

Efficiency Performance of General Insurance Companies in Malaysia

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Abstract

Keywords:

Performance
Data envelopment analysis
Managerial efficiency
Profitability efficiency

A two-stage approach in data envelopment analysis (2S-DEA) methodology is used towards decomposing a typical two-stage operation process of general insurance companies, which is conducted in a single operation involving intermediate. Specifically, we evaluate the managerial efficiency and profitability efficiency of Malaysia-incorporated companies involving in general insurance business for the period 2008-2011, by using the additive efficiency decomposition approach in 2S-DEA of Chen, Cook, Li, and Zhu (2009). We find that the sample firms have to first improve their managerial efficiency, and then proceed to improve their profitability efficiency.

Accepted: 16 April 2015

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1. Introduction

The 2007-2008 global financial crisis has put the issues of performance of financial institutions including insurance companies under a spotlight. Such event reminded the corporate world of the importance of effective financial performance management. Therefore, how well an insurance company manage and measure its financial performance is an empirical issue.

In today's challenging business world, insurers should incorporate various indicators in measuring their corporate performance to ensure they have comprehensively understood the performance. Practically, performance measures such as financial ratios, which are uni-dimensional and characterized by subjectivity, are regularly used. For example, return on assets (ROA), which is

measured as the ratio of profit after taxes to total assets, only define how profitable a company is in relation to its available total assets. In other words, it merely describes how efficient managers are at employing its total assets to generate profits for the company.

Specifically, single dimensional performance measures might not be able to portray the exact picture of a firm's financial performance. In contrast to those disputable performance measure, data envelopment analysis (DEA) offers advantages in evaluating corporate performance because it is able to handle multiple indicators at the same time [1]. This non-parametric method that utilizes mathematical programming incorporate various attributes together so that promising connections among them are considered in estimating a single efficiency score for a

decision-making unit (DMU). With that, managers could obtain an exact picture of their financial performance through information on aggregated relationships.

In the insurance literature, DEA has always been the most commonly used method of frontier efficiency analysis [2]. However, it is worth noting that traditional DEA models are subject to some shortcomings. For example, the typical DEA models including the BCC and CCR models treat the production process of a company as a black box. To address the shortcomings of traditional DEA models, we complement extant literature by adopting the two-stage DEA (2S-DEA) model, following [3], to uncover the black-box production process of general insurance companies in Malaysia.

That is, we employ the additive efficiency decomposition approach in 2S-DEA [4] to evaluate the managerial and profitability efficiencies of a sample of 16 general insurers in Malaysia for the period from 2008 to 2011. We argue that they should focus on managing and measuring well their performance in the face of rising competition to ensure sustainability.

This study proceeds as follows. The following section reviews some relevant studies. The third section discusses data collection and DEA-related topic. The fourth section reports this study's findings. The fifth section concludes this study.

2. Literature Review

The increasingly vibrant corporate environment has explained why performance measurement is important in the insurance industry. In Malaysia, the insurance industry has been supervised by the "Bank Negara Malaysia" (BNM) since 1988.

Furthermore, the sector has since 1996 been under the governance by the Insurance Act 1996. To further ensure the stability of the sector, the BNM launch a risk-based capital framework in 2009 to mandate all insurers in Malaysia to keep a minimum level of capital. Thereafter, the stronger capital base has enabled insurers to see improvement in their performance. However, as discussed earlier, using uni-dimensional performance measures to assess a firm's performance might be problematic. Put differently, using a multi-criteria performance measurement technique could better evaluate the performance of companies in the general insurance industry in Malaysia. Therefore, it is an empirical question how well a general insurer in Malaysia perform relative to its peers from a multiple-factors perspective.

3. Research Approach

3.1 Methodology

As mentioned earlier, using DEA to evaluate corporate performance could provide comprehensive information that involves multiple indicators in one shot [5, 6]. That is, DEA is an appropriate instrument for assessing the relative performance of DMUs, considering diverse factors. However, traditional DEA models neglect intermediate measures or the activities in a black-box production process [7].

The additive efficiency decomposition approach in 2S-DEA of [4] is able to estimate performance of DMUs that can be divided into two stages. This model enables a researcher to conduct a two-stage efficiency evaluation with intermediate measures in a single implementation. As shown in Figure 1, we develop a two-stage production process in this

study to assess the managerial and profitability efficiencies of general insurers in Malaysia.

Based on the two-stage production process, assume there are n DMUs (general insurers in this study) ($j = \text{DMU}_1, \text{DMU}_2, \dots, \text{DMU}_n$) and that DMU j employs d inputs ($x_{ij}, i = 1, \dots, d$) to get e outputs ($z_{bj}, b = 1, \dots, e$) in the first-stage process, which are then employed as intermediates in the second-stage process to get f outputs ($y_{wj}, w = 1, \dots, f$). Under variable returns to scale, S_1 and S_2 as shown below are the efficiency measures for Stages 1 and 2, respectively.

$$S_1 = \left(\sum_{b=1}^e \eta_v z_{bo} + \mu^A \right) / \left(\sum_{i=1}^d \gamma x_{io} \right) \quad (1)$$

$$S_2 = \left(\sum_{w=1}^f \mu_w y_{wo} + \mu^B \right) / \left(\sum_{b=1}^e \eta_v z_{bo} \right) \quad (2)$$

Meanwhile, the following convex linear program format: $\theta = w_1 S_1 + w_2 S_2$ denote the overall

efficiency performance, where $w_1 + w_2 = 1$ and w_1 and w_2 both signify the relative weightage given to the individual stages.

Referring to Figure 1, we mean to utilize four input variables, two intermediate variables, and three output variables for the evaluation process. Note that the production process and choices of variables are made based on the value-added approach (or production approach), in line with prior studies [8, 9]. To be specific, the inputs are (i) operating expenses (OPE) [8], (ii) total liabilities (TL) [8], (iii) total owners' equity (TOE) [10], and (iv) staff costs (SC) [11]. The intermediates are (i) total premium received (TPR) [12] and (ii) net income (NI) [9, 12]. The outputs are (i) the summation of incurred claims [11] and additions to reserves (CR) [13], (ii) investment assets (IA) [8, 10], and (iii) underwriting profit (UP) [9].

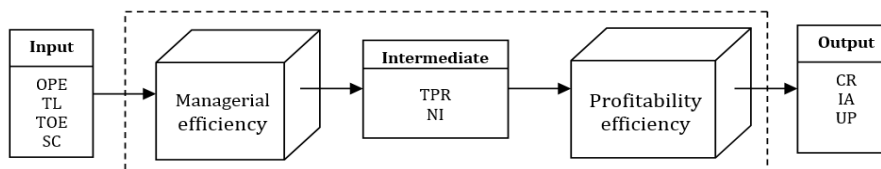


Figure 1: Two-stage production process

Following previous literature [8], the variables were deflated by using the Consumer Price Index (CPI) of Malaysia at 111.4 as of 2008. Table 1 shows the summary statistics for the sample. The mean values of the input and output variables steadily increased over the sample period.

In summary, this study applies the additive efficiency decomposition approach in 2S-DEA of [4] by establishing an input-oriented two-stage production model in a single operation involving intermediate. The DEA score ranges from 0 to 1, in which an insurer with the score of 1 is relatively efficient, while one with a score of less than 1 is

relatively inefficient. For details of the procedure, readers are referred to [3].

3.2 Data Collection

The sample companies of this study are all Malaysia-incorporated companies involving in general insurance business. The required data for inputs, intermediates, and outputs are extracted from the annual reports of the sample insurers. The population is made up of 20 general insurance companies in each year for the period from 2008 to 2011. However, we only manage to have a final dataset of 16 general insurers due to data availability. The sample size is not a major

concern because the total net premiums received by the 16 sample general insurers make up almost 80 percent of that of the population. In other words, the sample companies are in some way demonstrative of the general insurance industry in Malaysia.

4. Results and discussion

Table 2 presents the average values of the two stages of efficiency measurement, in which the mean scores of managerial efficiency and profitability efficiency are 0.854 and 0.926, respectively. These findings indicate that managers in the general insurance companies in Malaysia should strive to first improve their

managerial planning in terms of resources, and then focus on generating more income for their companies. The difference in the efficiency scores between Stage 1 and Stage 2 increases over the sample period. As can be seen in Table 2, the decrease in managerial efficiency is more tremendous than that in profitability efficiency. That is to say, the sample general insurance companies have to first reduce their inputs through efficient management of resources or increase their intermediates through more marketing or better products. Furthermore, we also find that general insurance companies in Malaysia have approximately 11 per cent room for improvement, as evident by the overall efficiency score of 0.890. On the overall basis

Table 1: Summary statistics

	Mean				
	2008	2009	2010	2011	Overall
Input					
Operating expenses (OPE)	60.26	62.34	66.95	70.93	65.12
Total liabilities (TL)	451.97	498.60	793.03	878.64	655.56
Total owners' equity (TOE)	187.43	251.03	304.38	353.78	274.16
Staff costs (SC)	28.05	33.45	35.31	37.59	33.60
Intermediate					
Total premium received (TPR)	343.90	370.36	479.62	527.99	430.47
Net income (NI)	300.31	334.88	341.02	350.52	331.68
Output					
Incurred claims + additions to reserves (CR)	257.91	212.97	249.59	279.53	249.99
Investment assets (IA)	530.30	631.99	589.59	645.60	599.37
Underwriting profit (UP)	308.34	347.68	368.19	379.07	350.82

Note: The variables are all denoted in MYR million.

Our findings generally show that the performance of general insurers in Malaysia has decreased over the sample period. The findings support our wordings earlier that it is an empirical question how well a general insurer in Malaysia perform relative to its peers from a multiple-factors perspective in today's challenging world. In short, insurers should apply a multiple-criteria evaluation tool like DEA to evaluate their performance.

5. Conclusions

This study enriches extant literature of DEA-application papers on performance measurement in the insurance industry by examining the performance of general insurance companies in Malaysia in a two-stage manner. To be specific, we employ a 2S-DEA model to estimate the managerial and profitability efficiencies of 16 general insurers in Malaysia over the period from 2008 to 2011. Over the sample period, the results show that the performance of the general insurers has monotonically decreased. Moreover, the

results indicate that general insurers should attempt to improve their managerial efficiency at the first place. With good managerial strategies, they should be able to improve further their profitability efficiency.

In conclusion, we suggest that insurers should consider using the 2S-DEA model to evaluate their

corporate performance so that they could comprehensively understand their financial performance. Using DEA, they are able to provide a more exact picture of their operating efficiency to investors or even for internal usage.

Table 2: Two-stage DEA Efficiency Scores

	Mean efficiency score				
	2008	2009	2010	2011	Overall
Managerial efficiency - Stage 1	0.919	0.902	0.810	0.787	0.854
Profitability efficiency - Stage 2	0.937	0.935	0.919	0.912	0.926
Overall	0.928	0.919	0.865	0.849	0.890

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