A Study of the Financial/Business Performance and Market Share of Non-Life Insurance Industry in Taiwan

Guan-Chih Chen* & Hening Xu**

*Assistant Professor, Department of Finance and Accounting, Dhurakij Pundit University, Bangkok, THAILAND.
E-Mail: u9727902{at}gmail{dot}com
**Department of Finance and Accounting, Dhurakij Pundit University, Bangkok, THAILAND.
E-Mail: 454707657{at}qq{dot}com

***Abstract*—**This research explores the effect of financial and business performance to market share of non life insurance companies in Taiwan from 2005 to 2011. First, apply factor analysis to extract seventeen financial ratios into four factors which are defined as "risk assumption ability," "investment performance," "underwriting quality," and "business ability." The factor scores are calculated for the comparison of financial and business performance between domestic and foreign companies, under different systems, before and after financial crisis by One-Way ANOVA. The results find out the risk assumption ability, investment performance of domestic companies are significantly superior to foreign companies, but domestic companies in underwriting quality aren't as good as foreign companies. The investment performance of companies under financial holding system is superior to non-financial holding system. The parameter estimate of fixed effects model show domestic companies have higher market shares than foreign companies and the business ability was significant in the domestic model. The results also show that the "risk assumption ability", "underwriting quality" and "investment ability" significantly affect market share in financial holding system and non-financial holding system, but "business ability" does not affect market share under different systems.

***Keywords*—**Business Ability; Financial/Business Performance; Investment Performance; Market Share; Non-Life Insurance Industry; Risk Assumption Ability; Underwriting Quality.

***Abbreviations*—**Analysis of Variance (ANOVA); Business Ability (BA); Fixed Effect (FE); Investment Performance (IP); Lagrange Multiplier (LM); Ordinary Least Square (OLS); Risk Assumption Ability (RAA); Random Effect (RE); Underwriting Quality (UQ).

I. INTRODUCTION

AFTER the development period of Taiwan's non-life insurance industry in 1960, with the pressure from the liberalization and internationalization of the financial market, adding the long-term balance of trade surplus to the U.S., the Taiwanese government decides to open the insurance market to the U.S. in 1987, permit American insurance companies to open branches in Taiwan at the same time, this led to the permission of Taiwanese-funded insurance companies in 1992 and created the opportunity for international insurance companies from other countries to open branches within Taiwan. Right now there are 19 licensed non-life insurance companies in Taiwan, including 14 domestic companies and 5 foreign ones.

In recent years, according to the data presented by Non-Life Insurance Review [1], the direct written premium of Taiwan's non-life insurance industry reveals continuous decline in 2011. The premium income is more than the previous year with 6.83% of positive growth. The Increase of premium income in 2011 mainly resulted from motor, commercial fire, and accident and health insurance. The positive growth of motor insurance was contributed by the growth of new car sales, while the growth of commercial fire insurance was contributed by the advance renewal of certain mega policies before the implementation of new natural catastrophe reference tariff.

In regard of the market portfolio in 2011 by classes of non-life insurance business, motor insurance accounts a major share of 49.39%, and the remaining is distributed to fire insurance 16.85%, personal accident and health insurance 12.16%, marine cargo insurance 5.29%, engineering insurance 3.97%, marine hull and fishing vessel insurance 2.47%, aviation insurance 0.97%, and other miscellaneous insurances 8.91%. If coupled with fire insurance, the percentage would reach approximately 70% of the entire

market. Thus, the growth and decline of motor and fire insurances become an important reference. The average loss ratio of the non-life insurance industry was decreased from 58.83% in 2010 to 51.29% in 2011, down by 7.54%.The fall in loss ratio was mainly attributed to the significant improvement from fire insurance. In addition, all classes of business, except marine hull and aviation insurance, also demonstrated some improvements on loss ratios.

The global financial crisis (Global Financial Tsunami) caused the global economic running down in 2008. In 2009, the economic performance in Taiwan is the worst for recent years. It is reduced 1.89% compared to 2008. The deregulation policy applies to non-life insurance industry started since 2002 has gradually revealed its adverse effects to the market. In 2002, the premium income growth of the market used to reach the peak of 11.67%, but the growth starts to decrease year by year and finally becomes negative since 2006. The decline in premium income has been lasted for four consecutive years. However, in face of a plight of premium decline and poor economic, insurance companies have to face with the challenge of how to create better financial and business performances and to keep certain market shares.

Therefore, this study evaluates the financial and business performances and compares the difference between local and foreign companies under different systems. Beside, the results of this article also explore the association between financial and business performances and market shares in order to understand how the non-life insurance insurers can create better performances and keep certain market shares. This research is organized as follows: the first section introduces the background and development of non-life insurance industry. Next section reviews studies of efficiency, performance, and modeling market share of non-life insurance industry. Following this, the sample selection, data and methodology is presented in the third section. The results are discussed in the fourth section, and followed by the conclusion.

II. LITERATURE REVIEW

In a highly competitive market, even after a merger or strategic alliance, there are still some companies cannot hide the financial crisis by bad management. Although there are few companies under financial-holding system, their finances are pretty good, but still have some disparity in expected because of a considerable attention for market share in Taiwan's non-life insurance industry, cause an ineffective use of resources in the exploitation of market.

Reviewing the previous studies about the performance of non-life insurance industry, the analyses of the research are mainly divided into financial ratio analysis and economic efficiency analysis. The financial ratio analysis is usually applied by multivariate analysis [Liang et al., 17; Ambrose & Seward, 19; Carson & Hoyt, 20; Lin et al., 22; Lin et al., 23; BarNiv & McDonald, 25; BarNiv & Hershbarger, 26], regression analysis [Choi & Weiss, 3; Hao & Chou, 4; Lai & Limpaphayom, 10; Rhoades, 27]. Over the last two decades, the distribution of market shares within the non-life insurance industry has increasingly shifted toward direct writers and away from multiline agency companies. Industry and financial analysts have generally relied upon the competitive strategy literature to explain why low-cost producers have persistently gained market share in this industry. According to this view, the business of personal auto insurance has come to resemble other commodified sectors where the battle for market share is dominated by cost as opposed to service considerations. Conning & Company [7] suggested that this trend is also indicative of a deeper reconfiguration in the production and demand for automobile insurance.

The operating efficiency, scale and scope economics of property-liability insurance companies in Taiwan is discussed by Liang & Liao [16]. Other studies also considered the competition in this industry that have potential improper behavior to increase market share, which leads to unnecessary waste of resources and receives lots of criticism on operation, quality, underwriting and profit [Liao, 5; Hwang & Kao, 28]. Cummins & Nini [13] was based on the view of capital expansion. They found that although the capital expansion enables to obtain or retain a capital to increase the shareholders' future financial benefits, but exceeding capital expansion may erode shareholder rights. Thus, the expansion and the potential of growth have no positive correlation, and it cannot increase or reduce long-term operating performance after the expansion.

Prior studies have tested hypotheses about differential efficiency and/or service, but the unit of observation has usually been a cross-section of firms or states. In many of the models, the expense ratio is regressed against price and quality measures, as well as other proxies of regulatory stringency, geographic concentration, marketing system, and production costs [Cather et al., 8; Flanigan et al., 9; Cummins & VanDerhei, 14; Joskow, 24]. They finally concluded that independent agency companies are less efficient due to higher expense ratios. Some earlier studies worked in the insurance competitive strategy tend to support the differential efficiency hypothesis [Cummins, 15; Culbert, 18]. The standard accounting ratios such as the loss, expense, and combined ratios have been used as comparative measures of operational efficiency and overall underwriting profitability, and the results of their studies showed that market share is inversely related to pricing and commission ratios, but positively related to firm-level technological change and advertising expenses.

Despite the breadth and sophistication of previous econometric studies of this industry, there had been few attempts at directly modeling (firm-level) market share. Pauly et al., [21] developed a model to explain aggregate differences between agency and direct writer market shares and loss ratios, their model was based on a more general supply-demand framework, which simultaneously solved for both price (proxied by the loss ratio) and quantity (proxied by market share). Carroll [2] used pooled panel data regression models to examine the relationship between market

characteristics and market performance for workers' compensation insurance. Hecht [12] attempted to explain the evolution of market shares for specific auto insurers in terms of both competitive and technological factors identified by Conning & Company [7] and other insurance analysts. He modeled market shares of personal automobile insurance companies and he indicated the insurance companies employ a range of strategies and tactics to achieve their growth and profitability objectives, gains and losses in market share among insurers suggest a fair degree of rivalrous behavior. His results showed that while automation and advertising are significant sources of competitive advantage, price-cutting, reductions in commission rates and concentration in the private passenger line of insurance are not always associated with increases in market share.

For recent studies, Lin et al., [22] explores the effect of financial and business performance to market share of non life insurance companies in Taiwan from 2005 to 2007. They first applied factor analysis to extract seventeen financial rates into four factors which are defined as whole operation, investment ability, underwriting quality, and business ability. Secondly, they used panel regression analysis to find the factors which affect the company's market share in financial holding and non-financial holding systems. Testing results show that the whole operation and investment ability significantly affect market share in financial holding system. The whole operation and underwriting quality are significant in non-financial system, but business ability does not affect market share in both systems. Lin et al., [23] extended the annual data in Lin et al., [22], and the results are different from Lin et al., [22]. The results showed that the whole operation, underwriting quality and business ability significantly affect market share in financial holding system. The whole operation and underwriting quality are significant in non-financial system, but investment ability does not affect market share in both systems.

III. METHODS

3.1. Data and Sample Selection

Excluding companies being with non-complete information during the research period and being consolidated, totally seventeen insurance companies, which include three domestic financial holding system companies based on insurance industry, ten domestic non-financial holding system companies and four foreign companies, are targeted. Annual data of each company from 2005 to 2011, totaling 119 cases was collected. This country is chosen for the data set because the natural disasters are happening with increasing frequency in recent years in Taiwan. The time period was chosen because the premium income of non-life insurance has decreased for four years since 2005 and the revealed database is also set from 2005 to 2011, so this data period is decided to use in order to explore whether the non-life insurance companies can create better financial and business performances to keep certain market shares. In addition, this is a more extensive data set than that used in previous studies and the financial crisis happened in this data period, the effects that financial crisis impact on this industry can also be explored. The financial ratios that adopted from the public information are set as variables, total 17 variables. It contains change of direct premium income ratio, change of direct losses incurred ratio, change of retained premium ratio, return on assets, return on stockholders' equity, benefit of utilizations of capital ratio, return on investment, retained expenses ratio, retained loss ratio, combined ratio, retained premium to stockholders' equity, gross premium to stockholders' equity, net reinsurance commission to stockholders' equity, voluntary reserve to stockholders' equity, change of stockholders' equity ratio, special reserve to stockholders' equity, expense ratio.

3.2. Methodology

The procedure of methodology included four stages, which were basic analysis, factor analysis, one-way ANOVA and panel regression analysis. Basic analysis was descriptive statistics of 17 financial ratios, and factor analysis was used to extract indices that sufficient to represent the companies' financial and business performance from these financial ratios. One-way ANOVA was used to compare the difference between market development of domestic and foreign companies, and the diversity of companies in financial and non-financial systems. Panel regression analysis was used to explore the effects of financial indices affect to market shares in domestic and foreign insurance companies under different systems.

Regression analysis was used to explore the effects of the companies' market shares by the indices in domestic and foreign companies under different systems. The data of this study comprised both time series and cross-sectional elements, such as a dataset would be known as a panel data or longitudinal data. Importantly, a panel keeps the same individuals or objects and measures some quantity about them over time. There are three types of panel analytic models, which are constant coefficients model, fixed effects models, and random effects models. The two main approaches to the fitting of models and solve the problems of heteroskedasticity and autocorrelation using panel data are known as fixed effects (FE) regressions and random effects (RE) regressions. The factor scores were set as independent variables, market share (MS) as the dependent variable. Thus, the constant coefficients model is

$$MS^{it} = \alpha_0 + \sum_{k=1}^{q} \alpha_k \, \text{Factor}_{kit} + \varepsilon_{it}, \text{ for i=1,2,….N, t=1,2,…T}$$

The observations are 17 companies (N=17) for 5 years (T=5). This model is sometimes called the pooled regression model.

IV. EMPIRICAL RESULTS

4.1. Descriptive Statistics

Table 1: Descriptive Statistics (%)

Variable	Min	Max	Mean	SD
Change of Direct Premiums Income Ratio	-39.99	122.55	1.37	17.23
Change of Direct Losses Incurred Ratio	-695.85	1084.73	20.95	158.02
Change of Retained Premiums Ratio	-44.47	95.09	2.60	16.26
Return on Assets Ratio	-30.82	18.63	2.34	4.73
Return on Stockholders' Equity Ratio	-177.98	37.44	5.53	22.88
Benefit of Utilizations of Capital Ratio	-14.80	17.92	2.36	3.58
Return on Investment Ratio	-12.38	16.10	2.00	3.17
Retained Combined Ratio	44.39	152.81	90.89	14.65
Retained Expense Ratio	24.42	112.14	44.17	12.99
Retained Loss Ratio	-2.64	82.07	46.07	16.53
Retained Premiums to Stockholders' Equity	10.07	910.88	117.69	101.20
Gross Premiums to Stockholders' Equity	26.57	1843.31	199.45	187.14
Net Reinsurance Commission to Stockholders' Equity	0.27	106.94	13.26	18.33
Voluntary Reserve to Stockholders' Equity	25.03	1001.42	225.83	151.13
Change of Stockholders' Equity Ratio	-76.08	91.05	5.85	20.32
Special Reserve to Stockholders' Equity	9.67	246.97	77.54	42.81
Expenses Ratio	21.65	82.78	33.74	9.59
Market Share	0.01	23.21	5.70	5.04

Table 1 provided the descriptive statistics of all insurers from 2005 to 2011. The means of return on investment ratio and benefit of utilizations of capital ratio were 2.36% and 2.00% respectively, and previous research results found that these ratios are 2.44% and 2.78% respectively in the period from 2005 to 2007 [Lin et al., 22], showing that the non-life insurance industry still had slight growth but decreased in that past five years. While insurance companies facing with pressure from shareholders, their profits were also limited. The average change of direct premiums income ratio was 1.37%, also reflected the impact of financial crisis in 2008 affects non-life insurance industry seriously. A rational reason of the high average "retained combined ratio" (90.89%) was that Taiwan is a disaster-prone area, while improving "retained combined ratios", companies should pay attention on whether non-proportional reinsurance can withstand losses caused by natural disasters, this also showed that there is still room to improve the underwriting business retention and controlling operating costs in this industry. The means of "return on stockholders' equity ratio" and "return on assets ratio" are 5.53 % and 2.34 % respectively, and previous research results showed that in the period from 2005 to 2007 these ratios are 3.87 % and 7.28 % respectively. We found that the two ratios declined rapidly from 2008 to 2011. It can be seen the competition market of non-life insurance industry is in a narrow margin of profit under the environment.

4.2. Result of Factor Analysis

Table 2 shows the result of factor analysis. The accumulated percentage of variance was 87.343%. The four factors represented the four financial/business indices and were defined as "Risk Assumption Ability (RAA)", "Investment Performance (IP)", "Underwriting Quality (UQ)", "Business Ability (BA)". The direction of UQ was negative means the underwriting quality is better if the score is smaller. The measure of sampling adequacy, an overall value of 0.724 for the KMO measure suggested that the indices are appropriate for factoring and the *p*-value (<0.0001) of the Bartlett test of Sphericity showed the same result.

4.3. Result of One-Way ANOVA

Table 3 and Table 4 gave statistical tests of whether the means of the factor scores of these four indices are equal between domestic and foreign companies and under different systems. Table 3 showed all the financial and business performance indices of domestic companies were significantly different from foreign companies in Taiwan's non-life insurance industry. The risk assumption ability and investment performance of domestic companies were superior to foreign companies, but domestic companies in underwriting quality weren't as good as foreign companies since this score was better if smaller. Table 4 showed companies under financial holding system and non-financial holding system had significant difference in investment performance, companies under financial holding system was superior to non-financial holding system, Hao & Chou [4] also suggested that firms with a larger market share are more profitable and have more capital and higher benefit of utilizations of capital ratio.

Table 2: Result of Factor Analysis

Variable	Factor Loadings				Communalities	Factor's Name (Direction)
Special Reserve to Stockholders' Equity	0.916	-0.070	0.082	-0.111	0.892	Risk Assumption Ability (+)
Retained Premiums to Stockholders' Equity	0.904	-0.234	0.203	0.049	0.913	
Voluntary Reserve to Stockholders' Equity	0.886	-0.191	0.219	0.039	0.849	
Gross Premiums to Stockholders' Equity	0.844	-0.319	0.258	0.088	0.896	
Return on Investment Ratio	-0.211	0.934	0.053	0.031	0.796	Investment Performance (+)
Benefit of Utilizations of Capital Ratio	-0.227	0.933	0.074	0.005	0.967	
Retained Combined Ratio	0.121	0.038	0.881	-0.266	0.973	Underwriting Quality (−)
Retained Loss Ratio	0.228	0.211	0.801	0.178	0.903	
Return on Assets	-0.419	0.515	-0.749	-0.057	0.840	
Change of Stockholders' Equity Ratio	-0.481	0.501	-0.742	0.032	0.837	
Change of Retained Premiums Ratio	0.052	0.022	-0.004	0.960	0.896	Business Ability (+)
Change of Direct Premiums Income Ratio	-0.032	0.003	-0.050	0.945	0.842	

Eigen Values and Percentages of Variance Explained by Factors			
Factor	**Eigen Value**	**Percentage of Variance**	**Accumulated Percentage of Variance**
1	3.726	31.053%	31.053%
2	2.503	20.858%	51.911%
3	2.307	19.222%	71.133%
4	1.945	16.210%	87.343%

Table 3: Results of the One-Way ANOVA for Domestic and Foreign Companies

Factor (Direction)	Domestic	Foreign	*F*-value
Risk Assumption Ability (+)	0.235	-0.764	25.901***
Investment Performance(+)	0.171	-0.556	12.392***
Underwriting Quality(−)	0.222	-0.723	22.659***
Business Ability(+)	0.012	-0.040	0.058
*** P≤0.01			

Table 4: Results of the One-Way ANOVA under Different Systems

Factor (Direction)	Non-Financial Holding System	Financial Holding System	*F*-value
Risk Assumption Ability (+)	-0.081	0.379	3.741**
Investment Performance (+)	-0.132	0.615	10.431***
Underwriting Quality(−)	0.024	-0.114	0.328
Business Ability(+)	-0.056	0.261	1.7552
** $P \leq 0.05$			

It was worth noting that the business ability of domestic companies was better than foreign companies, according to the data of this research, the reason can be found that the change of direct income ratio was declined by the effect of financial crisis, but the slump was less in domestic companies and financial holding companies.

4.4. Results of Panel Data Regression

According to the result of factor analysis, the pooled regression model can be written as

$$MS_{it} = \alpha_0 + \alpha_1 RAA_{it} + \alpha_2 IP_{it} + \alpha_3 UQ_{it} + \alpha_4 BA_{it} + \varepsilon_{it},$$

for i=1,2,….N, t=1,2,…,T

The observations are 17 companies (N=17) for 5 years (T=5). The fixed effects model of domestic and foreign companies (D/F) can be written as

$$MS_{it} = \alpha_0 + \alpha_1 RAA_{it} + \alpha_2 IP_{it} + \alpha_3 UQ_{it} + \alpha_4 BA_{it} + \beta D/F_i + \gamma_1 (RAA \times (D/F))_{it} + \gamma_2 (IP \times (D/F))_{it} + \gamma_3 (UQ \times (D/F))_{it} + \gamma_4 (BA \times (D/F))_{it} + \varepsilon_{it}$$

And the fixed effects model of financial holding system and non-financial holding system (SYS) is

$$MS_{it} = \alpha_0 + \alpha_1 RAA_{it} + \alpha_2 IP_{it} + \alpha_3 UQ_{it} + \alpha_4 BA_{it} + \beta D/F_i + \gamma_1 (RAA \times SYS)_{it} + \gamma_2 (IP \times SYS)_{it} + \gamma_3 (UQ \times SYS)_{it} + \gamma_4 (BA \times SYS)_{it} + \varepsilon_{it}$$

Finally, the random effects model can be written as

$$MS_{it} = \alpha_0 + \alpha_1 RAA_{it} + \alpha_2 IP_{it} + \alpha_3 UQ_{it} + \alpha_4 BA_{it} + \varepsilon_{it} = \alpha_0 + \alpha_1 RAA_{it} + \alpha_2 IP_{it} + \alpha_3 UQ_{it} + \alpha_4 BA_{it} + \varepsilon_{it} + u_i$$

To test the effects of FE and RE models, the pooled regression model is used as the baseline for the comparison. The significance test of fixed effect is performed with an F test resembling the structure of the F test for R^2 change, and the Lagrange Multiplier (LM) test statistic uses the residual

of pooled OLS regression model and has a χ^2 distribution with one degree of freedom under the null hypothesis of no random effects. If the results of F test and LM test show that both FE model and RE model are suitable, the Hausman specification test is the classical test of whether the fixed or random effects model should be used. The results of F-test and LM test both indicate that a pooled OLS regression model could not be employed and the Hausman test statistic is 9.523, with 4 degrees of freedom the critical value of chi-squared at the 0.1, 0.05, 0.01 percent level are 7.779, 9.488, 13.277, so it is definitely concluded that the fixed effects model should be used to estimate, this result is the same as Liao [6].

Table 5 showed the parameter estimates result of the D/F fixed effects model, the coefficients of interaction terms were not significant at the same time, but the dummy variable (D/F) was significant at the 1% level. This indicates that domestic and foreign insurance companies' financial and business performances had no effect on their market shares. The only difference was that domestic companies have higher market shares than foreign companies, but the business ability of domestic companies was significant. Table 6 displayed the parameter estimate result of SYS fixed effects model. The risk assumption ability, underwriting quality and investment ability significantly affect the companies' market share in companies under both systems. In addition, the Adjusted R^2 is 73.56%, means this fixed effects model has high goodness of fit and well fits the data.

Table 5: Regression Result of D/F Fixed Effects Model

Dependent Variable: MS				
Variable	**Parameter Estimate**	**Standard Error**	**t-value**	**VIF**
Intercept	7.243	0.480	13.21***	0
RAA	0.713	0.445	0.39	1.417
IP	0.550	0.421	1.31	1.266
UQ	-0.175	0.664	-0.26	3.156
BA	1.638	0.766	2.14**	4.192
D/F	-6.371	2.256	-2.82***	6.601
RAA×D/F	0.370	2.763	0.13	9.697
IP×D/F	-0.490	2.749	-0.18	5.017
UQ×D/F	0.345	1.179	0.29	5.799
BA×D/F	-1.631	0.896	-1.82	4.298
F value=8.047***		R^2 =0.3991	Adjusted R^2 =0.3502	
*** P ≤ 0.01, ** P ≤ 0.05				

The biggest difference between the two systems was the coefficient signs on these factors. Under financial holding company system, the coefficient of risk assumption ability was negative and statistically significant. This indicated that the market share did not increase when the whole operation got better, hinted there is a waste in resources. Contrarily, under non-financial holding company system, the coefficients of risk assumption ability, investment performance, and underwriting quality were positive and statistically significant. This represented that insurers under non-financial system were more effective in controlling costs.

Another difference was underwriting quality since this score is better if smaller, the market share increased when the underwriting quality got better in financial holding system, but opposite in non-financial holding system. It can be seen that consumers now emphasize on underwriting quality and operation of non-life insurance companies, and the results of this model reflected the corporate governance of companies under non-financial holding system should enhance the professional training of agents and companies under financial holding system should reduce the costs and expenses to improve operating efficiency.

Table 6: Regression Result of SYS Fixed Effects Model

Dependent Variable: MS				
Variable	**Parameter Estimate**	**Standard Error**	**t-value**	**VIF**
Intercept	4.1652	0.2656	15.68***	0
RAA	1.4244	0.2595	5.49***	1.181
IP	0.5141	0.2548	2.02**	1.139
UQ	0.8543	0.2456	3.48***	1.058
BA	0.1985	0.2429	0.82	1.035
SYS	12.6636	1.2004	10.55***	3.705
RAA×SYS	-5.7490	1.1036	-5.21***	2.914
IP×SYS	-1.5791	1.3004	-1.21	2.750
UQ×SYS	-0.3143	1.6968	-0.19	2.474
BA×SYS	-3.3018	1.8679	-1.77	1.669
F value=34.60 ***		R^2 =0.7552	Adjusted R^2 =0.7356	
*** $P \leq 0.01$, ** $P \leq 0.05$				

V. CONCLUSION AND SUGGESTION

In this article, 17 non-life insurance companies in Taiwan over the period 2005 to 2011 are used to explore the effects of financial and business performance on market share. Factor analysis is applied to extract indices sufficient to represent the companies' financial and business performance from the 17 financial ratios and calculate the factor scores of each index. After testing the effects of this panel data, fixed effects models are used to find out the effects of financial and business to market share in domestic and foreign companies under different systems. This methodology is different from previous studies because previous studies mostly used financial ratios as the independent variables, firm size as the control (dummy) variable in the pooled regression model [Lai & Limpaphayom, 10; Hecht, 12].

In terms of customers, Liao [6] and Lin et al., [22] explore whether the customers would refer to financial and business performance while underwriting. The results of Liao [6] point out that customers may choose the companies which have big size or have more aided brand awareness in addition to price while underwriting because the products had high homogeneity. Lin et al., [22] use market share as a proxy variable of dependent variable to explore whether the customers would refer to financial and business performance while underwriting. The empirical results show the whole operation and underwriting quality are the main two factors that customers would consider, the business ability is not be

considered. It is different from the results of this study. In this study period, the business ability has getting worse after the financial crisis and factors that customers would consider are risk assumption ability, underwriting, and business ability. Lai & Limpaphayom [10] also indicate that larger firms tend to be less profitable. The financial crisis, which has broken out in the end of 2007, extends and escalates in 2008. Not only does it cause a downturn in the global financial industry, it also significantly impacts the economy of the world. The non-life insurance industry of Taiwan suffers a negative growth in profitability and has been facing the difficulties for many years.

The risk assumption ability, underwriting quality and investment ability of non-financial holding system companies have no difference to that of financial holding system companies. Although the average factors of these three factors of financial holding system companies are better than these of non-financial holding system companies, but they are not statistically significant different in the result of one-way ANOVA. This shows that companies under financial holding system still have space for improving. Take MingTai as an example, although non-financial holding system companies are smaller in company size, assets and useful capital are far less than that of financial holding system companies [Liang et al., 17], if the whole operation of these companies are normal and make good profit from investment, they can still survive well in the non-life insurance market. The empirical results also find out that the coefficient is significantly negative on the whole operation of financial holding system companies in the SYS fixed effects model, companies after joining the financial holding system, the synergy can be observed from the market share, but the whole operation is with a negative relationship. This means that financial holding companies did not carry out effective control on operation management, leading to the companies' competitive edge in the market than expected. This shows that the size of companies is not the bigger the better. Tsui & Yang [11] also point out that the motivation of joining and consolidating financial holding system is a matter of saving cost and reducing the operating risk.

The efficiency of non-life insurance industry did not improve, even though the efficiency is decreasing after the second rate liberalization [Liao, 6]. The third phase of the rate liberalization was implemented in April 1, 2009 and this implementation causes temporary rate volatility. Nevertheless, there is an ample room in the non-life insurance market for a diversity of managerial strategies to improve an insurer's competitive position. Overall, non-life insurance companies should seek the goals such as: improve risk assumption ability and nurture professional talents and effectively apply resources to pursue sustainable growth. If maintaining a certain amount of growth in all respects, companies could further enhance operational efficiency, reduce operating costs and improve operating environment to maintain the competitive power and position in the market. These will assist in the future development of Taiwan's non-life insurance market.

REFERENCES

[1] Non-Life Insurance Review (2011), *Taiwan Insurance Institute*.

[2] A.M. Carroll (1993), "An Empirical Investigation of the Structure and Performance of the Private Workers Compensation Market", *Journal of Risk and Insurance*, Vol. 60, Pp. 185–207.

[3] B.P. Choi & M.A. Weiss (2005), "An Empirical Investigation of Market Structure, Efficiency, and Performance in Property-Liability Insurance", *Journal of Risk and Insurance*, Vol. 72, No. 4, Pp. 635–673.

[4] C.J. Hao & L.Y. Chou (2005), "The Estimation of Efficiency for Life Insurance Industry: The Case in Taiwan", *Journal of Asian Economics*, Vol. 16, Pp. 847–860.

[5] C.S. Liao (2008), "The X-Efficiency of Non-Life Insurance Industry in Taiwan", *New Century Enterprise Idea and Create Value Conference*, Fu Jen Catholic University.

[6] C.S. Liao (2009), "An Analysis of Rate Deregulation Affects Efficiency and Productivity in Non-Life Insurance Industry", *Insurance Issues and Practices*, Vol. 8, No. 2, Pp. 205–228.

[7] Conning & Company (1995), "Personal Auto Insurance: Winning Strategies for the Year 2000", *Strategic Studies Series*, Hartford: Conning & Company.

[8] D.A. Cather, S. Gustavson & J. Trieschmann (1985), "Profitability Analysis of Property-Liability Insurers using Alternative Distribution Systems", *Journal of Risk and Insurance*, Vol. 52, Pp. 321–332.

[9] G.B. Flanigan, D.T. Walker & J.E. Johnson (1993), "Cost Differences of Distribution Systems by Line in the Property and Liability Insurance Industry", *Journal of Insurance Issue*, Vol. 16, Pp. 59–73.

[10] G.C. Lai & P. Limpaphayom (2003), "Organizational Structure and Performance: Evidence from the Non-Life Insurance Industry in Japan", *Journal of Risk and Insurance*, Vol. 70, No. 4, Pp. 735–757.

[11] H.C. Tsui & W.X. Yang (2008), "Is Market Share the Only Standard of Horizontal Mergers?", *Taipei Economic Inquiry*, Vol. 44, No. 1, Pp. 67–105.

[12] J. Hecht (1999), "Modeling Market Shares of the Leading Personal Automobile Insurance Companies", *Journal of Economics and Business*, Vol. 51, Pp. 279–296.

[13] J.D. Cummins & G.P. Nini (2002), "Optimal Capital Utilization by Financial Firms: Evidence from the Property-Liability Insurance", *Journal of Financial Services Research*, Vol. 21, Pp. 15–53.

[14] J.D. Cummins & J.L. VanDerhai (1979), "A Note on the Relative Efficiency of Property-Liability Insurance Distribution Systems", *Bell Journal of Economics*, Vol. 10, Pp. 709–720.

[15] J.D. Cummins (1990), "Multi-Period Discounted Cash Flow Ratemaking Models in Property-Liability Insurance", *Journal of Risk and Insurance*, Vol. 57, Pp. 9–27.

[16] J.H. Liang & C.S. Liao (2007), "A Study of Property-Liability Insurance Industry on Operating Efficiency and Scale of Economics in Taiwan", *Chaoyang Business and Management Review*, Vol. 6, No. 1, Pp. 77–98.

[17] J.H. Liang, C.S. Liao & J.L. Chang (2008), "A Study on Determinants of the Performance of Property-Liability Insurance Industry in Taiwan-An Empirical Analysis by Financial Perspective", *Taiwan Insurance Review*, Vol. 24, No. 1, Pp. 81–102.

[18] J.L. Culbert (1989), "How to Forecast Pricing Action-Private Passenger Auto", *Best's Insurance Management Reports*.

[19] J.M. Ambrose & J.A. Seward (1988), "Best's Ratings, Financial Ratios and Prior Probabilities in Insolvency Prediction", *Journal of Risk and Insurance*, Vol. 55, No. 2, Pp. 229–244.

[20] J.M. Carson & R.E. Hoyt (2000), "Evaluating the Risk of Life Insurer Insolvency: Implications from the US for the European Union", *Journal of Multinational Financial Management*, Vol. 10, Pp. 297–314.

[21] M. Pauly, P.R. Kleindorfer & H. Kunreuther (1986), "Regulation and Quality Competition in the U.S. Insurance Industry", *The Economics of Insurance Regulation*, New York: St. Martin's Press, Pp. 65–107.

[22] M.C. Lin, C.H. Chen & G.C. Chen (2010), "An Analysis of Financial and Business Performance and Market Share in Non-Life Insurance Industry", *Insurance Issue and Practices*, Vol. 9, No. 1, Pp. 51–68.

[23] M.C. Lin, C.H. Chen & G.C. Chen (2011), "Does Financial and Business Performance Affect Market Share? ─ A Case of Non-Life Insurance Industry in Taiwan", *Journal of Statistics & Management Systems*, Vol. 14, No. 2, Pp. 453–365.

[24] P.J. Joskow (1973), "Cartels, Competition and Regulation, in the Property-Liability Insurance Industry", *Bell Journal of Economics*, Vol. 4, Pp. 375–427.

[25] R. BarNiv & J.B. McDonald (1992), "Identifying Financial Distress in the Insurance Industry: A Synthesis of Methodological and Empirical Issues", *Journal of Risk and Insurance*, Vol. 59, Pp. 543–574.

[26] R. BarNiv & R.A. Hershbargar (1990), "Classifying Financial Distress in the Life Insurance Industry", *Journal of Risk and Insurance*, Vol. 57, Pp. 10–136.

[27] S.A. Rhoades (1985), "Market Share as a Source of Market Power: Implications and Some Evidence", *Journal of Economics and Business*, Vol. 37, Pp. 343–363.

[28] S.N. Hwang & T.L. Kao (2006), "Measuring Managerial Efficiency in Non-Life Insurance Companies: An Application of Two-Stage Data Envelopment Analysis", *International Journal of Management*, Vol. 23, No. 2, Pp. 699–720.