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### Performance in Strategic Sectors: A Comparison of Profitability and Efficiency of State-Owned Enterprises and Private Corporations

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## Performance in Strategic Sectors: A Comparison of Profitability and Efficiency of State-Owned Enterprises and Private Corporations

### Abstract

State-owned enterprises (SOEs) are often claimed to be less profitable and less efficient compared to private corporations. According to Grout and Stevens (2003), SOEs were associated with different types of market failure and were mostly used to attain non-economic goals such as unemployment level reduction, control over natural resources, and political stability. Shirley and Walsh (2000), who surveyed 52 studies on the difference in performance between SOEs and private corporations, discovered that there were only five studies indicating that SOEs outperformed private corporations. However, these studies only monitored the firms in the monopolistic utility sectors. Similar situations occurred in most of the previous studies that researched correlation between performance and firm ownership. Many of them either focused heavily on industries with monopoly/oligopoly characteristics or industries with output that could not be priced by competitive forces. As a result, it was difficult to distinguish the effects of market regulations and conditions on the types of firm ownership. Since there is a correlation between competition and performance, controlling for the market structure is crucial to the proper investigation of performance across different types of ownership (Goldeng, Grunfeld, & Benito, 2008). Since my research is focusing on the difference in performance between SOEs and private corporations within a competitive environment, it contributes to the very few studies that controlled for the market structure. My main research question is whether private corporations perform better compared to SOEs in terms of profitability and efficiency in the strategic sectors in a competitive environment. My hypothesis is that due to the soft-budget constraint behavior and policy burdens imposed by the state, SOEs are less efficient and have lower profitability compared to private corporations.

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# **Performance in Strategic Sectors: A Comparison of Profitability and Efficiency of State-Owned Enterprises and Private Corporations**

**Brigitta Jakob**

## **I. Introduction**

State-owned enterprises (SOEs) are often claimed to be less profitable and less efficient compared to private corporations. According to Grout and Stevens (2003), SOEs were associated with different types of market failure and were mostly used to attain non-economic goals such as unemployment level reduction, control over natural resources, and political stability. Shirley and Walsh (2000), who surveyed 52 studies on the difference in performance between SOEs and private corporations, discovered that there were only five studies indicating that SOEs outperformed private corporations. However, these studies only monitored the firms in the monopolistic utility sectors. Similar situations occurred in most of the previous studies that researched correlation between performance and firm ownership. Many of them either focused heavily on industries with monopoly/oligopoly characteristics or industries with output that could not be priced by competitive forces. As a result, it was difficult to distinguish the effects of market regulations and conditions on the types of firm ownership. Since there is a correlation between competition and performance, controlling for the market structure is crucial to the proper investigation of performance across different types of ownership (Goldeng, Grunfeld, & Benito, 2008).

Since my research is focusing on the difference in performance between SOEs and private corporations within a competitive environment, it contributes to the very few studies that controlled for the market structure. My main research question is whether private corporations perform better compared to SOEs in terms of profitability and efficiency in the strategic sectors in a competitive environment. My hypothesis is that due to the soft-budget constraint behavior and policy burdens imposed by the state, SOEs are less efficient and have lower profitability compared to private corporations.

## **II. Theoretical Framework and Empirical Studies**

### **II.A Theoretical Framework**

#### **II.A.1 Difference between SOEs and Private Corporations**

SOEs are typically sizeable firms in a dominant sector in an economy. In most of the developing countries, state ownership is geared towards strategic sectors — either sectors that are crucial for economic development or that control natural resources of a country (Shleifer, 1998). There are a number of key differences between state and private ownerships in terms of objectives, financing, liquidation, management, and compensation. The main objective of private ownership is to maximize profits for the capitalists who own the corporation. Meanwhile, the ultimate goal for SOEs is to balance the interests of the stakeholders, including protecting jobs and preventing social unrests. Lastly, government can act as a backup that provides subsidies to the SOEs when their sources of revenue fall short of covering costs (Grout and Stevens, 2003).

When it comes to the liquidation of the firm, private ownership will have to declare bankruptcy or to be acquired when it becomes insolvent. The exit of SOEs will have to be

determined by the government — firms that are perceived as ‘too big to fail’ will be bailed out by taxpayers’ money (Peng, Bruton, Stan, and Huang, 2016). Unlike management of private corporations who usually have complete autonomy in any key decisions, management of SOEs only has autonomy in aligning operational strategies, types of output, and internal policies. Government plays a major part in other significant activities such as choosing the domain of activities, technology investments, and establishing subsidiaries (Aharoni, 1981). Lastly, managers’ compensation under private ownership is closely tied to the enterprise performance. That is not the case for managers in state ownership as their compensation is determined politically (Peng, Bruton, Stan, and Huang, 2016). Compared to private corporations, SOEs have a number of advantages including state subsidies, exclusive government contracts, low-interest loans, tax-breaks, and low-priced raw materials (Li, Lin, and Selover, 2014). However, there are also a number of disadvantages associated with state ownership.

### **Soft-Budget Constraint**

According to soft-budget constraint hypothesis, the state extends various forms of support to SOEs. As a result, this situation distorts the incentive structure because an SOE does not have to desperately rely upon generating profit to guarantee its long-term existence or have to worry about competition. Because a competitive environment incentivizes a management to constantly improve their performance and to innovate, an SOE is expected to deliver inferior performance compared to a private corporation (Goldeng, Grunfeld, and Benito, 2008). The *soft cushion* also allows the SOEs to be more risk taking in terms of investing their capital and to have less incentive to spend effectively. Because the returns from an SOE are allocated into a public budget that no one is specifically assigned to benefit from it as a principal, incentives to closely monitor the actions and performance of managers are significantly reduced (Stiglitz, 1988).

If managers of private corporations do not allocate their resources efficiently, the market will conduct a course of actions including replacing the managers, retracting the capital, taking over the company, or shutting down the company. However, the decision on what to do with SOEs in similar situation does not fall on the market, but it is decided by the government (Stiglitz, 1988). That is why the soft-budget constraint situation also causes the difference in skill-sets between the managers of SOEs and private corporations. While the latter needs to be highly capable of generating profit for the company, the former needs to be able to deal with the government/politicians (Barberis, Boycko, Shleifer, and Tsukanova, 1996). Eventually, the soft-budget constraint results in a number of moral hazard problems. In many cases, it impacts both the psychology and behavior of the SOE employees to be less aggressive in controlling for costs, to be less innovative, and to be less efficient as they don’t have to try as hard as the employees of private corporations to ensure the survival of the firm (Li, Lin, and Selover, 2014).

### **Lack of Autonomy due to Policy Burdens**

Another reason for less-than-optimal performance by the SOEs is because they are entitled to less autonomy as they have to help government achieve its special goals. According to Groves, Hong, McMillan, and Naughton (1994), when a firm had more autonomy in labor decisions, profit attainment, and output decisions, it would experience higher efficiency compared to firms that had less autonomy in making these crucial decisions. As SOEs are owned by the government, they might have to compromise their profit-maximizing goal in order to prioritize on other government goals. This is because through SOEs, government plays a conflicting role as a regulator and shareholder. As a regulator, government has a social contract with the public, hence has to serve

their best interests in terms of maintaining the social order. As a shareholder however, government has to increase the value of its investment (Chen, 2016). Hence, they are faced with multiple and conflicting objectives. Moreover, given that these other non-financial objectives make it difficult to measure the performance of an SOE, the incentives of SOE management is not as closely knit to the performance of the company as to those of private corporations (Putnins, 2015).

For instance, the Chinese government is notorious for often requiring the SOEs to maintain a surplus of employees in order to keep a low unemployment level, to provide satisfying level of benefits to the employees, and to sell the products at a lower price to the government (Lin and Li, 2008). Even though these policies are favorable to the Chinese government, they perpetuate inefficiency problems within the SOEs. According to research conducted by Lin and Li (2008) on Chinese SOEs between 1995-2001, the policy burden placed on SOEs triggered soft-budget constraint problems. As long as the SOEs helped the government carry out its goals (policy burdens), there would be a growing perception that the government would help the SOEs when things did not go well (soft-budget constraint).

Moreover, when different appointed public officials take office, they often have divergent views on which public interests they should prioritize. When these differences are not reconciled, it will be extremely hard for the employees to figure out the ultimate goals they are supposed to achieve. When the SOE itself is struggling with internally conflicting interests and instructions, the managers often turn to cooperative strategies in order to secure government support (Aharoni, 1981).

### **II.A.2 Correlation between Ownership and Efficiency**

According to neoclassical economic theory, efficiency is mostly affected by market and incentive structure rather than the type of ownership. Regardless whether a firm is state-owned or privately owned, efficiency can be achieved as long as the firm operates in a competitive market, gives full autonomy to the management to make crucial decisions based on market signals, and provides performance-based compensation (Nellis, 1994). In reality, the above conditions are rarely met within SOEs, and when the criteria are fulfilled, they are not sustainable in the long run. SOEs' responsibility to achieve both commercial and social objectives creates inefficient use of resources. Even though during times of crisis government often shifts its focus to a more profitable goal and grants full-autonomy to management, the change in behavior does not last when the crisis ends (Heracleous, 2001). The neoclassical theory is supported by a study conducted by Wortzel and Wortzel (1989) on privatization of SOEs. They concluded that SOEs were more inefficient compared to private corporations not because of the type of ownership, but mostly due to the lack of clear objectives and goals focusing on efficiency, and additionally lack of organization-level control systems to attain these goals.

Moreover, due to the perception that government is available to back them up, the employees of SOEs may have the tendency to develop rent-seeking behavior in order to seek for themselves more resources from the government. In addition, as they feel that their job security is guaranteed, the employees will not have the pressure to work very hard. As a result, the combination of rent-seeking behavior and reduced productivity will create higher burden of cost for the SOEs, which increases potential for inefficiency (Li, Lin, and Selover, 2014). According to Putnins (2015), the inefficiency SOEs usually encounter will either result in less output produced given an amount of resources or more resources used to produce the same amount of output. Individuals will be impacted through a number of channels including higher prices of the goods relative to the case of higher efficiency, higher taxes to compensate for lower dividends,

higher SOE subsidies compared to if SOEs were more efficient, and combinations of all of the channels. Hence, the above theory suggests the hypothesis that due to the soft-budget constraint behavior and policy burdens imposed by the state, SOEs have lower profitability and are more inefficient compared to private corporations.

## **II.B Empirical Studies on SOE Performance**

A number of studies have shown mixed results regarding the difference in performance between SOEs and private corporations. Boardman and Vining (1989) conducted a study on the correlation between ownership and performance in competitive environment across the 500 largest companies outside of the United States, as listed by the *Fortune* magazine in 1983. They discovered that SOEs and mixed enterprises (MEs) had inferior performance to that of private corporations in terms of both profitability and efficiency. For profitability, SOEs had the return on equity (ROE) that was 12 percent less than what PCs had, and generated US\$66 million less in net income compared to private corporations. For efficiency measurement, SOEs produced 4.4 percent less sales per employee compared to private corporations. Li, Lin, and Selover (2014) studied a panel dataset of more than 200,000 Chinese manufacturing firms during 2000-2005 to determine whether SOEs and private corporations performed differently in terms of their return on assets (ROA), ROE, return on sales (ROS), labor productivity, and sales growth. They discovered that the industrial SOEs performed worse than private corporations in terms of all of the categories investigated. This was mainly triggered by the fact that SOEs were subject to policy burdens. Moreover, the behavior of SOEs also demonstrated signs of soft-budget constraint, including higher investment rates compared to private corporations, higher operating costs, and higher debt levels.

A similar result was achieved by Goldeng, Grunfeld, and Benito (2008), who studied differences in performance between state and private ownership with the emphasis on the impacts of the market structure. Using ROA and cost/sales revenue to measure the performance of all registered companies in Norway in the 1990s, they found that private corporations performed significantly better than SOEs. Putnins (2015) developed a five-step framework that can help government improve and create SOEs. His framework implied that the creation of SOEs should only be limited to instances where there were market failures and that state intervention (in the forms of taxes, regulation, or subsidies) was not feasible to mitigate these failures. He further suggested that SOEs should be created if the cost of market failures exceeded the inefficiencies of SOEs and that there was low risk in government failure.

However, in an exploratory study, Heracleous (2001) discovered that superior performance was attainable under state ownership. Within the case of Singapore Telecom (Singtel), the state did not burden the SOE with demands that could compromise its profitability and efficiency. In most cases, this was not true for SOEs which were constantly imposed with objectives that jeopardized the two aspects, such as keeping incompetent employees for the sake of better employment figures. The state demanded the management of Singtel to prioritize on profitability, efficiency, and best quality of service. Singtel's main objective was commercially oriented without having to worry about the policy burdens. Moreover, Ang and Ding (2006) compared the performance of 15 government-linked companies and 144 private corporations in Singapore from 1990-2000 and discovered that government-linked companies not only performed better in terms of ROE and ROA, but also in terms of governance practices and plan implementation.

A number of other studies found that there was no correlation between ownership type and performance. In his study within the time period of 1994-1998 in Egypt, Omran (2004) discovered

that there was no significant difference in performance between state and private ownership. Peng, Bruton, Stan, and Huang (2016) investigated four theories — property rights theory, agency theory, transaction cost theory, and resource-based theory — and concluded that under any circumstances both private and state ownerships should deliver the same level of performance, as no one form of ownership is more superior compared to the other. Demsetz and Villalonga (2001) studied 223 firms in the U.S. and discovered that there was no significant correlation between firm performance and ownership structure.

### III. Empirical Model

Despite the mixed findings presented by the literature concerning the performance of SOEs, I hypothesize that when SOEs compete in the strategic industries that I study, the soft-budget constraint behavior and state-imposed policy burdens will cause SOEs to have lower profitability and to be less efficient compared to private corporations. In order to test the hypothesis, I compiled the list of 510 firms which consists of 111 SOEs and 399 private corporations from the 2016 Forbes' List of 2000 largest public companies. These companies are spread out within seven strategic sectors in 52 countries. Within the scope of this research, strategic sectors are defined as the sectors that play crucial roles on economic development of a nation, so government is more likely to partake in the sector through establishing an SOE. The strategic sectors that I gathered from the list include utilities, oil & gas, mining, transportation, ICT (information, communication, and technology), pharmaceuticals, and biotechnology. I utilized Yahoo Finance, Morningstar Direct, and annual reports to collect data on companies' financials that are used as the control variables within this research.

I conduct cross-sectional study using the OLS regression to test my hypothesis that private corporations perform better compared to SOEs in terms of profitability and efficiency. To test the profitability, I use return on asset (ROA), return on sales (ROS), and net income as dependent variables, and dummy variable for SOEs (hence, private corporations dummy is the benchmark) as the main independent variable. To measure the efficiency, sales per employee and sales per asset are used as the dependent variables. The difference in performance between SOEs and PCs can be affected by several confounding factors, such as types of industries, market share, sizes, market capitalization per employee, debt ratio, and home nations. Therefore, I control for these variables within each of the regression. Dummy variables for different types of industries and countries will be used to control for both factors. Hence, the models I use within this research:

#### Profitability model:

$$\begin{aligned} &ROA, ROS, Net Income \\ &= c + a1 (SOE) + a2 (industry) + a3 (market share) \\ &+ a4 (log of asset) + a5 (market cap/employee) + a6 (debt ratio) \\ &+ a7 (country) + error term \end{aligned}$$

#### Efficiency model:

$$\begin{aligned} &Sales/employee, sales/asset \\ &= c + a1 (SOE) + a2 (industry) + a3 (market share) \\ &+ a4 (log of asset) + a5 (market cap/employee) + a6 (debt ratio) \\ &+ a7 (country) + error term \end{aligned}$$

As listed in Table 1, SOE is expected to generate negative sign when it comes to both profitability and efficiency, because of the soft budget constraint and policy burdens imposed by the state. Market share is expected to be positively correlated with the dependent variables because when a company has a larger market share compared to its competitors, it will be able to take advantage of economies of scale, resulting in higher profitability and efficiency. Size should also generate a positive sign because the more assets a company has, the more profit-generating opportunities it can create.

Moreover, when the market capitalization/employee is higher, it shows that a company is valued more by the public. Hence, more investments are flowing in and more profits can be earned. Lastly, debt ratio is expected to be negatively correlated with the dependent variables. When a company is burdened by higher level of debt, the sales the company earns will more likely be allocated for paying off the debt instead of for research and development. Therefore, lower profitability and efficiency can be attained.

**Table 1: Variable Definitions and Expected Signs**

Variable	Expected Sign	Definition
<b>Dependent Variables</b>		
ROA		Ratio of net income and total assets
ROS		Ratio of net income and total sales
Net Income		Final profit or loss after all expenses have been deducted from sales
Sales/Employee		Amount of sales that is generated by each employee
Sales/Assets		Amount of sales generated per \$1 of a company's asset
<b>Explanatory Variables</b>		
SOE	-	Dummy variable that indicates that a company is an SOE
Market Share	+	Ratio of a company's sales and total sector's sales from the companies within the Forbes' list
Size	+	Log of assets
Market cap/employee	+	Total market value of a company's outstanding shares calculated per employee
Debt Ratio	-	Ratio of liabilities and assets
Industry		Strategic sectors that consist of utilities, oil & gas, mining, transportation, ICT, pharmaceuticals, and biotechnology
Country		52 countries in total who have both SOE and private corporations that are from strategic sectors



## IV. Results

### IV.A. Descriptive Statistics

**Table 2: Descriptive Statistics**

Sources: *Forbes' World's Largest Public Companies*, Morningstar, Yahoo Finance, and annual reports.

Variable	Private (PC)	SOE	Total
<b>Dependent Variables</b>			
ROA (%)	3.42 (14.21)	4.91 (5.25)	3.75 (12.82)
ROS (%)	8.39 (55.04)	7.92 (15.48)	8.29 (49.20)
Net Income (USD millions)	1,063.44 (3,533.57)	1,262.45 (3,104.04)	1,106.76 (3,442.70)
Sales/Employee (USD millions)	5.43 (50.10)	0.96 (2.25)	4.45 (44.36)
Sales/Assets (%)	65.18 (60.11)	75.37 (68.55)	67.40 (62.12)
<b>Explanatory Variables</b>			
Market Share (%)	5.33 (16.33)	2.77 (4.75)	4.77 (14.65)
Size	4.33 (0.51)	4.32 (0.52)	4.33 (0.51)
Market Capitalization/Employee (USD millions)	13.18 (128.88)	1.44 (3.48)	10.62 (114.08)
Debt Ratio (%)	61.35 (18.71)	55.75 (22.10)	60.13 (19.61)
Mining	0.19 (0.39)	0.16 (0.37)	0.18 (0.39)
Oil & Gas	39 (0.39)	0.2 (0.40)	0.19 (0.39)
Utilities	0.19 (0.39)	0.38 (0.49)	0.23 (0.42)
Other Sectors	0.44 (0.50)	0.26 (0.44)	0.40 (0.49)
China	0.04 (0.18)	0.35 (0.48)	0.10 (0.31)
India	0.02 (0.14)	0.09 (0.29)	0.04 (0.19)
Russia	0.02 (0.14)	0.07 (0.26)	0.03 (0.17)
Saudi Arabia	0 (0.23)	0.05 (0.23)	0.01 (0.11)
Other Countries	0.92 (0.26)	0.43 (0.50)	0.82 (0.39)
Note: All numbers in parentheses are standard deviations			

The variable means and standard deviations are listed in Table 2. The average return on asset (ROA) for SOEs is 4.91 percent, which is higher compared to private corporations that only generate 3.42 percent. SOEs also earn higher average net income at USD 1.26 billion, while the average net income of private corporations only stands at USD 1.06 billion. However, they generate 8.39 percent in return on sales (ROS) on average, which is 0.47 percentage point higher compared to SOEs. Each employee in a private corporation generates USD 5.43 million in sales on average, which is 5.7 times higher than what an employee from an SOE can produce. On the other hand, SOEs have higher average sales/assets ratio (75.37 percent) compared to private corporations (65.18 percent).

While the average size between the two types of ownership is quite similar, market share and market capitalization/employee are significantly different. Private corporations have 5.33% market share on average within each of their respective sector, while SOEs only maintain 2.77% of market share. Moreover, each employee within a private corporation generates an average of USD 13.18 million in market capitalization, where SOEs need about nine employees to generate the same amount. Both private corporations and SOEs carry relatively high burden of debt with their debt ratios are 61.35% and 55.75% respectively. The strategic sectors that have the most number of SOEs are utilities (42), oil & gas (22), and mining (18), while the countries with the highest total of SOEs are China (38), India (10), Russia (8), and Saudi Arabia (6).

#### **IV.B. OLS Regression**

The results for profitability and efficiency regressions are exhibited in Tables 3 and 4. The coefficient for SOEs turns out to be statistically insignificant at 0.05 level for both the profitability and efficiency models. This disproves my hypothesis and shows that type of ownership does not affect the profitability and efficiency of a company. This is consistent with three different studies I presented earlier in the paper that concluded that there was no correlation between ownership and performance. Omran (2004) conducted a time series study on the firms in Egypt within the period of 1994-1998 and discovered that there was no significant difference in performance between state and private ownership. Peng, Bruton, Stan, and Huang (2016) investigated four different theories and claimed that no one form of ownership should be superior compared to the others. Hence, both private and state ownerships should deliver the same level of performance under any circumstances. My result also aligns with research conducted by Demsetz and Villalonga (2001) on 223 firms in the U.S., which highlighted the insignificant correlation between ownership structure and firm performance.

As it is discovered that SOEs should have similar performance as private corporations, this shows that government subsidies, low-interest loans, and tax-breaks do not necessarily give SOEs a significant advantage compared to private corporations. This is because the advantage of the subsidies can potentially be compromised by the soft-budget constraint behavior and the conflicting roles of government. Firstly, the government subsidies can lead to soft-budget constraint behavior where SOEs have less incentive to spend effectively. Secondly, through SOE, government plays conflicting roles as both a shareholder – to increase the value of the investment – and a regulator – to maintain social order such as through creating more jobs. This type of policy burden reduces an SOE's autonomy to solely focus on maximizing profit. Therefore, SOEs deliver similar performance to private corporations' despite the government subsidies because they might be compromised by the soft-budget constraint behavior and the conflicting roles of the government.

**Table 3: Regression Results:  
Profitability Models**

Sources: *Forbes' World's Largest Public Companies*,  
Morningstar, Yahoo Finance, and annual reports.

Explanatory Variable	Dependent Variable		
	Return on Assets (ROA)	Return on Sales (ROS)	Net Income
SOE	0.007 (0.447)	-0.028 (0.428)	-44.51 (0.110)
Market Share	0.029 (0.758)	0.067 (0.424)	2591.514*** (2.668)
Size	-0.017 (1.546)	-0.012 (0.265)	2447.441*** (8.484)
Market Capitalization per	0.000136** (2.852)	1.32 x 10 <sup>-5</sup> (0.067)	-0.125 (0.103)
Debt Ratio	-0.152*** (5.083)	-0.084 (0.671)	-3467.11*** (4.513)
Mining	-0.013 (0.849)	0.071 (1.120)	-1314.617*** (3.349)
Oil & Gas	-0.077*** (5.028)	0.107 (1.693)	-2374.462*** (6.079)
Utilities	-0.022 (1.475)	0.014 (0.232)	-1115.247*** (2.973)
China	-0.001 (0.039)	0.029 (0.350)	532.614 (1.035)
India	0.028 (0.948)	0.071 (0.580)	632.479 (0.834)
Russia	0.078*** (2.475)	0.034 (0.259)	1882.695*** (2.325)
Saudi Arabia	0.006 (0.119)	0.049 (0.227)	244.202 (0.185)
Adjusted R <sup>2</sup>	0.136	-0.013	0.214
Sample Size	510	510	510
Values in parentheses are absolute t-statistics			
** indicates significance at the .05 level			
*** indicates significance level at the .01 level			

**Table 4: Regression Results  
Efficiency Models**

Explanatory Variable	Dependent Variable	
	Sales/ Employee	Sales/ Asset
SOE	-0.747 (0.156)	0.033 (407.000)
Market Share	-3.415 (0.297)	-0.114 (0.581)
Size	0.714 (0.209)	0.00023 (0.004)
Market Capitalization per	0.224*** (15.572)	5.54 x 10 <sup>-5</sup> (0.225)
Debt Ratio	-13.745 (1.514)	-0.059 (0.279)
Mining	-5.248 (1.131)	-0.07 (0.880)
Oil & Gas	-3.091 (0.670)	-0.134 (1.698)
Utilities	-7.047 (1.596)	0.050 (0.660)
China	-2.172 (0.357)	-0.025 (0.238)
India	-1.211 (0.135)	0.101 (0.658)
Russia	2.174 (0.227)	0.309 (1.885)
Saudi Arabia	-0.809 (0.052)	0.698*** (2.619)
Adjusted R <sup>2</sup>	0.338	0.011
Sample Size	510	510
Values in parentheses are absolute t-statistics		
** indicates significance at the .05 level		
*** indicates significance level at the .01 level		

As exhibited in the three profitability models and two efficiency models within Table 3 and 4, market cap/employee has a positive and significant correlation with return on assets (ROA) and sales/employee. For every USD 1,000 increase in market cap/employee, the ROA increases by 0.14% and sales/employee grows by USD 224,000. In addition, market share has a significant correlation with net income at 0.01 level. For every 1% growth in market share, net income will increase by USD 2.6 billion. On the other hand, ROA will decline by 0.15% and net income will decrease by USD 3.5 billion for every 1% increase in debt ratio. Companies that operate in mining, utilities, and oil & gas experience on average USD 1.6 billion lower net income compared to any other sectors. Especially for oil & gas, it also has 0.08% lower ROA compared to others. This sector performs worst because the oil prices have been declining within the past several years, hence driving down the profitability of the companies within the sector.

Companies in Russia tend to experience higher profitability – 0.08% higher ROA and USD 1.9 billion more net income – compared to companies from other countries regardless of their ownership. Moreover, companies in Saudi Arabia perform better in terms of efficiency as they have 0.7% higher sales/assets ratio compared to others. These different profitability and efficiency levels in different countries can potentially be driven by the leniency of the regulations, pricing policy, and the consumer market within each country. Companies in a heavily regulated environment will have a stronger incentive to underreport their profitability to avoid higher tax or stricter regulation (Sirtaine, Pinglo, Guasch, and Foster, 2004).

## **V. Conclusion and Policy Implications**

This study measures the difference in performance in terms of profitability and efficiency between SOEs and private corporations in strategic sectors. The main hypothesis of this study is that due to soft-budget constraint and lack of autonomy caused by the policy burdens, SOEs have lower profitability and are less inefficient compared to private corporations. The performance measures that are used to assess the profitability are ROA, ROS, and net income, while the measures to assess the efficiency are sales/employee and sales/assets. Through investigating 399 private corporations and 111 SOEs from 52 countries and seven strategic sectors, this study discovers that there is no significant correlation between ownership type and performance. Hence, SOEs and private corporations are expected to deliver the same performance under any circumstances. This further shows that the government subsidies received by the SOEs do not necessarily provide them with an edge compared to private corporations. The subsidies can potentially be compromised by the soft-budget constraint behavior and the conflicting roles of the government through SOEs.

The policy implication of the result is that government should look into limiting subsidies allocated for SOEs to a level that does not trigger soft-budget constraint behavior. Moreover, government should consider giving more autonomy to the SOEs so that it can minimize its conflicting roles both as a shareholder and a regulator. These policy implications are consistent with the result, which implies that potential advantage of the government subsidies can be compromised by the soft-budget constraint aspects and lack of autonomy. However, the result of this study necessitates a more comprehensive assessment computed with a larger set of measures, because the measures used within this research only provide a partial view. Moreover, different countries have different regulations and public policies that might impact how companies report their sales and profitability.

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