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# The Effect of Board Composition on the Efficiency of Public Listed Companies in Malaysia

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## Abstract

Using data from 2005 to 2010, we investigate the effects of board composition, especially by qualification of directors and role of independent directors, on the efficiency for Malaysia in balanced panel consisting of top 100 public listed companies and 582 observations. Using Data Envelopment Analysis (DEA), we calculate technical efficiency by taking into account of both time and firm effects directly. We conclude that the top 100 public listed companies are relatively less efficient in utilizing their inputs in terms of labor and capital in achieving a given level of output which is measured by the amount of sales revenues. In Tobit regressions, we investigate effect of board compositions on the firm's efficiency level for both cost and profit. With respect to the effect of board compositions, we find that number of independent directors is positively and statistically significant to increase firm efficiency while board size does not significantly influence the firms' performance.

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## 1. Introduction

In the past decades, especially after the subprime crisis erupted in December 2007 had signified the important of corporate governance not only to the banking institutions but also to all public listed companies. In Malaysia, corporate governance practices received considerable attention with the release of the Malaysian Code on Corporate Governance (MCCG) in March 2000. This enables shareholders and public gain better awareness and assurance on the standards of corporate governance of listed companies in Malaysia. With the implementation of MCCG, special emphases had been given to the role of independent non-executive directors to monitor and evaluate management performance (Fama and Jensen 1983, Bhojraj and Sengupta 2003, Ashbaugh *et al*. 2006). In 2001, the Bursa Malaysia (2001) Revamped Listing Requirement states that at least one third of their board of directors must comprise of independent non-executive directors as part of the listing requirement. Continuous improvement in the corporate governance practices is witnessed with the revision of MCCG code in 2007. Besides, board composition in terms of qualification of directors and the role of independent directors in the audit committee being reviewed following the Budget 2008 announced by the Malaysian Prime Minister. This highlights the important of corporate governance practices in ensuring the safety and soundness of the public listed companies.

According to Fama and Jensen (1985), the presence of independent non-executive directors on the corporate boardroom enhances the firms' value through monitoring management's decision, protecting interests of shareholders and other stakeholders, and safeguarding firm reputation. The benefit of having the independent in the corporate boardroom is also demonstrated in Shivdasani (1993), and Cotter *et al*. (1997). They found that the capability of independent directors can reduce the possibility of a hostile takeover and provide more return to the target firms. This is supported by Pathan *et al*. (2007) that claim the presence of outside directors on the board serves to prevent collusion among top managers on the board and increases the effectiveness of the internal managerial labor market. Likewise, Tama *et al*. (2008) found that independent directors have been effective in monitoring and controlling managers. Such an action may lead to a positive impact on performance, stock return, credit ratings, and auditing. The study of Chuan *et al*. (2009) also reveal that board independence plays a positive role on firms' investment behavior and performance. Other the other hand, a number of studies have pointed out that large number of non-executive directors may affect firms' performance with excessive monitoring, stifle strategic actions, lack real independence, and lack of the business knowledge among non-executive directors to be truly effective (Baysinger and Butler 1985, Patton and Baker 1987, Demb and Neubauer 1992, Goodstein *et al*. 1994).

In Malaysia, a number of studies have confirmed the pivotal role of composition of the board of directors in promoting firm performance. For example, Germain *et al*. (2014) examine the determinants of board structure for Malaysian firms from 2000 to 2007. They also study on the level of compliance of boards of directors in Malaysia with the requirements of the Malaysian Code on Corporate Governance. They find that there is a significant increase in the number of directors in 2002 resulting from the substantially increase in independent directors. In addition, the study reveals that the recommendation of the MCCG has a significant impact on board size, firm size, firm age and firm leverage.

On the other hand, Wan-Hussin (2009) investigates the relationship between board composition and corporate transparency by focusing on the independent and affiliated directors in Malaysia during the period 2001-2002. The study finds that the presence of independent directors is unlikely to enhance corporate transparency and there is even possibility that independent directors incur the agency problem together with CEO (p. 328). In a related work, a few Malaysian studies such as Abdullah and Mohd-Nasir (2004), Mohd-Salleh *et al*. (2005) and Abdul-Rahman and Mohamed-Ali (2006) also conclude that independent directors do not add to quality financial disclosure. Recently, Ooi *et al*. (2015) find that the exogenous crises such as natural disasters, disease outbreaks, war/terrorism and economic/financial downturn play to a significant role in influencing the linkages between firm performance and the board of directors.

To our knowledge, nevertheless, the literature is yet to provide a definitive conclusion on the issue of board composition, especially qualification of directors and number of independent directors, and board size on firms' efficiency in Malaysia. The study, therefore, examines the effect of board size and structure on public listed firm's performances in Malaysia in terms of technical efficiency for the period 2005 to 2010. The paper attempts to contribute significantly to the existing literature in three folds.

First, most of the studies of the effect of board structure on firms' performance are based on accounting ratio, namely return on assets and return on equity as well as Tobin's Q (Baysinger and Butler 1985, Zahra and Stanton 1988, Shrader *et al*. 1997, Adler 2001, Brown and Caylor 2004, Adams and Ferreira 2008, Francoeur *et al*. 2008). This study uses Data Envelopment Analysis (DEA) to estimate the efficiency scores to estimate the top 100 publicly listed companies in Malaysia. This enables us to evaluate the effectiveness of the firms in employing their factor of production to achieve a given level of output. The efficiency score derived from DEA is relatively superior as compared to the financial ratio because it is able to take into account of the shortcoming associated with the evaluation of inventories and depreciation.

Second, Tobit regression is used to investigate effect of board size and structure on the firm efficiency level for both cost and profit. In this context, the use of the Tobit regression model is more efficient than ordinary least square (OLS) method since the dependent variable, efficiency score, is between 0 and 1. If the dependent variable takes on values of either zero or one, then the use of linear regression model not only places inappropriate restrictions on the residuals of the model, but the fitted value of from a linear regression is not restricted to lie between zero and one (McDonald and Moffitt 1980, Powell 1986).

Third, the introduction of the Malaysian Code of Corporate Governance (MCCG) in 2000 has significantly changed the landscape of corporate governance in Malaysia's publicly listed firms. One of the objectives of MCCG is to focus on strengthening board structure and composition. The implementation and integration of MCCG by the publicly listed firms provide a natural experiment to examine whether the associated improvement in board structure and composition influences the efficiency and performance in Malaysia.

The paper is organised as follows. Section 2 analyzes the data and methodology used. Section 3 discusses the results of the regressions while Section 4 draws some policy conclusions.

## 2. Data and Methodology

### 2.1. Methodology

The study employs the Data Envelopment Analysis (DEA) model to estimate the technical efficiency scores of public listed companies in Malaysia from year 2005 to 2010. The estimation allows the decomposition of technical efficiency into pure technical efficiency and scale efficiency. This allows us to further determine the root source of inefficiency in the public listed companies.

DEA model based on constant return to scale (CRS) was formulated by Charnes *et al*. (1978). It is assumed that the firms are able adjust their input and output proportionally and operate in an optimal scale. This is a linear programming technique to estimate efficiency scores which is more flexible because it does not require the specification of a particular functional form for the best practice firms' production function. The sample firms which found to be the most efficient are assigned with a score of "1" while the firms which are less efficient will be allocated with the scores of less than one. Hence, this technique compares each firm's studied with the "best practice" firms and each firm is known as the Decision Making Unit (DMU). Besides, estimation of efficiency using DEA will not be subjected to possible misspecification of the production function as compared to the parametric approach (Bauer *et al*. 1998, Jemric and Vujcic 2002, Okuda and Hashimoto 2004).

Besides the CCR model, this study employs the DEA approach based on variable return to scale (VRS) proposed by Banker *et al*. (1988). It is a better representation of the efficiency estimation in the real world because firms are subject to imperfect competition market which governed by government regulations and financial constraints that prevented them to operate at their optimal scale level (Coelli *et al*. 2005). Besides, the model allows us to identify the pure technical efficiency of the firms studied. The technique employed in this study is based on input-orientation approach because it is important to analyze the utilization of the factors of productions in their cost minimization and profit maximization process in producing a given level of outputs. Equation (1) shows CCR models for technical efficiency.

$$
\begin{aligned}
&\theta^{*} = \min \theta \\
&\text{subject to} \\
&\sum_{j=1}^{n} \lambda_j x_{ij} \le \theta x_{io} \quad \text{i} = 1,2,...,\text{m}; \\
&\sum_{j=1}^{n} \lambda_j y_{rj} \le y_{ro} \quad \text{r} = 1,2,...,\text{s}; \\
&\lambda_{\text{j}} \ge 0 \qquad\qquad \text{j} = 1,2,...,\text{n}.
\end{aligned}
\tag{1}
$$

Where $x_{io}$ and $y_{ro}$ are the *i*th input and *r*th output for Decision Making Unit ($DMU_0$), respectively. Where $\theta^{*}$ symbolized technical efficiency of *jth* DMU. The firms are said to be

technically efficient if $\theta^* = 1$ with an optimum used of input. If $\theta^* < 1$, then $DMU_0$ is said to be relatively technical inefficient because it located below the production frontier. The variable return to scale (VRS) envelopment model will be estimated by setting $\sum_{j=1}^{n} \lambda_j = 1$ .

## 2.2 Data and Variables

The sample of the study consists of the top 100 public listed companies according to their market capitalization in year 2008. These companies take the weightage in the calculation of the Kuala Lumpur Composite Index which represents the Main Board performance of the Bursa Malaysia. The sample of the study starts from year 2005 to 2010 with the total number of observations equal to 582. The annual reports can be obtained Bursa Malaysia and Thomson Datastream Databases.

The inputs vector employ in this study are capital which is proxy by the amount of machinery, plant and equipment employed by the firms in the production process. Besides, the personnel cost is employed as the proxy of labor. These inputs are then assumed to produce the product of the firms which is proxy by the value-added of the product. Due to the availability of the data, this study employed total revenue of the firms in measuring the value of the product being produced by each firm.

Table 1 shows the descriptive statistics of the output and inputs vectors employed in the technical efficiency analysis of the top 100 public listed companies in Malaysia in thousand Ringgit Malaysia. It is shows that the firms on average are able to generate RM3.97 billion per year with the total fixed assets of RM2.73 billion and personnel expenses of RM0.35 billion on average in a year. The standard deviation of the output and inputs vectors is also high and this indicates that the firms are relatively diverse in terms of revenue generation out of the total inputs employed.

**Table 1: Descriptive statistics of the output and inputs vectors (thousand Ringgit Malaysia)**

| Descriptive statistics | Revenues | Total fixed assets | personnel expenses |
|---|---|---|---|
| Mean | 3,970,645.08 | 2,730,309.84 | 352,935.26 |
| Standard Deviation | 5,154,304.31 | 6,707,395.39 | 541,287.45 |
| Minimum | 13,942.40 | 200 | 255.00 |
| Maximum | 34,044,700.00 | 58,227,400.00 | 3,328,300.00 |
| Count | 582 | 582 | 582 |

Next, Tobit regression model is employed to examine effect of board size and structure on the firms' efficiency level. The Tobit regression model is employed since the dependent variable,

efficiency score, is between 0 and 1. The unbalanced panel data approach of Tobit regression is done using Equation (3) as follows:

$$Eff_{it} = f(BS, ID, size, ROA, ROE, ETA, LOAN)$$
$$Effi_{it} = \alpha_{it} + \beta_1 BS_{it} + \beta_2 ID_{it} + \beta_3 size_{it} + \beta_4 ROA_{it} + \beta_5 ROE_{it} + \beta_6 ETA_{it} + \beta_7 LOAN_{it} + \varepsilon_{ijt} \quad (3)$$

where;

$Eff_{it}$= efficiency score for *i* firm at time *t*
$BS_{it}$ = board size (natural logarithm of total number of directors) for *i* firm at time *t*
$ID_{it}$ = independent director/ total number of directors for *i* firm in at time *t*
$Size_{it}$ = firm size (natural logarithm of total assets) for *i* firm at time *t*
$ROA_{it}$ = return on assets for *i* firm at time *t*
$ROE_{it}$ = return on equity for *i* firm at time *t*
$LOAN_{jt}$= total loan to total assets for *i* firm at time *t*
$\varepsilon_{ijt}$ = error-terms for *i* firm at time *t*

The correlation matrix presented in Table 2 shows the correlation of the independent variables are less than 70% and hence the estimation did not suffer from multicolinearlity problem.

**Table 2: Correlation matrix**

| | **Board Size** | **Independent Director (%)** | **Firm Size** | **ROA** | **ROE** | **Loan / Total assets** | **Equity/ Total assets** |
|---|---|---|---|---|---|---|---|
| Board Size | 1.000 | | | | | | |
| Independent Director (%) | -0.025 | 1.000 | | | | | |
| Firm Size | 0.361*** | 0.121 | 1.000 | | | | |
| ROA | -0.098 | 0.114 | -0.509*** | 1.000 | | | |
| ROE | -0.026 | 0.045 | 0.036 | 0.027 | 1.000 | | |
| Loan / Total assets | -0.088 | 0.119 | -0.500*** | 0.112 | -0.051 | 1.000 | |
| Equity/ Total assets | -0.088 | 0.119 | -0.501*** | 0.011 | -0.051 | 0.400*** | 1.000 |

Notes: ***p ≤0.01; **p ≤0.05; *p ≤0.10

## 3. Results and Discussion

The computation of technical efficiency scores was performed using DEA Frontier program developed by Cooper *et al*. (2004). This program allows the decomposition of the overall technical efficiency of the top 100 public listed companies in Malaysia into pure technical efficiency and scale efficiency. The descriptive statistics of the estimated efficiency scores from year 2005 to 2010 are presented in Table 3.

The results in Table 3 indicates that the top 100 public listed companies are relatively inefficient in managing their inputs in terms of labor and capital in order to achieve a given level of output which is measure by the amount of sales revenues. In year 2007 the average technical efficiency

score of the firms dropped to as low as 6.73 percent and this is resulted mainly from the drop in both pure technical and scale efficiencies of the firms. This might due to the effect from the Subprime Crisis that initiated in the early 2007 which had turned into a Global Financial Crisis in the subsequent year. The overall technical efficiency of the top 100 public listed companies are still low following the Global Financial Crisis where in 2009 the average overall technical efficiency of the firms are only 14 percent and increased slightly to 14.09 percent in 2010.

It can be seen from Table 3 that the source of inefficiency in the firms are mainly due to pure technical efficiency as compared to scale efficiency. The reported pure technical efficiency score range as low as 23.69 percent to 30.38 percent. This means that the management is wasting their inputs as much as 69.62 percent to 76.31 percent in achieving their targeted sales level. Hence, the firms are relatively poor in managing their inputs level in obtaining a given output level. In terms of scale efficiency, the firms are said to be operating in the right scale of operation with an average scale efficiency score which is above 60 percent. However, a reduction in scale efficiency can be seen in year 2007 with a reported average scale efficiency score of 32.34 percent.

**Table 3: Descriptive statistics of the efficiency scores of top 100 public listed companies in Malaysia from year 2005 to 2010**

| **Overall Technical Efficiency** | | | | | | |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Mean | 0.1675 | 0.1418 | 0.0673 | 0.1984 | 0.1400 | 0.1409 |
| Standard Deviation | 0.2307 | 0.2093 | 0.1324 | 0.2159 | 0.2117 | 0.2002 |
| Minimum | 0.0152 | 0.0179 | 0.0050 | 0.0238 | 0.0127 | 0.0170 |
| Maximum | 1 | 1 | 1 | 1 | 1 | 1 |
| Count | 94 | 97 | 100 | 99 | 98 | 94 |
| **Pure Technical Efficiency** | | | | | | |
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Mean | 0.2806 | 0.2691 | 0.2369 | 0.3038 | 0.2529 | 0.2678 |
| Standard Deviation | 0.3155 | 0.3120 | 0.2885 | 0.2817 | 0.2950 | 0.3119 |
| Minimum | 0.0278 | 0.0237 | 0.0163 | 0.0494 | 0.0184 | 0.0242 |
| Maximum | 1 | 1 | 1 | 1 | 1 | 1 |
| Count | 94 | 97 | 100 | 99 | 98 | 94 |
| **Scale Efficiency** | | | | | | |
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Mean | 0.6746 | 0.6303 | 0.3234 | 0.7102 | 0.6010 | 0.6169 |
| Standard Deviation | 0.2587 | 0.2550 | 0.1771 | 0.2642 | 0.2910 | 0.2640 |
| Minimum | 0.0423 | 0.0438 | 0.0234 | 0.0956 | 0.0351 | 0.0336 |
| Maximum | 1 | 1 | 1 | 1 | 1 | 1 |
| Count | 94 | 97 | 100 | 99 | 98 | 94 |

Results in Table 4 indicate that board size does not significantly influence the firms' performance of the top 100 public listed companies in Malaysia. This is consistent with Adams

and Mehran (2005) study that found board size does not significantly influence the banking firms' performance in the U.S. The number of independent directors is found to be positively related to the firms' technical efficiency at 1 percent significant level. This proved that firm performed better with higher number of independent directors. This is because independent director plays an important role in mitigating moral hazard behavior of managers to act in accordance with their own self interest. According to Andres and Vallelado (2008) independent director in the board will also helps to minimize the agency problem. Finally, results are also consistent with the theory where firms with higher return to equity able are more efficient.

**Table 4: Tobit regression estimation**

| Variable | Technical efficiency |
|---|---|
| Constant | -0.404 |
| | (0.185) |
| | [-2.182]** |
| Board size | -0.042 |
| | (0.059) |
| | [-0.711] |
| Independent director | 0.150 |
| | (0.050) |
| | [3.008]*** |
| Firm size | 0.037 |
| | (0.010) |
| | [3.756]*** |
| ROA | -0.088 |
| | (0146) |
| | [-0.604] |
| ROE | 0.199 |
| | (0.078) |
| | [2.536]** |
| Loan/Total assets | -0.036 |
| | (0.066) |
| | [-0.545] |
| Equity/ Total assets | -0.040 |
| | (0.052) |
| | [-0.775] |
| Sigma | 0.288 |
| | (0.008) |
| | [34.117]*** |
| Log Likelihood | -100.528 |

Notes: ***p ≤0.01; **p ≤0.05; *p ≤0.10; Standard errors in parentheses and z-statistics in [ ].

## 4. Conclusions and Policy Implications

Reformation of corporate governance policies in Malaysia has been enhanced and improved dramatically in the second half of the 2000s, right after the global financial and economic crises. The literature indicates that better corporate governance practices should result in better

performing, more efficient firms. To investigate this issue empirically, we take a sample of top 100 public listed companies in Malaysia and focuson firm efficiency scores derived from frontier estimations of both cost and profit functions. Our findings have two important implications for empirical study. First, the average technical efficiency of the top 100 public listed companies has slightly increased 14 percent in 2009 to 14.09 percent in 2010. This is in line with our expectation that better corporate governance practices tend to generate considerably higher rates of firm's performance.

Second, the source of inefficiency in the firms is particularly resulting from pure technical efficiency rather than scale efficiency. The findings suggest that the management could further reduce the amount of labor and capital used in achieving their targeted sales level. Therefore the management of inputs needs to be more cautious so that the firms can further reduce their inputs mix given the same level of sales. In contrast, these firms are said to be operating in the right scale of operation with an average scale efficiency score which is above 60 percent. This indicates that firms are technically efficiency given their scale of operation. Third, both firm size and the number of independent directors are statistically significant to influence firm performance while board size by itself is not sufficient to insure firm efficiency in Malaysia because we find no statistically significant evidence on firm efficiency. This implies that the continuous improvement in the MCCG Code to increase the percentage of independent director in the corporate boardroom is a right move. This may due to the reason that independent director provides both monitoring and advisory roles in the decision making of the corporate boardroom. Fourth, return on equity is more successful than return on asset in imparting firm efficiencies.

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