83***	161.98 ***
Hausman test	3.91	10.50	1.82	3.80
Test results suggest	Random effect model	Random effect model	Random effect model	Random effect model
N	192	80	80	80

Panel B: Dependent Variable = Allocative Efficiency

	(1) Coefficient	(2) Coefficient	(3) Coefficient	(4) Coefficient
Intercept	0.710	0.755***	0.579	0.839
BD_{it}		0.534***	0.669	
MH_{it}		0.777***	2.592	
BH_{it}		–0.563***		0.022
FAM_{it}	0.721	0.014***	0.008	0.072**
$BRAN_{it}$	0.241			
AGE_{it}	0.237	0.001***	0.001	0.007
Lagrange Multiplier test	132.60***	93.26***	148.5**	205.28***
Hausman test	1.57	5.73	2.63	1.05
Test results suggest	Random effect model	Random effect model	Random effect model	Random effect model
N	192	80	80	80

Table continues

Table 7. *Continued*

Panel C: Cost Efficiency

	(1) Coefficient	(2) Coefficient	(3) Coefficient	(4) Coefficient
Intercept	0.286	5.157	0.2555*	0.267
BD_{it}		–0.015	0.2266	
MH_{it}		10.415*	0.073	
BH_{it}		–0.118		0.112
FAM_{it}	0.038	[a]	0.159***	0.229***
$BRAN_{it}$	0.064			
AGE_{it}	0.009**	0.281	0.008***	0.008**
Lagrange Multiplier	141.62***	33.64***	50.38***	63.56***
Hausman test	2.93	24.28***	6.19	4.85
Test results suggest	Random effect model	Fixed effect model	Random effect model	Random effect model
N	192	80	80	80

[a]We drop the family variable from the fixed effects model.
Statistical significance at the 1, 5, and 10 percent levels is denoted by ***, **, and *, respectively.
Note: BD_{it} = shares held by the board of directors and superiors divided by the outstanding shares; MH_{it} = shares held by the management divided by the outstanding shares; BH_{it} = shares held by block shareholders divided by the outstanding shares; FAM_{it} = a dummy variable that takes the value of 1 if firm *i* has two or more family members on the board or serving in management in year *t* and takes the value of zero, otherwise; $BRAN_{it}$ = a dummy variable that takes the value of 1 if firm *i* in year *t* is a foreign branch and takes the value of zero, otherwise; AGE_{it} = age of the firm *i* in year *t*.

find that all of them are positively related to technical efficiency scores and statistically significant at the 1% level.

The overall results of Panel A in Table 1 indicate that family-controlled insurers and foreign branch insurers are more technically efficient than local insurers. There is some evidence that corporate governance variables such as management shareholding and block shareholding are positively related to technical efficiency. Finally, AGE is positively related to technical efficiency.

Panel B presents the results of allocative efficiency regressions. Equation (1) in Panel B shows that all variables are not statistically significant

for all sample insurers. We drop foreign branch insurers from our sample and report the results in equation (2). The evidence of equation (2) shows the coefficients of all variables are negative and significant at the 1% level with one exception. The coefficient of block shareholding is negative and significant at the 1% level. This evidence is not consistent with our prediction. Again, a possible reason is the multicollinearity problem. When we drop BD from Equation (2), we find the BD variable becomes insignificant. For allocation efficiency, we find some evidence that corporate governance and ownership matter, but the evidence is weak and not robust.

We present the results of cost efficiency regressions in Panel C. We use the fixed effects model in equation (2) because the Hausman test rejects the null hypothesis that the coefficients of the fixed effects model and random effects model are the same. The overall evidence of Panel C in Table 7 reveals that family-controlled insurers are more cost efficient and that the longer an insurer exists, the more efficient it is.

It should be noted that the estimate of the coefficient of BD is not statistically significant in all equations except equation (2) in Panel B. The result is consistent with Dalton *et al.* (1998) and Hermalin and Weisbach (2000), which conclude that board composition has no effect on company performance.

To further test the robustness of the results, we replace premium income with claim benefits as the output variable. We further segregate the number of claim benefits into three categories: life annuity claim benefits, health and accident claim benefits, and group insurance claim benefits. Panel A of Table 8 shows that the difference in technical efficiency, allocative efficiency, and cost efficiency between family-controlled insurers and foreign branch insurers are statistically significant. Panel B of Table 8 indicates that only the difference in allocative efficiency between foreign branch insurers and local insurers is statistically significant. The results of Panel C of Table 8 are similar to those of Panel C of Table 4.

Table 9 presents the regression results based on claim benefits as the dependent variable. The technical efficiency, allocative efficiency, and cost efficiency regression results are presented in Panel A, Panel B, and Panel C, respectively. For the full sample, we find that the results of Table 9 are very similar to those of Table 7. For the sample that consists of family-controlled insurers and local insurers, we also find similar results, with two major exceptions. First, contrary to Table 7, the estimate of the coefficient of BD is positive and statistically significant in Panel A, Table 9 (equation (2)), suggesting that the existence of a board of directors and superiors has a favorable influence on the insurer's overall technical efficiency. These results are consistent with hypothesis 3. Second, we are not able to reject the null hypothesis that the proportion of block shareholdings does not

Table 8. Analysis of Efficiency Scores Among Different Ownership Structures (Claim Benefits as Dependent Variable)

Panel A: Foreign Branches Versus Family-Controlled Insurers

	Foreign branches	Family-controlled	t-value	p-value
Technical efficiency	0.451	0.641	3.594	0.000
Allocative efficiency	0.860	0.923	2.362	0.010
Cost efficiency	0.369	0.591	4.732	0.000

Panel B: Foreign Branches Versus Local Insurers

	Foreign branches	Local	t-value	p-value
Technical efficiency	0.451	0.603	–0.657	0.256
Allocative efficiency	0.860	0.873	–1.962	0.026
Cost efficiency	0.369	0.540	–0.876	0.191

Panel C: Family-Controlled Versus Local Insurers

	Family-controlled	Local	t-value	p-value
Technical efficiency	0.641	0.603	2.870	0.002
Allocative efficiency	0.923	0.873	0.408	0.341
Cost efficiency	0.591	0.540	3.341	0.001

have an influence on life insurer's cost, technical, and allocative efficiencies in Table 9. Two interesting findings in Table 9 are summarized below. First, the coefficients of family-controlled insurers are found to be significant in Panel A. Second, we find that the age of insurers is positively and significantly related to technical efficiency and cost efficiency.

The literature uses different proxies for the effectiveness of board ownership. For robustness, we first follow Like Morck *et al*. (1988) to examine the impact of board ownership on firm efficiency. Specifically, we estimate piecewise linear regressions and allow for two changes in the slope coefficient on board ownership. As Morck *et al*. (1988), we use the following variables to estimate and report piecewise linear regressions:

Table 9. Maximum Likelihood Tobit Regressions (Claim Benefits as Dependent)

Panel A: Dependent Variable = Technical Efficiency

	(1) Coefficient	(2) Coefficient	(3) Coefficient	(4) Coefficient
Intercept	0.159	0.312	2.2270	0.317
BD_{it}		0.658*	0.7962***	
MH_{it}		–0.892	2.2661	
BH_{it}		0.052		0.053
FAM_{it}	0.278***	[a]	[a]	0.106**
$BRAN_{it}$	0.184			
AGE_{it}	0.012***	0.006	0.1735	0.012***
Lagrange Multiplier	126.11**	7.27***	18.49***	28.81***
Hausman test	2.37	17.25***	16.38**	1.16
Test results suggest	Random effect model	Fixed effect model	Fixed effect model	Random effect model
N	192	80	80	80

Panel B: Dependent Variable = Allocative Efficiency

	(1) Coefficient	(2) Coefficient	(3) Coefficient	(4) Coefficient
Intercept	0.880	0.893	0.290	0.420
		0.188	0.669***	
		0.767	1.865	
		0.102		0.088
	0.031	[a]	0.047	0.017
	0.022			
	0.001	0.007	0.009**	0.008***
Lagrange Multiplier	10.92***	17.16***	22.87***	24.38***
Hausman test	5.23	18.10**	1.423	1.754
Test results suggest	Random effect model	Fixed effect model	Random effect model	Random effect model
N	192	80	80	80

Table continues

Table 9. *Continued*

Panel C: Dependent Variable = Cost Efficiency

	(1) Coefficient	(2) Coefficient	(3) Coefficient	(4) Coefficient
Intercept	0.520	0.333**	1.990	0.437
		0.033	0.697**	
		2.134	0.075	
		0.155		0.272***
	0.108	0.016	0.142**	0.037
	0.250			
	0.006**	0.009*	0.154*	0.089**
Lagrange Multiplier	26.81***	7.14***	20.3***	75.32***
Hausman test	4.51	9.14	2.92	3.13
Test results suggest	Random effect model	Random effect model	Random effect model	Random effect model
N	192	80	80	80

Statistical significance at the 1, 5, and 10 percent levels is denoted by ***, **, and *, respectively.

[a]We drop the family variable from the fixed effects model.

Note: BD_{it} = shares held by the board of directors and superiors divided by the outstanding shares; MH_{it} = shares held by the management divided by the outstanding shares; BH_{it} = shares held by block shareholders divided by the outstanding shares; FAM_{it} = a dummy variable that takes the value of 1 if firm *i* has two or more family members on the board or serving in management in year *t* and takes the value of zero, otherwise; $BRAN_{it}$ = a dummy variable that takes the value of 1 if firm *i* in year *t* is a foreign branch and takes the value of zero, otherwise; AGE_{it} = age of the firm *i* in year *t*.

BRD.0to5 = board ownership if board ownership < 0.05,

= 0.05 if board ownership ≥ 0.05;

BRD.5to25 = 0 if board ownership < 0.05,

= board ownership minus 0.05 if 0.05 ≤ board ownership < 0.25,

= 0.2 if board ownership ≥ 0.25;

BRD.OVER25 = 0 if board ownership < 0.25,

= board ownership minus 0.25 if board ownership ≥ 0.25.

Our results (not tabulated) are generally robust with respect to those of Tables 7 and 9. In other words, the board ownership is not related to efficiency scores when we use the proxy proposed by Morck *et al.* (1988). We also use the size of board of directors and superiors to replace the proportion of the board of directors' and superiors' shareholding. Again, the results are not statistically significant.

We next use the Malmquist index analysis to measure productivity changes over the years. The Malmquist index is proposed to measure productivity change (see Malmquist, 1953, and Fare et al., 1992.)[8] Malmquist analysis is specifically useful in that it allows us to separate shifts in improvements in efficiency relative to the frontier (technical efficiency change) from the frontier (technical change) and better understand the total productivity change. Technical efficiency change is the ratio of the distance from the frontier in period t to the distance in period t+1. If the firm is closer to the frontier in period t+1 than it was in period t, technical efficiency has improved between t and t+1. Technical change, on the other hand, is a geometric mean of shifts in the frontier between period t and t+1. If the Malmquist index of total factor productivity is greater than 1, it implies that total factor productivity progress has occurred. A favorable (unfavorable) technical efficiency change implies "catching up (falling behind)." A Malmquist index of technical change greater (less) than 1 implies "innovation (technical regress)."

The results are presented in Table 10, with year-to-year indices in the upper panel and cumulative changes in the lower panel. The cumulative change for a given year is the product of the year-to-year indices from the beginning of the period to the end of that year, e.g.—for 2000, the cumulative index is the product of the 1998–1999 and 1999–2000 indices.

The results of Malmquist index analyses for three different insurer ownership structures are presented in three panels.

Panels A, B, and C show Malmquist indices for family-controlled insurers, foreign branch insurers, and local insurers, respectively. In Panel A of Table 10, the cumulative results of technical efficiency are 1 in year 8, implying that the technical efficiency is neither catching up nor falling behind. The technology change score in year 8 is 0.408, suggesting that family-controlled insurers experience deterioration in technology change.[9] In addition, the total productivity change score in year 8 is also 0.408, suggesting that family-controlled insurers suffer productivity regress.

The results of Panel C are similar to those of Panel A, but Panel B shows that foreign branch insurers progress in technology change and total productivity change. The overall evidence of Table 10 indicates that family-controlled insurers and local insurers suffer serious technology regress,

Table 10. Malmquist Index Summary of Annual Means[a]

Panel A. Family-Controlled Insurers

Year	Technical efficiency change	Technology change	Total productivity change
2	0.904	0.935	0.845
3	1.076	0.681	0.733
4	1.049	0.777	0.815
5	1.006	2.287	2.301
6	1.011	0.552	0.558
7	0.989	0.691	0.683
8	1.011	0.591	0.598
Cumulative results			
3	0.973	0.637	0.619
4	1.129	0.530	0.597
5	1.055	1.777	1.875
6	1.017	1.262	1.284
7	1.000	0.381	0.381
8	1.000	0.408	0.408

Panel B: Foreign Branches

Year	Technical efficiency change	Technology change	Total productivity change
2	1.01	0.118	0.119
3	0.98	2.272	2.225
4	1.021	1.054	1.076
5	0.962	0.778	0.748
6	0.986	2.294	2.262
7	1.05	1.028	1.079
8	0.86	0.764	0.657
Cumulative results			
3	0.998	0.268	0.265
4	1.001	2.395	2.394
5	0.982	0.820	0.805
6	0.949	1.785	1.692
7	1.035	2.358	2.441
8	0.903	0.785	0.709

Table continues

Table 10. *Continued*

Panel C: Local Insurers

Year	Technical efficiency change	Technology change	Total productivity change
2	0.993	1.072	1.065
3	1.002	1.209	1.211
4	1.013	1.259	1.275
5	1	1.187	1.187
6	1	0.728	0.728
7	0.998	0.779	0.777
8	1.002	0.753	0.755
Cumulative results			
3	0.995	1.296	1.290
4	1.015	1.522	1.544
5	1.013	1.494	1.513
6	1.000	0.864	0.864
7	0.998	0.567	0.566
8	1.000	0.587	0.587

[a]The top section of each panel presents the year-to-year Malmquist index and its components. The cumulative changes from year to year are reported in the lower section. The cumulative change for a given year is the product of the year-to-year indices from the beginning of the period to the end of the year.

and result in total productivity regress. The changes in productivity are not related to ownership structure.

CONCLUSIONS

Previous research on the effects of ownership structure and corporate governance on performance has focused on the U.S. However, Asian corporations operate in a distinctive culture and in a different legal environment, which may have an important impact on governance-performance relations. Corporate governance has been acknowledged as relatively weak in many Asian countries, with companies being widely associated with creative accounting and lack of transparency in their operations, as well as having notorious and frequent cases of fraud by company management (*Taipei Times*, 18 July 2000). Taiwan is characterized by a codified style of legal system, which has influenced the development

of the country's system of corporate governance (La Porta *et al*., 1997). Thus, this paper focuses on a single country, Taiwan.

This study examines the impact of ownership structure on corporate performance and the interrelation between corporate governance and performance in the life insurance industry. There is some evidence indicating that the proportion of directors' and supervisors' shareholding generally has a positive relation with technical and allocative efficiency depending on the output proxy. However, the results are weak and not consistent with respect to different types of efficiency measures and different output proxies.

We also find that the proportion of management shareholding is positively related to efficiency measures when we use premium income as an output proxy. This result implies that when managers hold a proportion of shares in firms, the interests of shareholders and managers are aligned and result in increasing corporate performance. The positive relation is no longer statistically significant when we use claim benefits as the output proxy.

Although previous research provides ambiguous results in terms of the possible effects of the proportion of block shareholding on performance (Pound, 1988; Short, 1994), our results cannot reject the null hypothesis that the proportion of block shareholding and efficiency scores are positively related. The result is not consistent with the view that large shareholders play an active role in corporate governance (Shleifer and Vishny, 1986).

Consistent with our conjecture, we find family-controlled insurers perform better than local insurers. It should be noted that the family-controlled insurer variable serves not only as a corporate governance variable but also as an ownership variable.

Several earlier studies found that foreign institutional investors are more likely to produce positive performance effects on the local firm than domestic institutions (Thomsen and Pedersen, 2000; Filatotchev *et al.*, 2004). This paper adds to a growing body of literature that finds that there is a positive relation between foreign branch insurers and corporate performance in Taiwan. It should be noted that we use efficiency scores as measures of performance, while the literature uses other variables such as profitability.

Finally, we use the Malmquist index to measure productivity changes over the years. We find that family-controlled insurers, foreign branch insurers, and local insurers all suffer technology regress and total productivity losses. The overall conclusion is that most corporate governance variables have a positive, but weak, effect on corporate performance as measured by efficiency scores. The two most consistent variables that

have a positive impact on efficiency are family-controlled insurers and insurer age.

NOTES

[1] Prudential of Taiwan and AEGON Taiwan became subsidiaries in 2001 and New York Life became a subsidiary in 2002.

[2] Lehmann *et al*. (2004) investigate the relation between corporate governance and efficiency for the non-financial industries. However, they do not use regression analyses to examine the relationship.

[3] For example, Hardwick et al. (2003) and Jeng and Lai (2005) use the DEA approach to measure efficiency.

[4] There were 27 life insurers in the Taiwan life insurance industry in 2003. Only 24 firms have complete data. The proportion of our sample (24 firms) in terms of total assets is 92.77%.

[5] Jeng and Lai (2005) use D/E ratio to proxy for equity capital price based on the literature of cost of capital.

[6] Previous research has repeatedly shown that age has an impact on corporate performance (Hardwick *et al.*, 2003), so we include the firm's age to test whether firms with longer histories have a better performance.

[7] Only 10 firms have corporate governance data during the sample period. The proportion of 10 firms in terms of total assets accounts for 74.05% of the Taiwan life insurance industry.

[8] A recent paper that uses Malmquist Index analysis is Jeng and Lai (2005).

[9] There is no statistical test for Malmquist Index analysis.

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