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Productive Efficiency and Welfare Gains from Privatization in Malaysia

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Literature shows that privatized firms generally gain financially, and privatization leads to *production* efficiency gains since performance outcomes are largely conditioned by externalities like ownership. Our approach linking privatization to welfare gain measures reveals three interesting results. First, there is a significant positive effect on welfare gains from privatization. Second, corporate ownership control appears to condition production efficiency and welfare gains. Finally, privatized firms also gain financially. Linking privatization to welfare gain measures is an important research and policy objective since governments cite ensuring welfare as a reason for controlling privatized firms after privatization.

1. Introduction

There has been a decline in the number of privatization studies after an intense period of research on the topic. In the 1980s, scholars turned their attention to a new form of restructuring firms as a major research area. Three groups of leading scholars made significant comments on this research at various stages of the resulting literature development. Seminal works include Megginson and Netter (2001), Megginson *et al*. (1994), and Vickers and Yarrow (1991).

This paper takes that research to a new direction by examining a suggested link between privatization and welfare gains. This

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worthwhile investigation adds new findings to the existing literature that treats privatized firms as having the same objective as that of non-public-goods providers in the private sector. The litmus test of privatization policy success is not merely the evidence that financial performance has improved after privatization but that welfare gains that have been also observed in the period after privatization of hitherto state-owned firms. The attention needed to link privatization to welfare gain is a neglected area of research to-date.

Vickers and Yarrow (1991) observed that private ownership has efficiency advantages under competitive conditions but does not show either public or private ownership to be superior when general market power is present after privatization. They further commented that the outcomes of privatization are conditioned by externalities. Examples of this would be issues like the degree of competition present in the product market at the stage of economic development of the country. This means that there will be no unanimous evidence of privatization always leading to financial efficiency because externalities may limit the firms from achieving efficiency. This explanation is germane as to why privatization has not always led to improved both financial and productive efficiency.

Shapiro and Willig (1990) reported in the above study as having commented "*In competitive market conditions … externality effects are small, so private profits and welfare objectives are closely linked…*". If indeed erstwhile state firms are privatized but these firms continue to produce public goods in a given country--albeit more efficiently than before privatization--a demonstration that welfare gain is achieved through privatization should be an additional test of the success of privatization beyond merely showing that financial efficiency gains occurred. Hence, the modest aim of this paper is to report a set of new findings on the link between privatization and welfare gains as a direct test of the objective of a government's privatization policy.

This proposition linking privatization to welfare gains remains largely untested because of a continuing assumption of almost all privatization studies. The assumption is that a state firm turned over to the private sector with dispersed ownership or otherwise becomes a profit-seeker if the externalities suggested by Vickers and Yarrow are controlled.

Hence, scholars have continued to test for financial--and in recent years also production efficiency--of privatized firms.[5]

There has been a singular lack of focus on whether or not privatized firms (a) had low welfare gains before privatization and (b) had increased welfare gains after privatization. In so testing for welfare gains, we also measure production efficiency as well as financial efficiency gains (following the methodology of Megginson and Netter (2001) and Wei et al (2003) and Wei, Varela and Hassan (2002) to verify if there are post-privatization gains in financial and production efficiency in an emerging country Malaysia.

The rest of the paper is divided into four more sections. A brief history of Malaysian privatization program is given in Section 2. A brief review of more recent but significant studies on this literature is provided in Section 3. Section 4 provides a framework for the measurement of welfare gain. Section 4 provides a description of how to measure welfare gains at the firm level while Section 5 provides the findings on welfare gains and efficiency. The paper ends with conclusions in Section 6.

2. A Brief History of Malaysian Privatization

The problems of poverty, unemployment and inter-ethnic economic imbalances in Malaysia resulted in national level riots in May, 1969. The government announced a New Economic Policy (NEP) in 1970 to address these inter-racial economic imbalances. The main objective of the New Economic Policy (NEP) was to achieve national unity by 'eradicating poverty' and by 'restructuring society' to achieve inter-ethnic economic parity. The NEP sets an agenda to restructure wealth with emphasis on creating a Malay business community with target equity ownership levels of 30 percent for foreigners, 40 percent for non-Malays, and 30 percent for *Bumiputeras* to be reached by 1990. To achieve this target--among others--the government encouraged the participation of State Owned Enterprises (SOEs) in all sectors of the

[5] There have been other tests as well. For example, post-privatized firm are known to substitute labor for capital. Hence, in the immediate aftermath of privatization, less labor is employed. Also, tests have shown that firms retaining monopolistic power continue to earn superior returns. However, it is still correct to say that half a dozen hypotheses tested in this literature did not include testing for economy-wide welfare gains of privatized firms.

economy beginning in 1970. The modus operandi of the Government's involvement in business activities was to establish new companies with the Government as sole owner. The Malay government also set up joint-venture companies with private entrepreneurs as part owners and bought a portion of publicly-traded shares of existing companies.

The rapid expansion of the public sector under the NEP led to bloated bureaucracy, inferior services, inefficiency, low productivity, high costs and limited innovation. Gomez and Jomo (1997) identified the inefficiencies of the managers, lack of proper system or criteria to evaluate and prioritize the enterprise objective and little monitoring as factors contributing to the poor performance of public enterprises. The poor financial performance and waste of investment resources increased the fiscal burden of the Government which led to slower economic growth.

Another factor contributing to the Malaysia's economic woes in the mid-1980s was the Government's heavy industrialization strategy. To finance these initiatives, the Government borrowed from abroad using primarily Japanese Yen. This resulted in a significant increase in public sector foreign debt. By 1987, public enterprises accounted for more than one third of the public sector's outstanding debt and more than 30 percent of total debt servicing (Jomo, 1990).

The fiscal and debt crisis of the mid-1980s led to the reversal of the earlier public sector expansion. The change in policy in the mid-1980s caused an overall public sector deficit of 24 percent of GNP in 1982 to shrink to about 12 percent in 1985 (Salleh, 1987).

A new "Malaysia Incorporated" was launched in 1983 with the objective that Malaysia would be run as a single business corporation with the private sector becoming the main catalyst of economic growth. The public sector would provide the support vital for the success of corporations. Privatization in Malaysia was officially inaugurated with the pronouncement of the "Malaysia Incorporated" concept on 25th February 1983. This initiative addressed the growing disillusionment with the performance of SOEs and the need to reassess the role of the NEP.

In 1991, the Malaysian Government's "Privatization Masterplan" was published to provide a guideline on the implementation of the privatization policy. To help achieve such policy objectives, the Government formulated a Privatization Action Plan (PAP) that set the criteria in determining the feasibility and desirability of the SOEs. Feasibility is determined by the ease of privatization and the attractiveness of the firm to the private sector. Attractiveness is determined primarily by competitive market position, growth potential and financial profile. Desirability is defined by the Government's perception of private sector superiority. The SOEs are currently evaluated on feasibility and desirability criteria.

The methods of implementing privatizations are summarized in Table 1 which shows that the most common method is Sale of Equity (31.96%). This is followed by Sale of Assets (19.94%). The other two common methods are "Build-Operate-Transfer" and "Build-Operate-Own with 13.20 percent and 9.38 percent respectively.

Table 1: Privatization Projects including Methods 1983-2000

Method	**1983-90**	**1991-95**	**1996-2000**	**Total**
Sale of Equity	4	94	11	109
Sale of Assets	3	33	32	68
Build, Operate, Transfer	9	21	15	45
Build, Operate, Own	1	18	13	32
Corporatization	1	13	9	23
Management Contract	5	9	11	25
Lease of Assets	2	6	3	11
Management Buy Out	2	5	7	14
Build- Transfer	-	5	-	5
Sale of Asset and Leasing	2	-	-	2
Public Listing	7	-	-	7
TOTAL	9	204	101	341

Source: Mohamed, 1995, Seventh Malaysia Plan 1996-2000 and Eighth Malaysia Plan 2001-2005.

Privatization has played a fundamental role in achieving higher levels of microeconomic efficiency and fostering sustained economic growth in both the developed and the developing economies. In Malaysia, a total of 40 privatized companies were listed on the Bursa Malaysia by the end

of 2000. The listing of the privatized companies on the Bursa Malaysia contributed RM131.1 billion or 30.3 percent of the total market capitalization as of 26 December 2000 as shown in Table 2.

Table 2: Paid-up Capital and Market Capitalization of Listed Privatized Firms as at 26 December 2000

	Number of Companies	**Paid-up Capital (RM million)**	**Market Capitalization (RM million)**
Listed Privatized Companies	40	18,174	131,141
Total Companies Listed	759	146,414	433,414
Percent of Listed Privatized Companies	5.0	12.4	30.3

Source: Eighth Malaysia Plan 2001-2005

The privatization program reduced the financial and administrative burden of the Government. Table 3 shows that between 1983 and 2000, the sale of equity and assets under privatization program generated RM26.21 billion and savings on capital expenditure amounting to RM122.01 billion. In addition, privatization also helps reduce the operational expenditure by RM633 million annually.

Table 3: Proceeds, Savings and Reduction in Public Sector Employment

Item	**1983-1990**	**1991-1995**	**1996-2000**	**Total**
Proceeds (RM billion)	7.58	14.12	4.51	26.21
Sale of Equity	7.50	11.81	2.08	21.39
Sale of Assets	0.08	2.31	2.43	4.82
Savings (RM billion)				
Capital Expenditure	21.17	51.59	49.25	122.01
Number of Public Sector Employees Transferred	53,618	43,038	17,442	114,098

Source: Seventh Malaysia Plan 1996-2000 and Eighth Malaysia Plan 2001-2005.

3. Brief Review of Privatization Studies

To provide a meaningful survey of the mainstream literature on this topic, a summary below is provided of key concepts using (a) financial performance, (b) efficiency performance and (c) welfare gains. Appendix 1 provides a summary of important articles.

3.1. Financial Ratios as Performance Indicators

Financial measures are widely used as performance indicators since such measures are also easy to understand by the public and the private sector. A comparison of financial ratios shows that PCs are more profitable and productive than SOEs and MEs. However, performance improvement is concentrated on revenue improvement--not cost reduction--in firms privatized to outside owners.

3.2. Production Efficiency Measures as Performance Indicators

Another measurement assessed to compare privatized corporations (PCs) and SOEs is a performance measure of the total factor productivity (TFP) that uses the production frontier model. The assessments conclude that the rate of TFP increases significantly after privatization, although some studies--especially in Less Developed Countries (LCDs)--indicate no evidence of statistically significant gain. This implies that public enterprises have a lower level of technical efficiency than private firms operating at the same scale of operation.

3.3. Welfare Gains as Performance Indicator

Studies suggest that welfare gains for post-privatization performance resulted in net welfare gains by an average 26 percent pre-divestiture sales revenue. No workers were worse off and some were even significantly better off.

4. Data, Variables and Methodology

4.1. Data Description

This study examined all the SOEs privatized and listed on the *Bursa Malaysia* as of the end of 2000 under the Malaysian privatization since

1983.[6] The effective analysis period is from 1983 to 2000. However, data collected on the sampled firms covers 2003 to allow for sufficient lead time to ascertain and compare the impact of privatization exercise.

The final sample covers all but 3 firms in the population which means that 37 out of 40 privatized firms[7] are included. Labor, capital and total assets are used as inputs for the purpose of computing technical and productivity efficiency. The larger the number of inputs and outputs, the less discriminatory the model becomes, so we use a limited number of variables.

4.2. Variables Definitions

Labor is the annual total number of employees of the firm. Capital cost for each firm is calculated as the value of depreciation plus a risk-free rate of return on capital employed. Total assets are the value of the assets.[8] Output measures are: (a) turnover, (b) net income and (c) other outputs. Turnover is the total value of the sales. Net income is turnover minus the expenses, interest and taxes. Other outputs are firm specific and-vary according to the type of business involved.[9] The output, wage bill (as annual total wage bill of the firm), net income (turnover minus the expenses, interest and taxes) are used to investigate the welfare gain from the privatization.

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[6] In this study, SOEs and public enterprises are used interchangeably.

[7] The other two firms excluded from this analysis are Lingkaran Transkota Holdings Bhd and Puncak Niaga Holdings Bhd. Both these firms are listed under Infrastructure Project Company (IPC) on Bursa Malaysia. In 1996 securities of sizeable IPCs were approved under the Securities Commission's guidelines for the Public Offerings. These IPC guidelines allow qualified IPCs requiring substantial investments to seek listing without a track record. However, this is conditioned upon, such as company having a healthy and predictable income stream and profit potential for a remaining contractual period of at least 18 years. Due to this new guideline, the two firms do not necessarily have to provide the track record of past financial records. As these two firms do not provide comparable data before privatization, they are also excluded from this study.

[8] Input and Output of different industries are different, so we have used different definitions of output depending upon industry classification.

[9] We have run analysis using turnover and other output alone but the results are substantially the same. Since we use net income for welfare analysis, we have reported the results with three output measures.

4.3. Hypotheses Development

The data set is used to two main hypotheses. The first hypothesis tests if privatized firms– irrespective of ownership control – have higher performance during the three years after privatization. The second hypothesis tests ownership. The second hypothesis tests that fully-privatized firms under private sector control should have greater production efficiency than the firms under state or central government control because such firms have greater consumer surplus creation.

Finally, we examine with regression analaysis if there exists any relationship between welfare gains of firms in the post-privatization period and (a) production efficiency and (b) technical efficiency.

4.4. Brief Description of Methodologies

4.4.1. Welfare Gains

There is a rich literature on production function, welfare gains, and producer surplus in competitive markets. The main contribution of the privatization literature to this area has been comments by economists that--under state-owned enterprises (SOE) management--welfare losses are arise due to reduction in consumer surplus.

Assume a firm uses only two inputs; labor and capital. Then, we could show that gains in consumer surplus may be represented as change in consumer surplus (ΔCS), the cost of labor inputs may be represented as a change in the rental cost of labor input (ΔRL), and profitability as a change in profitability ($\Delta \Pi$). A measure of social welfare may be represented as change in $\Delta \Psi$:

$$\Delta \Psi = \Delta CS + \Delta RL + \Delta \pi \qquad (1)$$

Jones *et al*. (1990) developed an approximation procedure to estimate the values needed for the welfare gain of privatized entities. Due to the lack of available of data on these privatized entities, this study applies the approximation procedure to calculate such values. Change in consumer surplus (ΔCS) can be computed by approximating either Slutsky compensation variable or by using a liner approximation of the demand curve. Slutsky's compensation variable can be calculated as:

$$\Delta S = Q_g * (P_p - P_g) \quad (2)$$

Where,

Q_g : represents quantity of output before privatization,

P_p : refers to the real price after privatization, and

P_g: refers to the real price before privatization.

The second method to measure changes in consumer surplus (ΔS) is to use a first order linear approximation to the demand curve.[10] This approximation (ΔCS) can be calculated as:

$$\Delta CS = \Delta p \left(q_p + \frac{q_g - q_p}{2} \right) \quad (3)$$

Where,

Δp : is the change in prices,

q_p : is the quantity of output after privatization, and

q_g is the quantity of output before privatization.

Changes in the rent to labor inputs (ΔRL) are calculated as an approximation to:

$$\mathbf{\Delta RL = (w_p - w_g) L_g} \quad (4)$$

Where, w_p : is the wage rate after privatization,

w_g : is the wage rate before privatization, and

L_g : is the number of employees before privatization.

Changes in the firm's profitability (**Δπ**) is calculated as:

$$\mathbf{\Delta\pi = \pi_{p - \pi g}} \quad (5)$$

[10] We use this linear approximation in our analysis

Where, π_p : profit of the firm after privatization and

π_g : profit of the firm before privatization.

4.4.2. Efficiency Analysis

Technical efficiency reflects the ability of a firm to obtain maximum output from a given set of inputs (Farrell, 1957). There is increasing concern in measuring and comparing efficiency of firms under different environments and activities. One of the simplest and easiest ways to measure efficiency is:

$$\text{Efficiency} = \frac{output}{input} \tag{6}$$

However, this method is often inadequate as firms normally produce multiple outputs by using various inputs related to different resources. Therefore, the measurement of relative efficiency--which involves multiple inputs and output—is important. This was first addressed by Farrell (1957) and later developed by Farrell and Fieldhouse (1962). The relative efficiency can be measured as:

$$\text{Efficiency of unit j} = \frac{u_1 y_{1j} + u_2 y_{2j} + \ldots}{v_1 x_{1j} + v_2 x_{2j} + \ldots} \tag{7}$$

where:

u_1 is the weight given to output 1

y_{1j} is the amount of output 1 from unit j

v_1 is the weight given to input 1

x_{1j} is the amount of input 1 to unit j

This measure of efficiency assumes a common set of weights applied across all units. This raises the problem of how much an agreed-upon common set of weights can be applied to all units. Efficiency is often measured as an output-input ratio in cases where there is only one input and one output. A typical DMU will have multiple inputs and outputs. In this case, efficiency can be measured by using a weighted average of the outputs and a weighted average of inputs. The measure above can be

most readily applied when a common set of weights for the DMUs is applicable.

In practice it may be difficult for the DMUs to find and agree on a common set of weights. Data envelopment analysis (DEA) overcomes this problem by providing a way to properly value inputs or outputs differently. It also manages instances where there is a high uncertainty or disagreement over the value of some inputs or outputs by allowing each DMU to choose its own set of appropriate weights.

Under these conditions efficiency of an individual unit j_o (in equation 3) can be obtained as a solution to the following problem. Maximize the efficiency of unit j_o subject to the efficiency of all units being less than or equal to 1. This can be given as:

$$\text{maximize } h_o = \frac{\sum_r u_r y_{rj_o}}{\sum_i v_i x_{ij_o}} \tag{8}$$

subject to

$$\frac{\sum_r u_r y_{rj}}{\sum_i v_i x_{ij}} \leq 1 \quad \text{for each unit j}$$

$$u_r \geq \varepsilon$$

$$v_i \geq \varepsilon$$

The *u*'s and *v*'s are the variables of the weights of the above problem and the solution produces the weights most favourable to unit j_o. It also measures the efficiency.

The second measure of performance is productivity efficiency which is concerned with the volume of inputs required to produce a given volume of output or outputs. It is usually represented as a growth rate or index (Martin and Parker, 1997). There are three alternative methods available to measure productivity changes under the non-parametric method. These are Fisher index (1922), Tornquist index (1936) and the Malmquist index (1953). The Malmquist index has certain advantages over the other two. According to Grifell-Tatje and Lovell (1996), the

Malmquist index does not require the profit maximization or cost minimization assumption. This assumption is particularly relevant for privatized SOEs, as most of the firms under government ownership do not necessarily follow the objective of profit maximization. Secondly, it is the preferred method when input and output price information is not available or could be distorted due to regulatory practices. Lastly, the nonparametric strength of DEA is that it does not require a parametric functional form on the technology and it can handle multiple input and output characteristics of various industries in which the privatized firms operate.

This study follows Färe *et al*. (1992 and 1994) in defining output based productivity index. Consider a unit in two periods t and t+1, the latter being the most recent period where MC indicates the change in efficiency between the years t +1 and t and MF capture the technical change between the two periods evaluated at x^{t+1} and x^{t}.

The two components of the Malmquist index can be represented as:

$$MC_o^{t+1} = \frac{D_o^{t+1}(y^{t+1}, x^{t+1})}{D_o^{t}(y^{t}, x^{t})} \tag{9}$$

and

$$MF_o^{t+1} = \left[\frac{D_o^{t}(y^{t+1}, x^{t+1})}{D_o^{t}(y^{t}, x^{t})} \frac{D_o^{t+1}(y^{t+1}, x^{t+1})}{D_o^{t+1}(y^{t}, x^{t})} \right]^{1/2} \tag{10}$$

As a result, the total productivity growth, M is the product of MC and MF

$$M = MC * MF \tag{11}$$

The Malmquist index indicates productivity growth when the index is more than one and productivity decline when it is less than one. There is no change in productivity when productivity is equal to one.

5. Analysis of results and Discussion

Following Wei et al (2003) and Wei, Varela and Hassan (2002) Table 4 summarizes the key financial variables used for the three years before and three years after privatization to analyze technical efficiency,

productivity and welfare. A t-test is applied to test the mean difference in performance before and after privatization to provide robustness.

Table 4: Financial Performances of Privatized and Listed State-owned Enterprises

			Standard	**Standard**	
	Mean	**Mean**	**Deviation**	**Deviation**	
Variables	Before	After	Before	After	t-values
Assets	1290.373	2106.342	2625	4223	2.910*
Turnover	536.508	846.672	824	1323	2.551*
Net Income	67.298	151.181	126	327	2.153*
Shareholder's Equity	454.881	1204.193	1059	2476	3.081*
Capital Investment	104.987	166.780	273	374	2.610*
No. of Employees†	2,659	2,804	5896	6133	1.926*
Long-term Debt	608.415	510.760	1341	1382	-0.806
Total Liabilities	826.700	902.529	1642	1819	0.635

Notes: This Table shows the three-year average (before and after privatization) of financial performances of privatized and state owned enterprises.
† indicates the total number of employees. * indicates significant at 5 percent (one-tail).

The means of the variables--namely assets, turnover, net income, shareholder's equity, capital investment and the number of employees--suggest that values after privatization have significantly improved. There are no differences in the mean values before and after privatization in cases of long-term debt and total liability,

Boussofiane *et al.* (1997) used both constant returns to scale (CRS) and variable returns to scale (VRS) to model the U.K. privatization cases. They found that all but two firms showed similar results no matter if constant or variable returns were assumed. Smith (1993) demonstrated that the inappropriate use of the model might lead to widely inflated efficiency estimates when the sample size is small; as it is the case in this study. This study also uses Boussofiane *et al.'s* (1997) approach to attaching more weight to the CRS model.[11]

[11] We also ran the model with CRS assumption and found almost similar results.

5.1. Technical Efficiency of all Privatized Firms

The average technical efficiency of all the firms before and after privatization is compared by ownership structure. The year of privatization is excluded from this calculation since the study applies a longitudinal analysis. The ownership structure is divided into state and federally controlled versus fully privately controlled sector.

The evidence from efficiency ratings shows that there is no specific pattern of change in efficiency.[12] It is notable, however, that a number of firms show a decline in technical efficiency during the 1997-98 Asian financial crises. Statistics indicate that some firms performed well even before privatization was implemented. The decline in the post-privatized period indicates that the firms failed to sustain superior performance after privatization. A study of production efficiency measures-instead of the popular financial ratios-provides results that contradict mainstream evidence.

Table 5 (see row one) refers to the average technical efficiency ratings for all the firms before and after privatization. The average efficiency rating was 86.87 percent before privatization. This means that there was 13.17% slack before privatization and 89.0 percent after privatization. This gain of 2.13 points suggests that the slack has been reduced by a small margin.

The average efficiency ratings of firms with a Special Rights Share by the Federal Government--i.e. Federal controlled firms–had an efficiency rating of 93.82 percent prior to privatization. This is indicated in the second row of Table 5.

[12] Results on individual companies are not presented in the text due to the space constraint but are available upon request.

Table 5: Average Efficiency Ratings for all Firms in all years

	Before Privatization	**After Privatization**	**Mean (+/ -)**	**Mann Whitney Test**
All Firms	0.8687	0.8900	0.0213	0.333
Firms with Federal Government ownership	0.9382	0.9657	0.0275	0.231
Firms with State Government ownership	0.9226	0.8182	-0.1045	.004***
Firms without Government ownership	0.7902	0.9106	0.1204	.023**

Note: This Table shows the average efficiency ratings (under constant returns to scale) of all privatized state-owned enterprises listed on the Bursa Malaysia. Average is calculated based on all the available data of firms in the sample before and after privatization.

The rating improved to 96.57 percent after privatization representing an increase of 2.75 points. One reason for this decline in performance is the adverse economic condition during the two periods of 1985-87 and 1997-98. During these crisis periods, government spending--on which these firms' contracts depended- was curtailed.

Table 5 (see the third row) refers to the next sub-group: state controlled firms. The average efficiency ratings prior to privatization were 92.26 percent. This number declined to 81.82 percent after privatization. This group also experienced a decline in technical efficiency of 10.45 points. Further analysis, however, reveals that the Asian financial crisis was the main contributing factor. The results show that there is a negligible decline in technical efficiency if we exclude the data over the 1997-98 crisis period from the analysis,

Efficiency ratings of the final sub-group – fully private sector controlled – can be seen in row 4 of Table 5. The efficiency rating of 79.02 percent increased to 91.06 percent after privatization showing an improvement of 12.04 points. These results clearly indicate that firms with less control have a higher level of technical efficiency after privatization than those firms controlled by the Federal or state governments.

5.2. Efficiency of Productivity based on Malmquist Index

Table 6 summarizes the results[1] from the DEA Malmquist Productivity Index and their associated decomposition. MC (the relative efficiency change) obtained from equation 10 and MF (frontier shift effect) from equation 11 is used.

Table 6: Average Malmquist Productivity Index for all Firms in all years

	Before Privatization	**After Privatization**	**Mean (+/ -)**	**Mann Whitney Test**
All Firms	0.9758	1.0417	0.0658	0.333
Firms with Federal Government ownership	1.0052	0.9911	-0.0142	0.231
Firms with State Government ownership	1.0035	1.1191	0.1156	0.004***
Firms without state or federal ownership	0.9387	1.0040	0.0654	.023**

Note: This Table shows the average Malmquist Productivity Index values and their associated decomposition: relative efficiency change and frontier shift effect of the privatized state-owned enterprises listed on the Bursa Malaysia. The average is calculated based on the available data for all the years before and after privatization.

The results in Table 6 (see first row) show the average TFP for all the firms before and after privatization. The average productivity growth before privatization was 0.9758, meaning it was inefficient before privatization. Productivity increased to 1.0417 after privatization (a gain of 4.27 points above constant return to scale). This shows an overall improvement of 6.58 points in productivity. This TFP can be further decomposed into relative efficiency change and frontier shift effect. The relative change in efficiency before privatization was 0.9782 which indicates inefficiency. The figure rose to 1.0598 after privatization. The overall improvement of 8.15 point is more than the TFP increase which indicates that improvement in productivity is due to the increase in technical efficiency. The frontier shift effect before privatization was 1.0044, but was reduced to 0.9843 after privatization, showing a decline

of -2.01 point. This shows a technological regression for all the privatized and listed SOEs.

The co-existence of different levels of control within the privatized firms provides an opportunity to assess the relative performance of different groups. The firms are classified in the same way on control. The performance of the first group– Federal control--shows average productivity before privatization of 1.0052, meaning that productivity was increasing before privatization. However, the figure reduced to 0.9911 after privatization, which shows a 1.42 point productivity decline for this group of firms. The findings for the second group displayed in the second row of Table 6--firms with State Government control--show that the Malmquist productivity index was 1.0035 before privatization and rose to 1.1191 after privatization. This represents 11.56 point increase in productivity.

The statistics for the firms with neither federal nor state control are shown in the third row of Table 6. The average productivity before privatization was 0.9387. This number indicates inefficiency. The value, however, increased to 1.004 after privatization, showing an increase of 6.54 points. This result does not differ from the previous results. The productivity increase is wholly due to the relative efficiency change of 6.53 percent which is also close to the productivity index of the full sample; 6.58 percent. The frontier shift effect before privatization was 0.9899. It is reduced to 0.9799, a decline of 1.0 percent. This indicates that this group of firms is slow in acquiring technological know-how.

5.3. Welfare Gains due to Privatization

This part of the analysis attempts to evaluate the welfare gains of privatized and listed SOEs by comparing their performance before and after privatization. If privatization reduces the price, there will be a positive gain in consumer surplus. In the same way that when labor costs fall, labor rents will decline. Lower input costs need to be balanced against lower prices, as profits may increase as a result. The outcome of this will be the effect of all the factors and their weightings placed on the gains and losses.

Table 7: Summary of Welfare Measures of all the Privatized State-owned Enterprises Listed on the Bursa Malaysia

Summary	ΔCS	ΔRL	Δπ	ΔΨ
Total Value	5,574.90	421.34	3,196.26	9,168.40
Welfare Increase after Privatization	31.79%	2.40%	18.22%	52.28%

Notes: All the values are in RM million. ΔΨ = Change in welfare. ΔCS = Change in consumer surplus. ΔRL = Change in the rents to labor inputs. Δπ = Change in the firm's profitability.

We estimated the level of welfare gains for all the affected classes of economic agents--consumers, employees and enterprises--before and after privatization. This procedure allows the calculation of welfare gains and its distribution. Table 7 contains a summary of welfare gains after privatization. It is impressive that these results are achieved largely by partial divestiture. Full privatization is the transfer of 100 percent enterprise ownership to private buyers while partial is anything less. As shown in the table, the magnitudes of the gains vary. The gains are significant in absolute terms, amounting to 52.28 percent of the pre-privatized firms. This increase might be due to privatized firms under full private sector control increasing consumer surplus, thus resulting in welfare gains. This suggests the control mechanism present in any form of central control leads to firms operating to gain monopoly rent, and thus reduce consumer surplus.

It can be concluded that the consumers gain the most from privatization as a result of increased consumer surplus produced by privately-owned and controlled firms. This is important given that the important stakeholder of privatization is the customer. This gain accounts to 60.81 percent of the total gain (31.79 percent from the total gains of 52.28 percent).

The second stakeholder is the employees. Table 7 shows that the aggregate value of gains by employees is positive, meaning that employees of all the firms benefited from privatization. The total welfare gain is 4.60 percent (2.40 percent of the total gains of 52.28 percent) of the pre-divestiture values. Although this gain is relatively

small, it is significant in the sense that none of the employees lost out because of privatization. This is different from the findings of other privatization studies that document a decline in the total number of employees after privatization (Galal *et al.* 1994). It is not surprising that the total employment does not decrease in the case of Malaysian privatization.

The effect of privatization on employees is a pressing concern of governments in this form of restructuring. This is due to the common belief that privatized firms improve their efficiency by reducing the number of employees. In this regard, the cases in this study show significantly different results. In some studies, labor did not decline. The most important finding is that personnel were not retrenched over five years of privatization except on disciplinary grounds (see the Economic Planning Unit Report, 1991: 25).

The third stakeholder is the corporation and its measure of gain is corporate profitability. Corporate profits accounted for 34.85 percent of the total gains from privatization (18.22 percent from the total gains of 52.28 percent). Corporations achieved profitability.

Table 8: Average Welfare gain Index for all Firms in all years

	ΔCS	**ΔRL**	**Δπ**	**ΔΨ**	**Pre-privatized Sales**	**Welfare +/-**
Firms with Federal Government ownership	2,942.11	317.33	1,994.00	5,253.44	9,481.89	55.40%
Firms with State Government ownership	405.47	23.99	45.33	474.79	598.40	79.34%
Firms without Government ownership	2,227.33	79.52	1,156.92	3,463.78	7,495.90	46.21%

Notes: All the values are in RM million. ΔΨ = Change in welfare.
ΔCS = Change in consumer surplus.
ΔRL = Change in the rents to labour inputs.
Δπ = Change in the firm's profitability.

The analysis of the welfare effect was further extended to three groups according to their ownership or control. Table 8 shows the mean values on welfare gains of the firms in the cases of Federal government controlled firms. This group shows that welfare gains were up by 55.40

percent in terms of pre-divestiture values. This increase is higher than the performance for the full sample. For State controlled firms, the welfare gain increases in absolute terms, amounting to 79.34 percent in terms of pre-privatized values. This improvement is quite large compared to other sub-groups.

The gain by the final sub-group--private sector controlled firms--is shown in Table 8. The results show that welfare gain increased by 46.21 percent relative to pre-privatized sales. The increase in welfare gain is smaller for this group than for the other two sub-groups. This group had the lowest increase in welfare gain. This is expected since these firms are more concerned with directly improving financial performance rather than welfare.

5.4. Relationship between Welfare and Efficiency gain

A regression between welfare change (dependent variable) and productivity change (independent variable) with technical efficiency change (second independent variable) was done to test if there is a relationship between the welfare gains and the independent variables chosen. Simple regression was used in order to identify which of the two is more correlated with the welfare gain as a significant source of welfare gains. The results are summarized in Table 9.

Table 9: Relationship between Technical and Productivity and Welfare Change

Variable	Coefficients	Standard Error	R^2	Normality Test	Heteroscedasticity Test
Panel A					
Constant	0.648 (2.24)*	0.288	0.171	26.35 (0.000)*	9.09 (0.000)
Productivity change	5.34 (2.65)*	2.02			
Panel B					
Constant	0.730 (3.30)*	0.221	0.454	8.85 (0.019)*	27.92 (0.000)
Technical change	6.57 (5.32)*	1.23			

Note: Parentheses refer to t value. * indicates significance at 0.01 acceptance level.

The diagnostic tests on normality and heterosedasticity indicated that there are no problems arising from these assumptions. The regression with the productivity change shows a low explanatory power with the R-squared value of 17.1 percent. The technical change appears to have much more explanatory power as the correlation value is 9 times larger and the R-squared value is 2.5 times higher at 45.4 percent. Both variables are significant at the 0.01 acceptance level. The significance of the intercepts in both the tests show that there may well be more variables associated with the welfare gains. This suggests there is a need to explore other variables in a future study to indicate other significant factors associated with welfare gains.

6. Conclusions

This paper provides a new direction to research by adopting welfare gain as an assessment tool for evaluation of privatization. In addition to merely looking at welfare gains, we measure production efficiency and relate these popular measures to welfare gain to examine if there is a relationship between the two. The results indicated that--on average--privatized firms have only a marginal but insignificant increase in production efficiency. This result is contrary to the findings using financial ratios. The financial ratio method has always shown increased financial performance. The value of financial ratios as a measurement tool has been criticized as incomplete.

Second, ownership control subsequent to the privatization appears to have a significant impact on performance. If control is exercised by the government state or central, then the productive efficiency is significantly lower than in the cases of firms under private sector ownership. It implies that the common practice of registering state-owned firms as private companies and then retaining majority control does not lead to good performance. This finding is consistent with the economic theory where monopoly rent seeking behavior of firms with government being the significant stakeholder of privatized firms has lower efficiency than fully private sector-controlled firms.

The welfare gain measurement leads to new set of results. Welfare gains--on average--significantly increased in the period after privatization. This is consistent with the concept that reductions in monopoly behavior lead to greater welfare gain. Hence, the results are

consistent with the economic concepts of consumer surplus and welfare improvement. Testing by grouping ownership shows state-controlled firms after privatization have significant large welfare gains. Also indicated is that central government controlled firms have gains, but smaller than the state cases. Fully privatized firms had only a marginal welfare gain which is not significantly different from that of the state/central government controlled firms.

The use of welfare gains as a measure of evaluation tool has given new result that needs further explanation. To do that, we appeal to the political economic concept of public goods production and welfare economics. It appears that the achievement of greater efficiency is only possible under full private sector ownership without government control. However, welfare gains are delivered by the control mechanism of the state or central government control since it this control that ensures that the monopolist's tendency to increase prices is checked. Hence, our results show that under state control, welfare gains are maximized, which is consistent with this political economic concept. More studies using this approach will illuminate the nature of the privatization, ownership, efficiency and welfare gains.

Appendix 1: Previous studies on cross-listing premium

Study	Sample	Major Objectives	Findings
Comparative Studies on Public versus Private Ownership			
Boardman and Vining (1989)	*Fortune* 500 largest non-US firms in 1983 classified by private corporations (PCs), SOEs and mixed enterprises (MEs). Of those, 409 were PCs, 57 SOEs and 23 were MEs	The study employed four profitability ratios and two measures of X-efficiency.	They found that PCs are more profitable and productive than SOEs and MEs. The results also established that MEs are no more profitable than pure SOEs, suggesting that full private control, not just partial ownership is essential to achieve performance improvement.
Vining and Boardman (1990)	500 largest non-financial Canadian corporations by using 1986 data, data extracted from Britain, Canada, France, Germany, Italy and Sweden	The study employed four profitability ratios and two measures of X-efficiency.	Their conclusions, once again, was that privatized firms are significantly more profitable and efficient than MEs and SOEs. However, this time MEs outperform the SOEs. This study attempted to control for size, market share and other factors.
Picot and Kaulman (1989)	Uses the same source of data (fortune 500) as Boardman and Vining (1989)	The study examined a range of performance measures.	Privately-owned corporations perform better than SOEs.
Frydman *et al*. (1999)	Compared the performance of privatized and state firms of some Central European countries by using data for 506 midsize manufacturing firms	Compared four measures of performance and found that on average privatized firms perform better than the state owned firms.	This study found that on average privatized firms perform better than the state owned firms. However, the performance improvement is concentrated on revenue improvement (not cost reduction) in firms privatized to outside owners.

Pre- versus Post-Privatization Studies on Share Issue Privatizations			
Megginson, Nash, and van Randenborgh (1994)	61 firms from 18 countries and 32 industries from 1961 –1989	Compared 3-year average post-privatization financial and operating performance ratios to the 3-year pre-privatization	The results show economically and statistically significant post-privatization increase in output (real sales), operating efficiency, profitability, capital investment spending, and dividend payments, as well as significant decreases in leverage
Macquieira and Zurita (1996)	22 Chilean companies privatized from 1984 to 1989	Compared pre-versus post-privatization performance	They found similar results as Megginson, Nash, and van Randenborgh (1994).
Dewenter and Malatesta (2001)	63 large, high-information companies divested during 1981-94 from Hungary, Poland, and the UK	Compared pre-versus post-privatization performance	The results indicate significant increases in profitability (using net income) and significant decreases in leverage and labour intensity over both short and long-term comparison horizons.
Sun and Tong (2002)	24 Malaysian firms before and after privatization.	Compared financial and operating performance. Main performances used are financial ratios and share price performance after privatization.	They discovered that operating and financial performances improved after privatization. However, the share price of sample firms performed slightly under than benchmark market index.

Appendix 1: Previous studies on cross-listing premium (continued)

Studies Related to Productivity			
Study	**Sample**	**Major Objectives**	**Findings**
Ashworth and Forsyth (1984)	major international airlines in the 1970s	The performance measure used was mainly total factor productivity.	They were uncomplimentary about state-owned British Airways. Study concluded that Air Canada, as a SOE, was the most efficient.
Milward (1990, 1991)	UK gas, electricity, water, mining, transport and telecommunication industries between 1951 and 1985. The study also compared with UK private manufacturing and similar industries in the USA.	Examined the growth of labour productivity and total factor productivity (TFP)	The evidence of this study shows that on average labour productivity in manufacturing increased by 2.8 percent and by 3.2 percent in the state enterprise group. TFP in the SOEs rose by 2.2 percent, but still surpassed the private manufacturing growth rate of 1.6 percent. Milward concluded that there is no general evidence that productivity growth has been slower in SOEs than in manufacturing industries in the post-war period.
Hjalmarsson and Veiderpass (1992)	Swedish electricity distribution utilities in 1970s and 1980s	Measured the productivity	The study found that there is no correlation between ownership type and performance.
Price and Weyman-Jones (1993)	The twelve production and distribution regions of British Gas for the periods 1977-8 and 1990-1	Examined the growth of labour productivity and total factor productivity (TFP)	Using the production frontier model confirmed that the rate of TFP increased significantly after privatization. The study stated that privatization was equivalent to an annual increase in productivity of 2.5 percent, of which about 0.5 percent was due to the different regions becoming less dispersed in their efficiency and 1.8 percent was due to the whole frontier shifting.

Cont'd

Study	Sample	Major Objectives	Findings
Martin and Parker (1997)	Used 11 privatized firms' data from UK	Two measures were used to identify productivity improvements in the periods studied: labour productivity and total factor productivity (TFP).	The results show a better performance in terms of labor productivity than TFP which is consistent with the view that state ownership is primarily associated with over-staffing. The relative TFP results were particularly poor and do not support the view the privatization will necessarily lead to a major change in the use of all inputs leading to higher efficiency.
Studies on Efficiency			
Atkinson and Halvorsen (1986)	United States (US) electric utilities	Relative efficiency of public and private firms in a regulated environment	The study indicates that there is no significant difference between public and privately owned utilities.
Pollitt's (1994, 1995)	The study used data of 129 US electricity transmission utilities and 145 electricity distribution systems.	Economic Efficiency	By using the data envelopment analysis (DEA) along with a regression analysis of cost efficiency, he found that publicly-owned and privately-owned electricity transmission and distribution systems had no significant difference in terms of technical or cost efficiency.
Boussofiane *et al*. (1997).	The study used data of eleven firms from different sectors in UK	Measure technical efficiency	The results show that, although there is evidence of clear efficiency improvements in some entities, for other organizations there is little discernible evidence between pre- and post-privatization performance. These results are broadly in line with other efficiency studies mentioned earlier and are not conclusive.

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