# CORPORATE GOVERNANCE, EFFICIENCY, AND FIRM PERFORMANCE IN THAI PROPERTY-CASUALTY INSURERS[1]

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## Abstract

*Recently there is curiosity about the impact of corporate governance on firm performance, and interest in the relationship between efficiency and a firm's operating result. This paper aims to assess insurers' efficiency and the relationship between efficiency, corporate governance and performance in Thai property and casualty insurers.*

*This research is based on 52 observations of insurers, 2005-2006 and 2008-2009. Regression analysis is used to explore the important factors in insurer's return on asset. The results show that factor of good governance, efficiency and financial performance can explain the return on assets of these insurers in 2005-2009. It is consistent with other research papers which find that corporate governance would be a good guide for a firm's business practice and would yield better performance. The higher the number of independent board members, the higher the return on assets, because independent members would help with checks and balance, and produce a strong and sustainable financial operating result.*

*Efficiency is another important factor in stimulating operating results. An efficient insurer would more appropriately allocate resources, with less waste. This increase profit and thus strengthen return on assets. High expenses would intuitively decrease profit. This paper finds this linkage and therefore low efficiency and high expense would lead to a lower financial operating result or lower return on assets. Therefore, insurance firms need to carefully supervise underwriting expense, brokerage and commission, operating costs, and claims and claims handling expenses, as well as boosting premium investment income.*

**Key words:** Efficiency, Corporate Good Governance, Return on Asset

## บทคัดย่อ

เมื่อไม่นานมานี้ได้มีปรากฏการณ์เกี่ยวกับผลกระทบของธรรมาภิบาลที่มีต่อภาพลักษณ์ขององค์กรและความสนใจในความสัมพันธ์ระหว่างประสิทธิภาพ กับ ผลประกอบการขององค์กร งานวิจัยฉบับนี้ต้องการประเมินความมีประสิทธิภาพของบริษัทประกันภัย และ ความสัมพันธ์ระหว่าง ประสิทธิภาพ

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ธรรมาภิบาล และภาพลักษณ์ของบริษัทวินาศภัย

งานวิจัยนี้ใช้ข้อมูลของตัวแปรสงเกต คือบริษัทประกันภัยจำนวน 52 บริษัทในปี ค.ศ. 2005 - 2006 และปี ค.ศ. 2008 - 2009 ใช้การวิเคราะห์ถดถอย เพื่อศึกษาความสำคัญของปัจจัย ที่บริษัทประกันภัยได้รับผลตอบแทนจากทรัพย์สิน ซึ่งผลลัพธ์แสดงให้เห็นว่า ปัจจัยความมีธรรมภิบาล ประสิทธิภาพและผลประกอบการการเงินสามารถอธิบายได้ด้วยผลตอบแทนจากสินทรัพย์ของกลุ่มบริษัทประกันภัยดังกล่าวในช่วงปี ค.ศ. 2005 - 2009 อีกทั้งยังมีการยืนยันจากงานวิจัยในหลายฉบับว่า ธรรมาภิบาลเป็นเครื่องนำทางอย่างดีในการดำเนินธุรกิจ และช่วยส่งเสริมในเรื่องผลประกอบการ ยิ่งถ้าในคณะกรรการบริษัทมีจำนวนสมาชิกอิสระเป็นจำนวนมาก ยิ่งทำให้เกิดผลตอบแทน จากทรัพย์สินที่สูงขึ้นตามลำดับ เนื่องจากกรรมการอิสระจะเป็นผู้ตรวจสอบ รักษาสมดุล และเป็นผู้ก่อให้เกิดความแข็งแกร่ง ความยั่งยืน ในด้านผลการดำเนินงานด้านการเงิน

ประสิทธิภาพเป็นอีกปัจจัยที่สำคัญที่แสดงถึงผลการดำเนินงาน การที่บริษัท จะมีการดำเนินงานที่มีประสิทธิภาพนั้น หมายถึงบริษัทต้องมีการจัดสรรทรัพยากรได้อย่างเหมาะสม ด้วยการลดความสูญเสีย การกระทำดังกล่าวย่อม ทำให้ผลกำไรเพิ่มขึ้น และเกิดความแข็งแกร่งในด้านผลตอบแทนจากทรัพย์สินตามมา

การมีรายจ่ายที่สูง ส่งผลให้ผลกำไรลดลง ซึ่งภายใต้งานวิจัยจัยฉบับนี้ ได้ค้นพบถึงความเชื่อมโยงดังกล่าว และสามารถสรุปได้ว่า ประสิทธิภาพที่ลดลง และรายจ่ายที่สูงขึ้น สามารถนำไปสู่ ผลตอบแทนด้านการเงินเงินลดลง หรือ ผลตอบแทนจากทรัพย์สินที่ลดลงนั่นเอง ดังนั้น บริษัทประกันภัยจึงควรสนใจในการกำกับดูแลค่าใช้จ่ายด้านการรับประกันภัย ด้านค่าตอบแทนโบรกเกอร์ และค่านายหน้า ต้นทุนในการดำเนินงาน และการจ่ายสินไหมทดแทน และค่าใช้จ่าย ในกระบวนการการจ่ายค่าสินไหมทดแทน รวมไปถึง การกะตุ้นรายได้จาการลงทุนของเบี้ยประกันภัย

## INTRODUCTION

Recently there has been considerable concern about the impact of corporate governance on a firm's performance. This is because the Thai economy has experienced several financial and political crises. Therefore, the need for corporate governance reform is the focus of Thai businesses. On the one hand recent empirical evidence focusing on developed markets is still inconclusive as to whether corporate governance practices would enhance firm performance. On the other hand, research on emerging markets shows some evidence of linking good corporate governance to better firm value (Black, Jang, and Kim, 2006; Black, Love, and Rachinsky, 2006; Cheung, Connelly, Limpaphayom, and Zhou, 2007; Cheung, Jiang, Limpaphayom, and Lu, 2008; Connelly, Limpaphayom, and Nagarajan, 2008). The direction of the relationship between corporate governance and good performance is still inconclusive. The question is whether good practice in corporate governance leads higher market value or a whether a firm with good performance needs a good corporate governance system.

There is also interest in a relationship between efficiency and a firm's operating result. Economic theory predicts that in the long-run, the price of a product or service will equal the minimum average costs associated with the most efficient production technology. Therefore, business competition is expected to put heavy pressure on insurance firms to increase their operational efficiency. Any deviation from cost-minimizing or profit-maximizing strategies, and inefficient technologies, will force firms out of the market in the long run. As a result, analyzing an insurance firm's performance relative to other firms in the industry is important. Traditionally, this has used conventional financial ratios to measure the efficiency of the property and casualty insurance market. Thus, high loss ratio, high expense ratio, and low profitability indicate lower efficiency. With the emergence of the frontier methodology for measuring efficiency and productivity, the conventional approaches have become outdated.

Efficiency of operation requires firms to (1) select an output mix that fully exploits economies of scale and (2) select an input mix that minimizes usage (technical efficiency) and uses the best combination (allocative efficiency). Efficient insurance markets are better at allocating resources and at enhancing consumer choice and value than are inefficient markets.

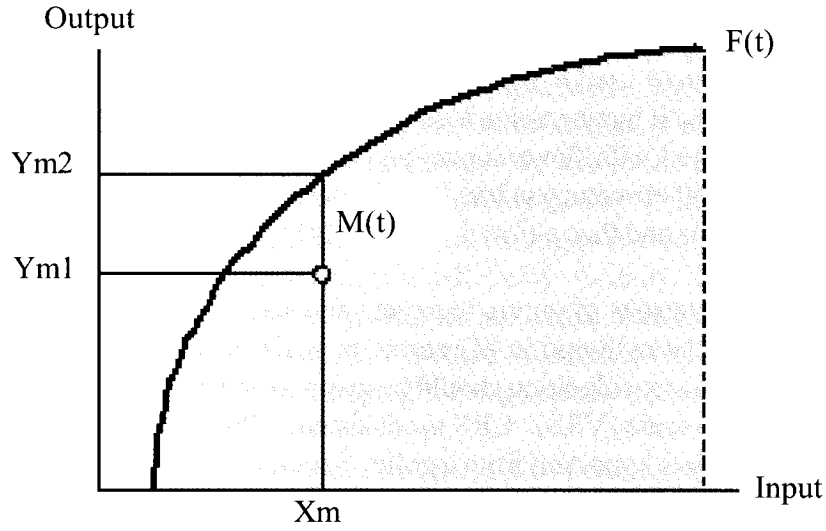
Analyzing the link between efficiency and firm performance would enhance explanations of the behavior of property-casualty insurance firms. It is intuitively perceived that better performance needs an insurer to become more efficient. However, it is questionable whether increased efficiency results in better performance of Thai property-casualty insurance firms.

## EFFICIENCY CONCEPTS

In efficiency analysis, the production function is interpreted not only as a relationship between inputs and outputs, but also as the frontier of a set called 'production set'. A point lying on the frontier is characteristically one that corresponds to the maximum achievable quantity of the output for any given level of input. Production functions, F(t), therefore show the maximum amount of inputs required to achieve the given output levels.

In Figure 1.1, a production set (shaded) and production frontier (in bold) are represented in the case of one input and one output. A distinction then naturally follows between productive activities in the production set. Every productive activity lying on the frontier is defined as fully efficient while those lying below are considered to be inefficient. If firm M is operating at point (Xm, Ym1), it could operate more efficiently by moving to the frontier; i.e., by adopting state-of-the-art technology, to point (Xm, Ym2).

**Figure 1.1: The Production Frontier for a Single Input-Single Output Firm**




**Efficiency Measurement**

Modern efficiency measurement begins with Farrell (1957) who extended the work initiated by Koopmans (1951) and Debreu (1951). Farrell (1957) measured operating efficiency, as reciprocals of distance functions providing a radial measure of the distance, by a comparison between observed and optimal values of its output and input.

Efficiency can refer to the proficiency with which inputs to the production process are converted to outputs of the process, in which case it is referred to as technical (or total) efficiency. Farrell (1957) first provided a partial decomposition of cost or overall efficiency into technical and allocative efficiency.

*Overall or cost inefficiency* measures the equi-proportionate reduction in costs which could have been attained had a production unit been both technically and allocatively efficient. *Price or allocative efficiency* refers to the ability to combine inputs and outputs in optimal proportions in light of prevailing prices. Thus the allocative inefficiency measure gives the proportionate reduction in costs if the optimal combination of inputs had been utilized.

*Technical efficiency* reflects the ability of a firm to avoid waste by producing maximal output as input usage allows. It can be measured by the ratio of maximum potential to observed output obtainable from the given input. Alternatively, technical efficiency of a production unit refers to the minimal deployment of inputs, given the productive technology. Technical efficiency also can be measured by the ratio of minimum potential to observed input required to produce the given output.[2] In these two types of orientation,

[2]For example, in Figure 1.1, the Farrell measure in output-oriented technical efficiency of M(t) is given by the ratio Oym2/Oym1.

[3]The technical efficiency measure of Farrell does not coincide with that of Koopmans. Observations are technically efficient in the sense of Farrell although slacks exist.

the optimum is defined in terms of production possibilities. If output-oriented technical efficiency is 1, the given level of inputs cannot be employed to produce higher outputs; a firm is technically efficient if output-oriented technical efficiency is greater than 1, then the same input level can be used to generate higher outputs and thus a firm is technically inefficient.[3] Alternately, if input-oriented technical efficiency is 1, the given level of outputs cannot be produced with fewer inputs and thus a firm is technically efficient; if input-oriented technical efficiency is less than 1, then the same output level can be produced with fewer inputs and thus a firm is technically inefficient.

Technical efficiency consists of purely technical and scale efficiency. To derive these efficiency measures, the assumption of returns to scale needs to be discussed. With respect to scale returns, consideration should be given to constant returns to scale (CRS) and variable returns to scale (VRS). CRS is consistent with a zero profit long-run equilibrium situation which is important from a policy perspective. CRS is sometimes called optimal scale (i.e., firms operate on the long-run average cost curve). On the other hand, VRS is relevant for private decision making in the sense that a firm does not consider achieving constant returns to scale as an objective of its operation.

## IMPORTANCE OF THIS RESEARCH

This study is important for at least four reasons. First, this study estimates these efficiencies based on input orientation or on the objective of cost minimization. Second, the study recognizes that some property and casualty insurers likely overuse inputs (e.g., too much labor, physical capital, financial capital, and materials) and/or produce the wrong output quantities (e.g., too many or too few output quantities) and, therefore, they are less efficient operators than others, ceteris paribus.

Third, estimates of input choice inefficiencies (i.e., technical inefficiency, purely technical inefficiency, and scale inefficiency) are derived from a mathematical programming framework, usually called data envelopment analysis (DEA), first developed by Charnes, Cooper and Rhodes (1978) and subsequently modified by Banker, Charnes and Cooper (1984). DEA is especially useful when there are multipled inputs and outputs with different units of measure. DEA's distinguishing attribute is that it computes 'best practice' efficient frontiers based on convex contributions of firms in the industry. Therefore, DEA provides relative rather than absolute efficiency measures. Since a theoretically efficient firms' cost structure is not fully known, relative rather than absolute efficiency measures may be more useful for empirical purposes.

This research expands the body of knowledge related to efficiency of the property and casualty insurance industry in developing countries. Despite the importance of the effi-

[3]The technical efficiency measure of Farrell does not coincide with that of Koopmans. Observations are technically efficient in the sense of Farrell although slacks exist.

ciency of a country's property and casualty insurance market, not many studies have examined this issue especially in developing countries. In addition, little work has been done as to whether insurance industries operate efficiently at the individual firm level. In examining efficiency, the work of Farrell (1957) stands out. He stated that:

> The problem of measuring the productive efficiency of an industry is important to both the economic theorist and the economic policy maker. If the theoretical arguments as to the relative efficiency of different economic systems are to be subjected to empirical testing, it is essential to be able to make some actual measurements of efficiency. Equally, if economic planning is to concern itself with particular industries, it is important to know how far a given industry can be expected to increase its output by simply increasing its efficiency, without absorbing further resources.

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Lastly, this research aims to explore the link between efficiency, corporate governance, and firm performance. Higher cost efficiency may be an indicator of higher revenues as the most cost efficient property-casualty insurers are the best managed and therefore enjoy better operating performance. Corporate governance gives guidelines and rules to direct an insurer's operation. Therefore, an insurance firm adopting sound corporate governance should have good financial performance.

## INSURANCE EFFICIENCY: LITERATURE REVIEW

The literature on property and casualty insurance efficiency is less developed than that on banking efficiency (Kohers et al., 2000; Kwan and Wilcox, 1999). The pioneering property-casualty insurance cost literature typically focused exclusively on scale and scope economies (Allen, 1974; Doherty, 1981; Hammond, Melander and Shilling, 1971; Joskow, 1973; Suret, 1991, and Quirin et al., 1974). Some recent studies of insurance cost functions primarily focused on efficiency (Berger et al., 1997; Cummins et at., 2006; Cummins and Weiss, 1993; Weiss, 1991, and Wolff, 1991). With the rapid evolution of frontier efficiency methodologies, interest in analysis of cost efficiency of insurers has grown rapidly but is still focused mainly on a single and developed country (see Cummins and Weiss, 1998).

In addition, few research papers concentrated on the link between corporate governance and firm performance (Black, Jang, and Kim, 2006; Black, Love, and Rachinsky, 2006;

Cheung, Connelly, Limpaphayom, and Zhou, 2007; Cheung, Jiang, Limpaphayom, and Lu, 2008; Connelly, Limpaphayom, and Nagarajan, 2008). The research paper shows that firms in emerging markets practicing corporate governance exhibit good performance.

## METHODOLOGY

There are two principal types of efficiency methodologies - the *econometric (parametric)* approach and the *mathematical programming (non-parametric)* approach. The basic idea of measuring efficiency is similar in each approach, which involves the "best practice" frontier with the sample and comparing each decision making unit (DMU) to this frontier to measure relative efficiency. However, these two approaches differ in the underlying assumptions and techniques to approximate the frontier.

Both have advantages and disadvantages. The econometric approach is stochastic. The primary advantage of this approach is that it attempts to distinguish the effects of random error, which is outside the control of producers, from inefficiency. However, this methodology is vulnerable to errors in the specification of the functional form of the production, cost, revenue, or profit function or assumptions about the error term(s). The mathematical programming approach, a non-parametric approach, has advantage since it avoids this type of specification error by imposing somewhat less structure on the optimizing problem, e.g., neither functional form of technology nor inefficiency assumptions are required. In addition, the mathematical programming method does not require a large data set to estimate the coefficient of a cost or revenue function. However, in most applications of the methodology, any departure from the frontier is measured as inefficiency, i.e., random error or bad luck is not separated out.

To explore the relationship between the degree of corporate governance, the level of DEA efficiency and firm performance of the property and the casualty insurance industry is to adopt a regression model as explained in equation (1).

$$\begin{aligned} ROA = {} & b^0 + b_1 BOSIZE_i + b_2 BOIND_i + b_3 GCG_{1i} + b_4 GCG_{2i} + b_5 GCG_{3i} + b_6 TE_i + b7 \\ & LR_i + b_8 EXR_i + b_9 DER_i + b_{10} PM_i + \varepsilon_i \end{aligned} \quad (1)$$

where ROA is return on assets, BOSIZE is board size, BOIND is proportion of independent board amount to total board amount, GCG is good corporate governance and is a dummy variable where $GCG_{1i}$ is 1 when an insurance firm is rated as excellent corporate governance, and 1 otherwise, $GCG_{2i}$ is 1 when an insurance firm is rated as very good corporate governance, and 1 otherwise, $GCG_{3i}$ is 1 when an insurance firm is rated as good corporate governance, and 1 otherwhise, TE is a total or technical efficiency, LR is loss ratio, EXR is expense ratio, DER is debt to equity, and PM is profit margin.

It is expected that size, corporate governance, and DEA efficiency variables are posi-

tively correlated with firm performance measured by return on assets. However, the firm's liability to capital should be negatively correlated with the firm's financial operating result.

There are thirteen property-casualty insurance companies listed in the Stock Exchange of Thailand (SET) each year. The study period is 2005-2006 and 2008-2009. The year 2007 is a skipped period since the Thai Institute of Directors (IOD) which evaluates firms' corporate governance rating did not operate a corporate good governance rating for that year as it was reviewing the rating criteria. Therefore, this research has a total of 52 observations.

## DATA AND MEASUREMENT OF OUTPUTS AND INPUTS

The data used in this study are drawn from the annual reports filed by the listed property and casualty insurers and the level of corporate governance reported by the Thai Institute of Directors (IOD). Data were collected from 2005 until 2009.

***Inputs***

Insurer inputs can be classified into three principal groups: labor, business services and materials, and capital. The administrative labor, and agent and broker labor, are distinguished. Administrative labor input is the salary/welfare reported to the Insurance Commissioner at the Department of Insurance. Agent and broker labor is similarly defined by the amount of commissions reported to the Insurance Commissioner. Business services and materials expenses consist of communication services, rents, equipment rentals, stationery, and other professional services provided by external lawyers, actuaries and accountants. This research uses the sum of those expenses as inputs of an insurance company.

Financial capital is also an important expenditure for insurers. The rationale for the use of equity capital is that insurers must maintain equity capital to back the promise to pay claims even if losses are higher than expected, and to satisfy regulatory requirement. Therefore, this paper uses capital and surplus as an insurer's input.

An insurance company needs to be concerned with preparation for liquidity to pay expected and unexpected future loss and unpaid loss to the insured and/or beneficiary. Therefore, backup assets for unearned premium reserve and unpaid loss are the necessary capital which the insurer would need to manage its solvency. In addition, unearned premium is the liability of the insurer, since such amount is paid in advanced by insured. Therefore, an insurer needs to reserve assets to back up the unearned premium reserve. This research therefore uses unearned premium reserve, loss reserve, and unpaid loss as another input of an insurance company.

***Outputs***

Insurers are analogous to other firms in the financial sector of the economy in that their outputs consist primarily of services, many of which are intangible. As such, measuring the output of an insurance firm is not always easy. Three principal approaches have been used to measure outputs in the financial services sector: the asset or intermediation approach, the user-cost approach, and the value-added approach (see Berger and Humphrey, 1992).

The third approach to measuring output - the value-added approach - is the most appropriate method for studying insurance efficiency. This approach considers all asset and liability categories to have some output characteristics rather than distinguishing inputs from outputs in a mutually exclusive way. The categories having significant value-added, judged as using operating cost allocations, are employed as important outputs. Others are treated as unimportant outputs, intermediate products, or inputs, depending on the characteristics of the specifics under consideration.

Some efficiency studies have used premiums to measure output. This is a fallacy, however, because premium represents price times the quantity of output not output (Yuengert, 1993). Thus, it is necessary to develop measures that are consistent with the preceding discussion. Therefore, this study defines outputs into five categories. Incurred losses after deduction and loss adjustment expenses for different lines of business - fire, marine and transportation, automobile, miscellaneous insurance - will be used as proxies. Incurred loss represents payment paid to policyholders and this kind of payment is a useful proxy for the risk-pooling and risk-bearing functions because they measure the amount of funds pooled by insurers and redistributed to policyholders as compensation for insured events. Loss adjustment expenses are considered as a reasonable proxy for the real services provided by insurers.

In addition, property and casualty insurers also provide value-added of the intermediation function to policyholders, by giving a discount in the premium to compensate for the opportunity cost of the funds held by insurers. Thus, invested asset, representing intermediation function services, is used here as another proxy of output. These output proxies capture most, if not all, principal services provided by property and casualty insurers.

This paper uses efficiency score, corporate governance, and other financial information to study a link between firm efficiency, firm good governance, and firm financial performance measured by return on assets. Therefore, a multiple regression analysis would be the tool to find important factors of an insurance company's return on asset. Financial ratios used in this paper are loss ratio, expense ratio, debt equity ratio, and profit margin. In addition to the information about insurer efficiency firm corporate governance is used to find the relationship between corporate governance and firm performance. Firm corporate governance proxies used in this study are firm corporate governance rating score, board size of an insurance company, and the proportion of independent board members to total board members. Firm corporate governance rating score is used as a dummy

variable to see whether it would have an impact on return on asset of an insurance company. Therefore, there are three dummy variables and another seven independent variables.

## RESULTS

The details of total or technical efficiency, purely technical efficiency, and scale efficiency of the listed property and casualty insurers in the Stock Exchange of Thailand (SET) during year 2005-2009 can be summarized in Tables 1 to 5.

**Table 1: Minimum, Maximum, and Mean of Total Efficiency, Purely Technical Efficiency, and Scale Efficiency of the Thai Listed Property-Casualty Insurance Industry in the Stock Exchange of Thailand in 2005**

| | Total Efficiency | Purely Technical Efficiency | Scale Efficiency |
|---|---|---|---|
| **Minimum** | 0.687 | 0.777 | 0.658 |
| **Maximum** | 1.000 | 1.000 | 0.941 |
| **Mean** | 0.895 | 0.920 | 0.818 |

**Table 2: Minimum, Maximum, and Mean of Total Efficiency, Purely Technical Efficiency, and Scale Efficiency of the Thai Listed Property-Casualty Insurance Industry in the Stock Exchange of Thailand in 2006**

| | Total Efficiency | Purely Technical Efficiency | Scale Efficiency |
|---|---|---|---|
| **Minimum** | 0.587 | 0.790 | 0.576 |
| **Maximum** | 1.000 | 1.000 | 1.000 |
| **Mean** | 0.881 | 0.906 | 0.796 |

**Table 3: Minimum, Maximum, and Mean of Total Efficiency, Purely Technical Efficiency, and Scale Efficiency of the Thai Listed Property-Casualty Insurance Industry in the Stock Exchange of Thailand in 2008**

| | Total Efficiency | Purely Technical Efficiency | Scale Efficiency |
|---|---|---|---|
| **Minimum** | 0.438 | 0.624 | 0.369 |
| **Maximum** | 1.000 | 1.000 | 0.944 |
| **Mean** | 0.842 | 0.878 | 0.734 |

**Table 4: Minimum, Maximum, and Mean of Total Efficiency, Purely Technical Efficiency, and Scale Efficiency of the Thai Listed Property-Casualty Insurance Industry in the Stock Exchange of Thailand in 2009**

| | Total Efficiency | Purely Technical Efficiency | Scale Efficiency |
|---|---|---|---|
| **Minimum** | 0.588 | 0.770 | 0.588 |
| **Maximum** | 1.000 | 1.000 | 1.000 |
| **Mean** | 0.902 | 0.922 | 0.828 |

Table 5 below shows the details of a multiple regression with backward technique. The result indicates that at least one factor in the model has a statistically significant impact on return on asset of the Thai listed property and casualty insurance industry in the SET during 2005-2009.

**Table 5: ANOVA of Multiple Regression--Backward Technique--of Return on Asset on Financial Ratios, Corporate Governance, and Efficiency of the Thai Listed Property-Casualty Insurance Industry in the Stock Exchange of Thailand during 2005-2009**

| Model | Sum of Squares | Degree of Freedom | Mean Square | F-Statistics | P-Value |
|---|---|---|---|---|---|
| **Regression** | 546.825 | 5 | 109.365 | 57.156 | 0.000 |
| **Residual** | 88.019 | 46 | 1.913 | | |
| **Total** | 634.844 | 51 | | | |

The assumptions of multiple regression analysis were tested before further analysis of the regression result. The first assumption is about the normality of the variables. The testing result shows the Kolmogorov Smirnov test as 0.171, indicating that independent variables are normally distributed. Figures 1 and 2 show the relationship of the predicted values and the errors and the histogram of the errors with a mean of zero, respectively.

The second assumption of multiple regression is that the errors have a mean of zero, and the testing result is synchronized with such assumption. The third assumption is that the

**Figure1: Graph of the Relationship between the Predicted Values (ROA) and the Errors of the Multiple Regression Analysis**

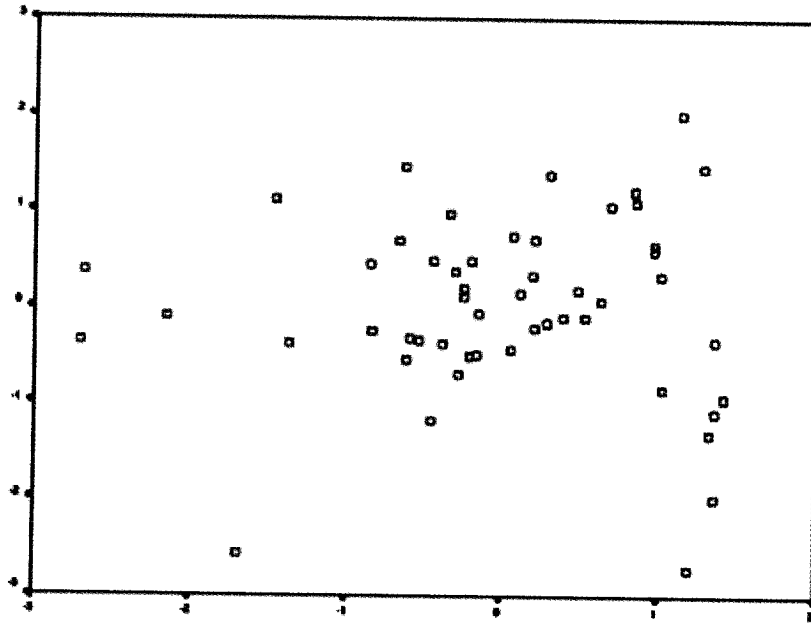
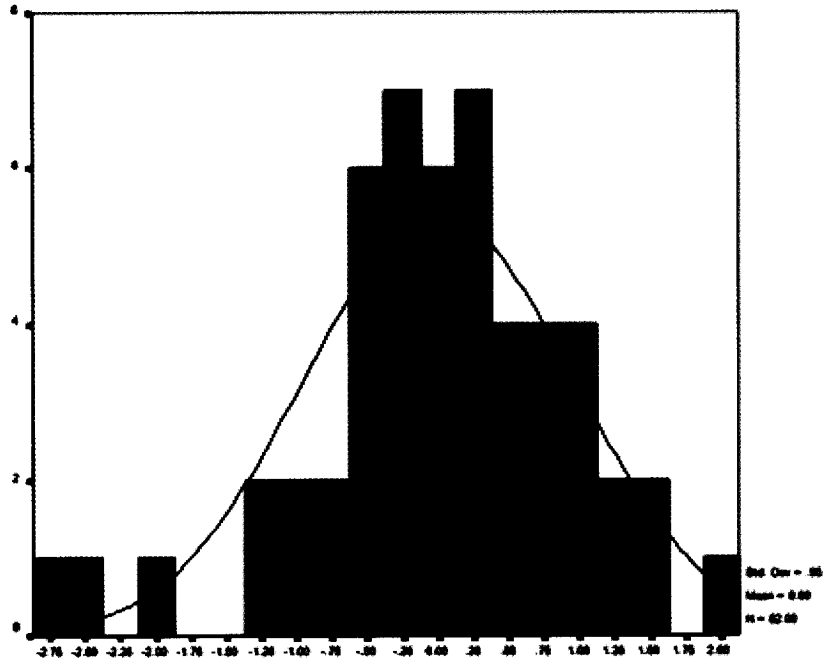


**Figure2: Graph of the Histogram of the Errors of the Multiple Regression Analysis**

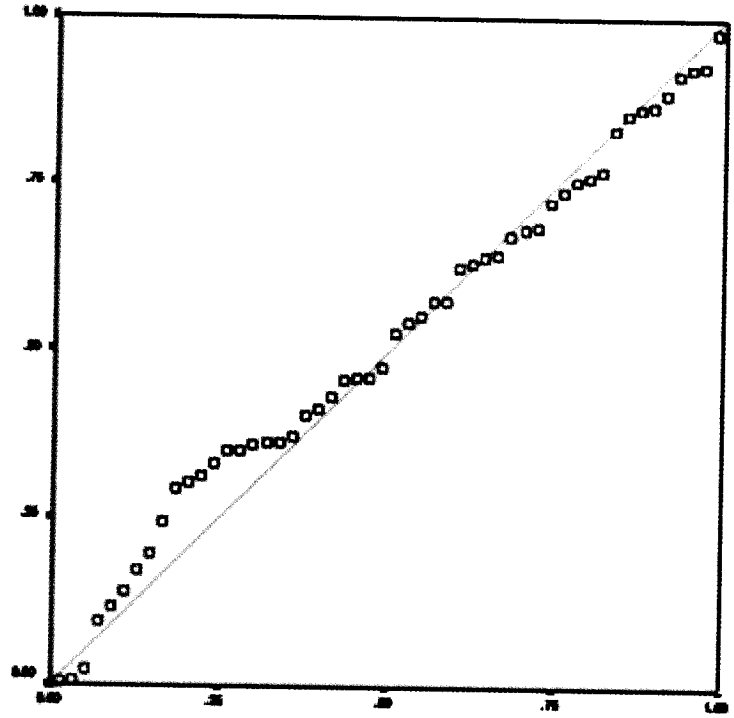


errors are uncorrelated. The Durbin-Watson with a value of 2.393 as shown in Table 6 suggests that we have no autocorrelation.

**Table 6: Multiple Regression--Backward Technique--of Return on Asset on Financial Ratios, Corporate Governance, and Efficiency of the Thai Listed Property-Casualty Insurance Industry in the Stock Exchange of Thailand during 2005-2009**

| | Unstandardized Coefficients | | Standardized Coefficients | t-statistics | P-Value | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | Beta | Standard Error | Beta | | | Tolerance | VIF |
| Constant | -6.370 | 1.761 | | -3.617 | 0.001 | | |
| Board Size | 0.092 | 0.053 | 0.104 | 1.742 | 0.088 | 0.852 | 1.173 |
| Proportion of Independent Board Amount to Total Board Amount | 0.028 | 0.012 | 0.129 | 2.288 | 0.027 | 0.952 | 1.050 |
| Total Efficiency | 9.316 | 2.050 | 0.336 | 4.544 | 0.000 | 0.553 | 1.809 |
| Expense Ratio | -0.020 | 0.010 | -0.122 | -2.056 | 0.046 | 0.859 | 1.165 |
| Profit Margin | 0.216 | 0.028 | 0.585 | 7.713 | 0.000 | 0.524 | 1.907 |
| R | 0.928 | | | | | | |
| $R^2$ | 0.861 | | | | | | |
| $R^2$ Adjust | 0.846 | | | | | | |
| Standard Error of the Estimate | 1.383 | | | | | | |
| Durbin-Watson | 2.393 | | | | | | |
| Mallows' Cp | 5.990 | | | | | | |

**Figure 3: Graph shows the Normal P-P Plot of the Multiple Regression Analysis**



The fourth underlying assumption includes that the predictor variables must be independent or must not have a multicollinearity issue. This requirement is approved as shown by the VIF value of each variable having a value less than 10, as reported in Table 6. The last assumption of multiple regression analysis is that variance of the error is constant across observations or has homoscedasticity. The testing result indicates that we have no problem of heteroscedasticity, as shown by Figure3.

In addition, the result of the regression suggests the statistically significant factors in the operating result of the Thai listed property and casualty insurance industry in the SET during the year 2005-2009, as shown in Table 6. The factor which has the highest impact on the financial operating result is profit margin. The result also shows that profit margin has a positive effect on insurer's return on asset. Another variable which has a high impact on insurer's financial operating result is total or technical efficiency. This factor was found to have a positive relationship to an insurer's return on asset. In addition, the result reveals that the number of independent board members of an insurance company also has a positive effect on insurer's return on asset. This paper also found that a higher expense ratio would have a negative impact on firm profitability. The details of a backward regression result are shown as follows.

## CONCLUSION

The factor of good governance, efficiency and financial performance can explain to a

level of 84.60% the return on asset of these property-casualty insurance companies during 2005-2009. It is consistent with other research papers to find that corporate governance would be a good guideline for a firm's business practice and would yield better performance. The higher number of independent board members would enhance a higher return on asset of insurers. Independent board member would help for more 'balance and check'. Therefore, a strong and sustainable financial operating result of an insurance company would be supported by securing a higher proportion of independent board members.

Another important factor which could stimulate insurance firm financial operating results is efficiency. Firms need to be efficient because firms want to minimize input usage and/or maximize output. Efficient firms would be able to allocate resources more appropriately, which leads to less waste. Therefore, being efficient would benefit insurance firms by increasing profit and thus strengthening return on asset.

Higher expense, of course, intuitively would lead to lower profit. This paper finds this linkage and therefore these two factors would lead to a lower financial operating result or lower return on asset of an insurance company. Therefore, insurance firms would need to carefully supervise the underwriting expense, brokerage and commission expense, operating expense, and claims and claims handling expenses, and also boost premium and investment income. This strategy would see appreciation in return on asset and financial operating results.

Future research should include a longer period of study. More variables, e.g. solvency, which may have an impact on insurer's financial operating result should be researched. In addition, the total factor productivity by using the Malmquist index to investigate the cause of such results, as to whether it comes from technological change or technical efficiency improvement, should be obtained.

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