

Efficiency Measurement on Government Linked Companies (GLCs): A Review on Non-Parametric Methods and Applications

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Abstract—The government's objectives for economic sectors are to ensure exports and earnings, food security, improving productivity and competency. Thus, by emplacing government role on economic development of a country, this study aims to examine the efficiency of top listed Government Linked Companies (GLCs) in Malaysia. This study will use secondary data that obtained from financial statement of each company from the period of 2004Q1 to 2013Q4. Moreover, we will employ Data Envelopment Analysis (DEA) to measure the efficiency of GLCs. The results obtain from this study will help GLCs management and policy makers to determine how successful the companies in each sectors especially in achieving efficiency and productivity and overall create an efficient production decisions and determine the areas that need improvement.

Keywords: Government Linked Companies (GLCs), government's role, efficiency, Data Envelopment Analysis (DEA), sectors, productivity.

1. INTRODUCTION

Malaysia experienced Asian financial crisis in 1997/1998 and one of reason is because of poor corporate governance [8] in term of their efficiency across industries and enterprises. Malaysia ringgit value has dropped and the Kuala Lumpur Stock Market Index also has fallen down until April 1998. The crisis had brought much loss for companies including GLCs. This is because of the constraint by those companies in obtaining loan and credits. Moreover, unemployment rate increased to 6% and negative GDP growth rate. GLCs are under government because of their role as major shareholder in those companies [2]. Government provides many ways to reinforce the economic and financial position of GLCs as because of their vital role in Malaysian economy.

Through GLCs, it can contribute revenue via tax payment, reduce unemployment, implement government policies and generate a knowledge based economies. For instance, GLCs create 34.3% of workers, 12.2% in Sri Lanka and 7.4% in Kenya [23]. Therefore, a macroeconomics variable affects the efficiency of companies under GLCs and vice versa. Furthermore, the national leadership has stated that

Government Link Companies also inhibit expansion of new firms and crowding out the private investment because of their dominant in a country [10]. These show that, the intervention of a government in a country, like Malaysia is high and it is not realistic for country that represents open economies. Therefore, it squeezes private investment in Malaysia [10]. Besides that, government run companies also may owe to tax payers and shareholders in order to operate in best way. Therefore, the links with the private sector are needed in order to meet the challenges and boost the economies [13].

Based on World Economic Forum, Malaysia has achieved 25th place in Global Competitiveness Index because of the efficiency, competitiveness and stable financial sector. Unfortunately, these are not enough for Malaysia to move out of the middle income trap. Previous study found that GLCs underperformed the broader Malaysian market especially in term of financial position [7] such as total shareholder return and dividend yield. This may well be more in hope and anticipation rather than in actual performance to date [14]. Even though New Economic Model (NEM), we assume that GLCs can enhance the economic growth but it still being a question because of the trends of their revenue towards Malaysia GDP.

The net profit of GLCs increased from 2005 around RM 8985.6 million to RM 199872.1 million in 2007. However, most of the companies started to have loss after the financial crisis in 2008 that fall until RM 17097 million in 2010. In 2011, they were able to increase the profit to RM 20080 million. Even though the net profit keep increasing after 2011, but this can see through certain companies such as Maybank and Sime Darby. MAS is one of the companies that having losses until now because of the performance.

Based on Government Linked Companies (GLCs) historical performance in financial and operational show, the risks were high especially in term of government vision to achieve 2020. Even though the government attempt to increase shareholders

return as well as their commitments to stakeholders of the companies, but the sustainable issue occurs especially in term of the firm's competitiveness globally. Government Transformation Programme (GTP) that been introduced in order to recover the performance of GLCs and conveys those firms to the liberal and competitive environment. In order to meet these challenges, the firms have to be efficient to avoid from falling out from the business world or government control. Moreover, the main objective of these programme, is to provide a firm with efficient and productive in order to become global player and reach the world standard [20].

**Table 1: Government Linked Companies (GLCs)
Indicators from 2004Q1 until 2013Q4**

Description	Net Profit (RM '000)	Revenue (RM '000)	Asset (Rm'000)	Market Capital (RM M)
Mean	851306.50	50076.85	2945.70	14877.35
Median	860227.70	50601.63	2976.57	13027.48
Maximum	1472952.00	86644.24	5096.72	24637.85
Minimum	253914.10	14936.12	878.60	8562.36
Std. Dev.	374842.70	22049.57	1297.03	5359.02
Skewness	0.11	0.11	0.11	0.33
Kurtosis	1.98	1.98	1.98	1.66
Jacque- Bera	1.81	1.81	1.81	3.71
Probability	0.40	0.40	0.40	0.16
Observations	40	40	40	40

Source: Author's estimate from GLCs report published by Economic Transformation Programme Review

Companies such as Pos Malaysia and Proton were sold because to help them keep going and boost the capital market. Different stories to Petronas, whereby it has divested and not listed GLCs because of its capability to survive itself and at the same time Petronas involvement under GLCs may crowding out private investment. However, Sime Darby also is a type of merge from the Golden Hope Plantation and Guthrie to be more profitable. There are reasons for the divestment. However, the role of the government will be always needs as a shareholder and overall proved their responsibility as 'economic developer'.

The contributions of those companies also are not constant for each sector whereby there are fluctuations especially in services and agriculture sectors. Restructuring of GLCs, which was announced by the Malaysia Prime Minister in May 2004, also focuses on the corporate governance practices and performances in GLCs. This triggers a question whether the existing mechanisms in GLCs are ineffective or inappropriate in order to enhance the economic growth of Malaysia. Based on Forbes Global 2000, only six companies under GLCs is declared as largest public listed corporations in 2013. The companies are Maybank, CIMB Group Holdings, Tenaga Nasional, Sime Darby, Axiata Group and Telekom Malaysia. However, in term of ranking, Maybank is in 332 followed by CIMB Group Holdings (467), Tenaga Nasional (516), Sime Darby (542), Axiata Group (807) and Telekom (1961). These

shows that Malaysia is still low in business performance compare to other high income countries such as South Korea that able to rank their companies under the list of 100 largest companies in the world. Samsung electronics and Hyundai motors earn high market value, sales and profits and overall able to grab the 20 and 89 stage in 2013. This becomes one of the reasons of the movement by this country from middle income to high income. Moreover, their aggressiveness in activate the business environment able to increase their national income.

Malaysia's GLCs are under New Economic Policy (NEP) whereby, they are closely associated with government policies especially in reform the society and wealth distribution. Moreover, government tends to appoint the chairman / Chief Executive Officer (CEOs) and directors which have to be approved by the Ministry of Finance. This is one of the government interventions in most GLCs. This makes the GLCs efficiency being a question mark in term of management. GLCs also usually partook by boards of directors that involved in various political parties. Thus, this make the GLCs more pressured in hiring politically connected people rather qualified members that able to perform preferred tasks. Moreover, this political intervention would distract managerial objectives left from profit maximization to employment maximization [22].

As discussed in the previous section Malaysia needs to focus on several factors to avoid the growth slowdowns that can lead to middle income trap. In order to strengthen the framework and provide more relevant effects on growth, this study emphasis more on the efficiency of governance standards and practices through Government Linked Companies (GLCs) and it is believe to be vital if the country tend to increase investments and ultimately attain their goal as a developed country by 2020. But if the there is a question of why undertake a study that emphasis on GLCs in order to move from the middle income trap? This is because Malaysia's GLCs account for a substantial element especially in terms of revenue and asset base rather than efficiency. For example, all GLCs obtain 34% of the total market capitalization of GDP in market value.

Thus, any substantial enhancement in performance and enhancement of GLCs would have created high profits especially in wealth, expenses and income of the nation. GLCs are the backbone of the country's economy especially in providing 'mission-critical services' such as telecommunications, financial, energy and transportation services. The effect of GLCs' performance will overall give impacts to economic sectors as a whole.

1.1 Government Linked Companies (GLCs)

Malaysia has not yet realized its market potential, stifling the development of increasingly competitive enterprises that cause

of the nation's stagnant labor productivity. Prime Minister said that GLCs play crucial role to offshoot economic growth of Malaysia [3]. He mentioned that in order to move Malaysia to high income economies and achieved our 2020 vision, the role of the government and the GLCs are important. Furthermore, GLCs would be able a platform to generate and enrich knowledge in key sectors and able to implement government policies. Moreover, in order to meet the challenges to achieve vision 2020, Government Linked Companies (GLCs) have to be competitive.

Table 2 shows the classification of GLCs under financial, plantation and services sector. From the table, we can see that most of GLCs are operating under services sector such as telecommunication, electricity, airlines, health and constructions.

Table 2: Classification of GLCs based on Sectors

Financial	Plantations	Services
Affin Bank BIMB CIMB MBSB Maybank	Sime Darby TH Plantations	TM Axiata Boustead CCM Airport MAS MRC TNB UMW UEM

Malaysia is now having challenges especially in term of globalization whereby, a lot of competitiveness in international trade. GLCs now are under pressure and moving in more liberal way to new players and rival [19]. Hence, GLCs are advised to place the aim in term of increasing the profits to achieve the goal to play with the economic scenarios [11]. Therefore, they have to be more efficient, develop knowledge resources, hire more educated workers, effective leadership, identify new markets and establish professional management [18]. Moreover, GLCs also have the responsibility to create more job opportunities and new investment as its issue that contribute to economic crisis. Even though GLCs has benefited from preferential treatment, but they have proven highly ineffective, that makes government keep doing transformation.

There are types of control, GLCs fully control (super control and exercise control) for example for companies such as Petronas, MAS, Maybank and Telekom Malaysia whereby the five GLICs are largest shareholders. Then followed by quasi control, whereby GLCs are single largest shareholder and finally non- GLCs whereby does not receive control by government. Recently, there are 17 listed GLCs under G20 that contribute to the federal government.

Malaysian government intervention in GLCs are not only in term of ownership but also in controlling the stakes such as in

appointing the board members, senior management, and major decisions in contract awards, policy, reformation and financing, acquisitions and divestments for the GLCs either directly or through government linked investments companies (GLICs). It has achieved a high performance since in diverse economic fields [15]. Moreover, companies like GLCs that link with government also can be defined in other different terms. For instance, [16] defined GLCs as public enterprise whereby the capital are fully under government control and use to achieve politic, economic and social objectives. Then followed by [9] that defined as ‘government controlled enterprise’ whereby government own equity or substantial and the companies holds in the hand of State. According to Vining [21], the economic enterprises that render services to public defined as ‘Crown Corporation and World Bank come with the definition as ‘State Owned Enterprises’ that generate economic revenues and profits and fully controlled by government. Shin (2005) defined as government linked companies in which government directly control the share and subsidiaries, for e.g: Temasek Holdings.

There are companies under GLCs that already divested for e.g: Pos Malaysia and Proton. There are many reasons of the divestment, (1) to enhance the market capital, (2) to be more competitive, (3) more liquidity in market and (4) increase the number of investors. Most of the GLCs are sell or merge, in order to keep grow and at the same time to avoid the ‘crowding out’ of private investment. The divestment programme, will make the government decrease the stake or sell the overall stakes of the companies.

2. METHODOLOGY

The model in this study will be developed from [4] and [6] by using the input and output from the financial statement of each company. The efficiency model will be as follows:

$$\text{Efficiency}_{GLCs} = \frac{\text{Weighted Number of Output}_{GLCs}}{\text{Number of Weighted Input}_{GLCs}}$$

Where:

GLCs: Government Linked Companies, Weighted Number of Output refers to output that used to measure efficiency value and Number of the Weighted Input is the input that used to measure efficiency value.

View of efficiency in term of production function by [6] and was followed by [4] whereby they combined the technical efficiency and production frontier to create a new efficiency measurement, so called DEA method. Moreover, they introduced DEA as non- parametric method based on linear programming. Data Envelopment Analysis (DEA) is method whereby it calculates the relative efficiency for observed unit with simultaneous consideration over two ratios. Moreover, DEA measures efficiency by using technical nature. DEA occurs from the assumption of [1] and [4] VRS concerning Farrell’s method.

In DEA, the production efficiency of economic units refers to the output increase by the use of inputs. The outputs can be measure by using linear programs. In the beginning of introducing this method, it was applied as management tool in solving business issues and problems but later one its area of application have spread widely to profit sectors such as services, manufacturing and industry. According to [12], DEA has been an appropriate tool in measuring the efficiency among industry but inefficient in term of theoretical maximum relative. [4] proposed that DEA is one of the efficiency models to replace the regression analysis in determining the organizational efficiency.

The selection of variables of inputs and outputs must be considered in this study. There is still lacking of literatures regarding the inputs and outputs of government linked companies (GLCs). The selection of inputs and outputs depends on the sectors of selected companies such as services, manufacturing, agriculture and construction and the relevant information that available.

DEA model based on constant return to scale (CRS) developed by [4] is to generalizes single- input, single output measure of decision making unit (DMU) in a multiple input and multiple output measures. Data envelopment analysis (DEA) can be calculated by using input output oriented. Input is the amount that will be used to produce the output. Input

and output have to work in similar way without any change. Variable and specific return to scale is the measures that can be used to identify the efficiency of the firms. According to [5], technical efficiency score can be identify by using Constant Return to Scale (CRS) but unequal value for the Variables Returns to Scale (VRS).

3. RESULTS

We used six outputs in this research which are rate of revenue, rate of asset, rate of net profit, ROA, ROE and ROR. The first output rate of asset shows that most of GLCs have highest mean with the value of 10 except TM, BIMB, Boustead and Airport. The lowest mean owned by BIMB with the value of 7.396. Then, the second output rate of net profit shows that AFFIN Bank have the highest mean of 10.998 and the lowest mean owned by MAS. Besides that, rate of revenue as third output shows that all mean value are same with the value of ten except TH Plantations with the mean value of 9.999. Then Return on equity (ROE) shows that TH Plantations has the highest mean value of 26.133 and the lowest mean owned by MAS-19.772. Then return on revenue (ROR) shows that Maybank has the highest mean value, around 38.884 and lowest mean value owned by UEM with the amount of-0.638. Finally, return on asset (ROA) shows that Sime Darby has the highest mean value of 12. 938 and UEM owned the lowest mean value of-0.323.

Table 3: Descriptive Statistics of Pure Technical Efficiency Value of each DMU in the selected Period (2004q1- 2013q4)

DMU	Mean	Median	Max	Min	Std Dev
Finance					
Affin Bank	0.927	1	1	0.489	0.136
BIMB	0.997	1	1	0.904	0.016
CIMB	0.914	1	1	0.442	0.160
MBSB	0.667	0.6405	1	0.239	0.329
Maybank	0.631	0.601	1	0.174	0.247
Plantations					
Sime Darby	0.903	0.941	1	0.521	0.115
TH Plantations	0.948	1	1	0.781	0.083
Services					
TM	0.748	0.681	1	0.475	0.203
Axiata	0.867	0.852	1	0.636	0.119
Boustead	0.900	0.906	1	0.699	0.095
CCM	0.853	0.9345	1	0.233	0.196
Airport	0.774	0.7835	1	0.523	0.136
MAS	0.951	1	1	0.379	0.111
MRC	0.794	0.807	1	0.483	0.191
TNB	0.874	0.955	1	0.422	0.173
UMW	0.990	1	1	0.618	0.060
UEM	0.941	1	1	0.210	0.150

From the table 3, we can see that the BIMB has the highest mean value around 0.997 and lower mean owned by Maybank. Overall, we can see that only GLCs under financial owned highest mean value compare to other GLCs.

Table 4 displays the overall efficiency known as Pure Technical Efficiency, under VRS assumption. In 2004, there

are 8 GLCs reaching the efficient level (TM, Axiata, BIMB, MAS, TH Plantations, TNB, UMW and UEM), while remaining 9 GLCs are inefficient. The most inefficient GLC is MBSB with the value of 0.354 or 35.4%. Overall, we found that for PTE values, there are 6 efficient GLCs and 11 inefficient ones (2005); 8 efficient GLCs and 9 inefficient ones (2006); 10 efficient GLCs and 7 inefficient ones (2007); 9

efficient GLCs and 8 inefficient ones (2008); 10 efficient GLCs and 7 inefficient ones (2009); 10 efficient GLCs and 7 inefficient ones (2010); 5 efficient GLCs and 12 inefficient ones (2011); 8 efficient GLCs and 9 inefficient(2012) ones and finally in 2013 6 efficient GLCs and 11 inefficient GLCs. Overall, we can see that GLCs under financial sector are more efficient compare to services.

Table 4: Pure Technical Efficiency Value of each DMU based on sectors for the period 2004- 2013 (in percentage)

DMU/SECTOR	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>FINANCE</i>										
AFFIN BANK	0.841	0.960	1	1	0.513	1	0.941	1	1	1
BIMB	1	1	1	1	1	1	1	1	1	1
CIMB	1	1	1	1	1	1	1	1	1	1
MBSB	0.475	0.574	0.421	0.312	0.434	0.947	1	1	1	1
MAYBANK	0.719	0.642	0.545	0.841	1	1	0.672	1	1	0.922
<i>PLANTATION</i>										
SIME DARBY	0.865	1	0.69	0.984	1	1	1	0.868	0.925	0.962
TH PLANTATIONS	1	1	1	1	0.964	0.844	1	0.879	0.930	1
<i>SERVICES</i>										
TM	1	0.840	1	1	0.513	0.787	0.647	1	0.745	0.892
AXIATA	1	1	0.84	0.636	0.821	0.946	0.838	1	0.692	0.718
BOUSTEAD	0.789	0.772	0.802	1	1	0.891	1	0.905	0.862	1
CCM	0.825	0.850	1	1	1	1	0.843	0.728	0.542	0.233
AIRPORT	0.814	0.591	0.633	0.772	0.800	1	0.876	0.688	0.728	0.523
MAS	1	1	0.783	1	0.840	0.893	1	1	0.723	0.379
MRC	0.512	0.586	0.565	0.642	1	1	1	0.959	1	0.994
TNB	1	0.422	0.658	0.952	0.964	1	1	0.931	0.735	0.848
UMW	1	1	1	1	1	1	1	0.998	0.985	0.618
UEM	1	0.666	1	1	1	1	0.905	0.808	1	0.878

Based on the result presented, we can see that most of GLCs are operating under decreasing return to scale. In 2004, there were 3 under CRS and 14 under DRS. Same goes in 2005, whereby 9 under CRS and 8 under DRS. However, in 2007 and 2008 most of the GLCs were operating CRS. There were 8 GLCs under CRS and 9 under DRS in 2007 and 11 GLCs under CRS; 4 and 6 under DRS in 2008. In 2011, GLCs 11 under CRS and 6 under DRS. Same return to scale goes until 2013. Furthermore, in our analysis only eight GLCs are mostly operating under CRS such as Malaysia Airport, CCM, CIMB, MBSB, Maybank, Affin Bank, TM and Boustead. The remainder all are operating under DRS.

4. CONCLUSION

The results of measuring the technical efficiency by using output orientation shows that, most of GLCs are performing better after the break or financial crisis, which is from 2008. Moreover, all the growth indicators that mentioned previously show the growth of GLCs, whereby there is increase in term of growth indicators from 2004 to 2007, and dropped on 2008. However, they able to increase their growth start from 2009 until now. The value of pure technical efficiency is better than technical efficiency. The VRS test showed that most of GLCs are performing under IRS. This means that output increases by more than that proportional change in inputs. Hence, role of GLCs should be emphasis by government in performing economic growth. Next chapter will analyses thoroughly the effects of macroeconomic and internal factor on technical efficiency of GLCs.

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