INVESTMENT EFFICIENCY of SOEs and NON-SOEs within ASEAN-5

BY

MISS PANISA SANTISARUN

A THESIS PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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FACULTY OF ECONOMICS
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ABSTRACT

Public utilities are mandatory resources that governments must provide to their people. However, the cost of constructing firms, or state-owned enterprises (SOEs), to provide these goods and services are high. This cost includes the trade off its efficiency for the accessibility of goods and services for citizens. The government has to maximize the utilities of by lowering the price of goods and services or subsidizing the SOE to provide as many utilities as possible. Thus, performance is an inferior goal for these companies. This issue has raised the question on whether these firms are underperforming. Therefore, this research aims to study the factors affecting the investment efficiency and investment performance of SOEs compared with private firms to identify the differences in the management of each type. Hence, this study uses the fixed effect model to examine firms within the ASEAN-5 and its four main industries, namely, banking; transportation; gas, water, and multiutilities; and oil and gas producers, in which SOEs play a major role. The result shows that SOEs perform more poorly in terms of investment efficiency than private firms. Furthermore, in some aspects, SOEs have no significant effects on the investment expenditure and investment opportunities, thus indicating investment efficiency of the firms due to their policy-driven characteristics. The findings of this study suggest that the government should consider changing its management strategies. Moreover, related

policies that affect the performance of firms are proposed to prevent firms from operating poorly or wasting expenditures while under the government.

Keywords: ASEAN-5, Investment efficiency, State-owned enterprises, Tobin's

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Miss Panisa Santisarun

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Every firm aims for profitability, reputation, and success. The easiest way to show that the business is successful is through the company's value. All profits and revenues that each company earns represent how much the company is worth in others' view. The main factor that helps firms accomplish their goals is the corporate finance sector. In corporate finance, each company has to generalize its budget wisely and benefit from it. Moreover, investment decision, capital structuring, and funding sources will be the responsibility of this department (Kenton, 2019). Thus, researchers must study how external factors affect the decision or change the behavior of the corporate finance of the company. Theoretically, a firm's investment will be based on the idea that the marginal benefit should cost the same as the marginal cost (Modigliani & Miller, 1958). In other words, firms should be investing solely according to their maximum benefit. However, in the real situation, other external factors apart from their benefits exist, including information asymmetry, which can drive the company to over- or underinvest or seek government intervention in all aspects.

1.2 Background and hypothesis

The government must provide public utilities to their people, as these resources are the basic elements of living. This goal can be attained through several approaches, one of which is the creation of state-owned enterprises (SOEs). However, the cost of establishing these firms so that they can provide the basic needs of citizens is high, especially in terms of the efficiency that would be traded off to enhance the accessibility of people to attain products and services, which prevents firms from maximizing their profits.

The term state-owned enterprises or SOEs refers to companies wherein the government has greater than or equal to 50 percent of ownership; these companies include those in telecommunications, natural resources, finance, transportation, and other types of industries (Sturesson et al., 2015). SOEs have been established according to several aspects—whether for maintaining political stability, providing employment, serving government policies, or pursuing other commercial activities undertaken by the government. The SOEs are owned by the government but largely rely on specific departments, such as the department of telecommunications or the department of energy, rather than on the central government directly. These firms can be among the players in the free market. They can be surrounded by other similar companies in the same industry or be the only firms operating in that sector.

Apart from being in a competitive market, most SOEs have natural monopoly. Natural monopoly occurs when the products or services are produced at relatively high costs and have large economies of scale. In other words, a huge number of consumers are required for the product or service, such as water, electricity, telecommunication, and railways, to reach its optimal point (Shirley, 1983). These firms would obtain monopoly from being the only firm in the market that provides the product or service. Therefore, the government should step in and regulate the firm either by regulation or ownership, as monopoly power would create a deadweight loss to society. To illustrate, a firm would maximize its profits and set the highest price possible at a price equal to the marginal revenue, which eventually leads to market failure (Shirley, 1983). This action will evidently harm the market and consumers because the consumers will not have access to these products and services. In the natural monopoly case, it would worsen the impact because it mostly provides necessary goods and services to consumers. Eventually, a company that needs large economy of scale will not achieve this condition and fail in the end. Thus, the government should set regulations to limit the price and subsidize the company to grant consumers access to the products and services and allow the company to run its business to serve people (Shirley, 1983).

These companies have a competitive advantage compared with private firms, thus creating unintended consequences, such as inefficiency, weak governance, and non-transparency (Wisuttisak & Rahman, 2020). Furthermore, the performance of SOEs has been an issue, as some people believe that their performance is inefficient. For instance, consumers will perceive problems in the governance. Distant ownership from the government also motivates the staff to underperform, as their boss, in this case, the government, insufficiently oversees the SOEs (OECD, 2015). In addition, the abovementioned actions of the government do not give the firms enough incentive to perform well because even if a firm incurs losses, the government will attempt to subsidize the firms for it to operate and benefit from this operation.

Conflicting objectives are another issue that prevents SOEs from becoming an efficient firm. To illustrate, SOEs have no clear direction because they have one or more bosses. The unmatched objective may come from the individual interest of politicians, thus driving firms to have a complex guideline of responsibilities that lead to inefficient operations (OECD, 2015).

As a result, these problems would cause the inefficiency and poor performance of SOEs, which will then increase government expenditure. Theoretically, subsidies that the government should give to SOEs should mainly rely on the policy making process or the burden that each SOE has to bear because of the policy. However, given several factors, such as information asymmetry, whether the cost comes from the policy or the operating cost itself is difficult to distinguish (Lin et al., 1998).

Therefore, several countries have formulated a solution to increase the efficiency of these firms through a process called privatization or corporatization. Privatization occurs when governments want to sell their owned companies, which, in this case, are the SOEs, to private and non-government companies. The condition of the economy in each country would indicate the government's decision to privatize; for example, a country facing a fiscal crisis and a budget deficit would be more likely to privatize its firms as a method to decrease the budget that needs to go to these firms as a

subsidy (Dornbusch, 1992). Moreover, according to Richmond et al. (2019), an article from the IMF states that SOEs become more efficient after they become privatized.

This study focuses on the economy of the ASEAN-5. The Association of Southeast Asian Nations (ASEAN) is an economic union consisting of 10 Southeast Asia countries, namely, Thailand, Singapore, Philippines, Indonesia, Malaysia, Vietnam, Laos, Myanmar, Cambodia, and Brunei (ASEAN, 2021a). The ASEAN promotes the cooperation of countries to help one another in terms of economics, regional peace and stability, education, and sociocultural factors. The agreement among ASEAN nations is to create a free trade area that increases the potential of trading within economies, along with competing with the world's economy (ASEAN, 2021b). A variety of economies in terms of size, growth, and other aspects are difficult to compare. Therefore, the top five countries in the ASEAN, or the ASEAN-5, will be discussed in the research. The ASEAN-5 consists of Thailand, Malaysia, Indonesia, Philippines, and Singapore, which have similar economic characteristics to one another. Moreover, these nations are considered to have the largest economies in the ASEAN region according to their gross domestic product or GDP (Statista, 2021). They were the pioneer countries when the ASEAN was established, and they are among the fastest growing economies in the world (Lim, 2009). To illustrate, the ASEAN-5 has grown resiliently in the past decades, thus promoting the standard of living and managing poverty in the region (Oncel & Lubis, 2017). Hence, this study uses the ASEAN-5 to examine the investment performance of firms within the economy.

The hypothesis of this research is that SOEs appear to have less efficiency in terms of investment than non-SOEs due to the abovementioned reasons. To illustrate, SOEs deal with several issues, such as governance, thus demotivating the staff from doing their best for the company. Other concerns are the conflicting interests between the owners, namely, the government, which act on behalf of the citizens, and the controllers, which are the managers and directors of the company.

However, an opposite result can occur. The SOEs are controlled by the state, thus giving these firms an advantage to invest or seek better investment opportunities and obtain a high degree of investment efficiency (Chen et al., 2011). As numerous countries

show, a politically connected firm will have more access to bank financing. Studies have observed this trend in Indonesia (Fu et al., 2017), Pakistan (Khwaja & Mian, 2005), Italy (Sapienza, 2004), and 35 other countries around the world (Faccio et al., 2006). Therefore, the investment efficiency will be measured to confirm whether the SOEs or non-SOEs would have higher efficiency in terms of the investment.

1.3 Objectives

1. To determine factors affecting investment efficiency of SOEs and non-SOE firms in ASEAN-5.
2. To compare the investment efficiency between SOEs and non-SOEs in ASEAN-5.

1.4 Scope of the study

The scope of this study includes determining the investment performance of SOEs and non-SOEs along with comparing the investment efficiency between the SOEs and non-SOEs of ASEAN-5 in 2000-2019. The study will focus on four main industries, which are banks; transportation; gas, water, and multiutilities; and oil and gas producers, as these industries strongly represent the characteristics of natural monopoly and SOEs. The period from 2000 to 2019 covers the Great Recession in 2008, which has affected the economy around the world, including the ASEAN-5.

Moreover, the investment efficiency of SOEs and non-SOEs will be measured using the investment expenditure depending on the investment opportunities and other relevant factors, such as the internal and external capital expenditure, which will be further explained in the following section. To illustrate, neoclassical theory, Tobin's Q, agency cost, natural monopoly, market and government failure, and other related theories will be raised.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Natural Monopoly

The main characteristic of most SOEs is their natural monopoly. Natural monopoly often exists in industries for necessary goods, such as telephone, water, and electricity. Given the high fixed cost of goods and services, firms must provide their resources to consumers in a large area to achieve economy of scale. Such circumstance also demotivates other competitors from joining the market because duplication can occur and the scale of consumers will be divided into numerous groups, which could eventually lead to the inefficiency of a firm's performance (Depoorter, 1999). According to Baumol (1977), natural monopoly occurs when a single firm can serve the entire market at a lower cost compared with two or more firms. Moreover, new entrants are demotivated from joining the market due to the inability to survive and the incapability of engaging in a price war with the incumbent firm.

The concept of natural monopoly can further be explained by subadditivity. Subadditivity is raised if the production cost of a single firm is lower than two or more identical firms, regardless of whether the average cost is at a decreasing or increasing level. This situation leads to the distinction between strong and weak natural monopoly, as stated in Gagax and Nowotny (1993). These authors described that a strong natural monopoly occurs when a firm generates a decrease in the average costs. To illustrate, the average costs curve of that monopoly firm would be at a declining stage when it intersects with the market demand. In contrast, a firm that increases its average costs will have weak monopoly, which is defined as the instance in which the average cost curve increases while it intersects with the market demand. It results in a lower cost compared with those of new entrants.

Hence, the regulatory authorities should create barriers for new entrants to lower the incentive of joining the market and, in return, control the price of that product or

service. In natural monopoly, if the market or industry only has one firm, it will increase the market welfare to the maximum point possible. Thus, the regulator or the government has to intervene in the market to avoid the duplication of the product and service (Depoorter, 1999). Regulation by the government can come in various forms, such as price regulation, incentive regulation, and, most importantly, public ownership, which will be emphasized in the present work.

2.2 Market failure and establishment of SOEs

Market failure will occur if the market is unable to allocate the resources whether by limitation to produce or consume. Moreover, this failure can be due to several reasons, one of which is the monopolist. Owning a monopoly can cause market failure because the monopolist may consider its main goal to be maximizing profit, which can be achieved by decreasing the supply or increasing the price. In the market, no firm produces a similar product that the monopolist firm offers. Thus, the consumer has to purchase from that monopolist only. If the profit maximizing becomes too extreme, the price becomes too high, thus preventing consumers from consuming the product or service. Consequently, market failure occurs. A worse-case scenario is if the monopolist is considered the natural monopolist, as most of the products and services provided by natural monopoly firms are necessary goods. In other words, consumers will be prohibited from accessing the goods and services provided by the monopolist. Thus, they would have low or even no access to necessary goods, such as electricity, water, or gas. Therefore, the government has to step in to prevent market failure, which, in this case, is to turn the company into an SOE. Nevertheless, the consequence of this intervention may either be better or worse, which will be further discussed.

Firms that are considered SOEs have their major shares owned by the government—50 percent or more, to be precise (Sturesson et al., 2015). Establishing the SOEs would change the firm's goal from maximizing its own profit into serving other purposes that are less related to profit maximizing. Hence, the most crucial issue that SOEs

have to face is inefficiency. As SOEs are one of the tools that the government uses to operate policy, shareholders might not consider profit as the highest goal to achieve. Numerous factors drive the inefficiency of SOEs. One factor is the agency problem called "lack of interest," which was raised by Smith (1776). The author stated that the manager would have less incentive to take care of the firm compared with the owners themselves; hence, further corruption can occur within the firm. In addition, according to Hart et al. (1997), the manager of a publicly owned company would have low incentive to reduce costs generated by the company or improve the quality of products or services served by the company because the asset of the company is owned by everyone not only the particular firm. Moreover, vague goals are more likely to diminish the incentive of the employees, thus resulting in inefficiency. According to Shirley (1983), one of the most crucial factors that cause SOEs to perform inefficiently is their goal. The government fails to clarify objectives to SOEs due to several reasons. For instance, these firms are used as a tool for fiscal policy in both commercial and social approaches. Consequently, SOEs have difficulty projecting its importance. Hence, they fail to meet the appropriate level of efficiency. Budget constraint is also a significant issue because the SOEs have to control their prices for all customers to be able to access essential products or services. Hence, the government has to restrict the prices at a low threshold. Moreover, the gap between cost and revenue might be low or even a loss. This restriction reduces the incentives of the employees to develop further innovations with the constraints of budget (Depoorter, 1999).

2.3 Government failure

Government intervention when market failure occurs might not be the best solution because it can lead to an even worse situation called government failure. Government failure contradicts the concept of market failure; market failure occurs in a free market with no intervention from the government, whereas government failure is evidently due to the government's action. Regulatory capture is the main concept of government failure (Stigler, 1971). To illustrate, the authorities that regulate policies or

laws might be under the company, which would announce policies that benefits the company instead of the whole economy or the public. This action would ally with the monopoly power; if regulatory capture occurs, the consumer will have significantly less power to deal with the monopolist, thus further diminishing market welfare. In addition, the natural monopoly will worsen this situation, especially the naturally monopolistic state-owned firms (Stigler, 1971). As mentioned above, firms with natural monopoly characteristics might supply the necessary goods. Thus, if these firms are compatible with the government and regulate any laws that specifically benefit the firm, it would create a huge welfare loss to society.

In conclusion, the abovementioned ideas seem to imply that the SOEs would create a significant impact on society, which draws attention from all sectors to itself and raises numerous questions as to whether the SOEs are efficient enough to maintain their ownership status. Several researchers found that the research and development sector has a positive correlation with the performance of the firm (Heshmati & Loof, 2008). Thus, to measure a firm's efficiency, investment is one of the factors that must be considered. One of the ways to describe the efficiency of the firm is through the term "operational efficiency," which refers to how a firm efficiently earns profit compared with its operational cost. In other words, it is the ability to generate income for the firm through various options, one of which is the investment (Chen, 2019). Therefore, investment is considered an important factor that drives firms forward and creates higher income for the company. SOEs are more likely to be less efficient in terms of investment than private firms or non-SOEs, as mentioned in the reasons above.

According to neoclassical investment, firms will invest up to the optimal point at marginal benefit equals the marginal cost of capital. Additionally, the general aspect to the decision making of a firm's investment is due to two major reasons: the maximization of profits and the market value. To illustrate, firms will invest in assets that would generate profit for them. In other words, the expected rate of return of those assets should be higher than the interest rate; in addition, the assets will increase the firm's equity (Modigliani & Miller, 1958). However, factors that prevent firms from making optimal decisions on

investment are varied; for instance, the agency cost will constrain the credits. According to Jensen (1986), managers tend to hold more assets under their control to increase their power or to address the above-mentioned problems, such as conflicts in the objectives of the firm. In terms of SOEs, agency theory plays an important role in demonstrating that the investment of firms would be inefficient. As illustrated, the ownership of SOEs are the citizens of the country, while the only sector that can control them is the government. Thus, the separation of the owners and the management team leads to the deviation of the firm's goal from profit maximizing to serving the demand of the government. This problem would occur only in SOEs and easily lead to the inefficiency in terms of investment.

In addition, the study by Kim et al. (2015) states that the investment efficiency of an individual firm is due to several factors. However, the most crucial aspect is information asymmetry. As a result, non-SOEs perform better in terms of investment than SOEs. Moreover, the research and development sector along with the capital expenditure of non-SOEs is more efficient than that of SOEs. Inefficiency in SOEs mostly comes from the agency problem in these firms, which affects the investment decision of companies and leads to the substandard results. To illustrate, the clear ownership benefits private companies or non-SOEs so that they can have higher efficiency because the owner will be responsible for the company's profit and loss. Hence, they will monitor the performance of the firm more compared with SOEs.

The study of investment theory was initiated from Keynes and Fisher, who stated that the present value of the expected future revenues equals the opportunity cost of capital is the level of investment that should be financed (Eklund, 2013). In addition, the concept of net present value built by Keynes and Fisher becomes crucial in corporate finance theory. However, even though their main ideas are compatible, the definition of risk and expectation of the two economists are different. On the one hand, Keynes posited that investment is not a path to reach equilibrium. Moreover, it relies on people's "animal-spirited" trait. In other words, individuals or investors might sometimes irrationally invest. On the other hand, Fisher (1930) and Hayek (1941) believed that the investment is a tool toward optimal capital stock.

These ideas were influenced and developed by other approaches, such as neoclassical theory, the accelerator principle, and Tobin's Q theory of investment. First, these concepts were further expanded by neoclassical theory, which is more likely a capital theory than an investment theory. This theory assumes that the capital stock without an essential investment function will influence the capital to adjust immediately. Thus, it is out of the scope of investment theory, in which the present research is interested. Second, the accelerator approach also elaborates on the concepts. It has similar characteristics to the Keynesian approach, which assumes that the price is fixed. In addition, it assumes that the adjustment of the capital stock is complete in each period and is instantaneous. Lastly, the Q-theory of investment solves the issues in previous theories. The capital stock is instantaneously completed within one period, thus this theory solved issues occurred in previous theory. The solution provided is to add a cost function into the optimization problem. In addition, the previous two theories, neoclassic theory and accelerator approach, do not take the expectation into account. Thus, Brainard and Tobin (1968) and Tobin (1969) came up with a solution by expecting that the market value being equal to the replacement cost of the assets will be the optimal point to make an investment, which is the same concept as the Q-theory of investment.

Tobin's Q is widely used in numerous studies. It is cited in the model or study of Evans and Gentry (2000) as an estimator of the investment of a firm. As mentioned in their work, Tobin's Q is the method that measures a firm's growth, as its formula comes from the comparison of the market value of the firm and its replacement value. As a result, it will score 0 to 1 and implies a firm's intangible assets. As mentioned in the paper, the intangible assets are also used as the implication of a firm's future value, investment opportunities, power, and successful management system.

Moreover, Chen et al. (2011) examined government intervention in relation to the investment efficiency of firms in China. They stated that the optimal decision that a firm makes depends on various factors, not only on the firm itself. In this case, the government intervention is given attention. Tobin's Q model is used to explain that the theory might not be applicable to the real world due to information asymmetry or agency

problems. Thus, the authors expanded the model by applying the basic idea and added other variables that are more applicable to the real situation. Tobin's Q, as an investment opportunity, is defined as the market value of tradable shares plus the combined book value of non-tradable shares and liabilities divided by the book value of total assets. Tobin's Q definition is used in other works as well (Bai, Liu, Lu, Song, & Zhang, 2004). Other variables in this study consist of indicators that distinguish between SOEs and non-SOEs, net operating cash flow to determine the power of investing of the firm, leverage as the representative of the debt of each firm, external financing source, and firm size calculated by the total assets of the company. The study also uses fixed effects tests to estimate the model that the Hausman test suggested to fit with the data. The result shows that SOEs perform worse than non-SOEs when their performances are measured by the sensitivity of investment expenditure to investment opportunities. Meanwhile, political connection worsens the firm's investment efficiency. Although this study mainly uses variables from this literature, the explanation of each variable changes accordingly to the appropriation.

O'Toole et al. (2016) analyzed the investment efficiency between the SOEs and non-SOEs in Vietnam and evaluated the effects of privatization using the structural model. They used the relationship between capital spending and Tobin's Q to calculate the investment efficiency of the firm. As a result, the SOEs show no significant effects between Tobin's Q and the capital expenditure, as the investment strategies and activity plans are driven by other factors rather than the investment opportunities or the profit. Meanwhile, private firms have a positive relationship with capital expenditure, thus driving such firms to be more efficient.

Moreover, another study on measuring a firm's performance applied the concept of Tobin's Q. Razak et al. (2011) assessed the impact of corporate governance on a firm's performance in Malaysia using Tobin's Q as the indicator. They claimed that Tobin's Q helps measure a firm's performance, while return on assets (ROA) is used to measure a firm's accounting performance. Their study used Tobin's Q by calculating the market value plus the total debt divided by the total assets of the firm and the ROA as the dependent variables, as lifted from Haniffa and Hudaib (2006) and McConnell and

Servaes (1995). In addition, they used other independent variables, which are the company size calculated by the company's total assets. These variables come in terms of the natural logarithm and can solve heteroskedasticity issues. Role non-duality shows the separation of the CEO and chairman, government ownership, leverage, growth opportunities, agency cost, and profitability of the firm. Then, the authors ran a multivariate regression, as the model consists of two dependent variables, along with panel data. The analysis controlled the firm's characteristics and measures to determine whether the SOEs perform better than non-SOEs. The results showed that non-SOEs perform better in terms of all controlled aspects, which are corporate governance, profitability, risk, growth, and agency cost.

Agency cost can drive SOEs to become less efficient. As mentioned above, the agency cost is the conflict between the shareholder and the manager's interest. For the SOE, the shareholders or the owners of the company are the people in the country, while the manager is the government, which established the SOE to to benefit the economy (Chen, 2021). Several studies show that high agency costs lower the firm's efficiency (Mi & Wang, 2000; Jensen & Meckling, 1998). Thus, the agency problem is one of the factors that cause the decline in the efficiency of SOEs.

2.4 Estimates and determinants of investment efficiency

$$y = f(x_{1it}, x_{2it}, x_{3it}, x_{4it}, \ldots, x_{nit}) \tag{2.1}$$

Each firm has a different production function that is used to determine the optimal investment. According to the neoclassical theory of investment, a firm's objective is to maximize its net present value. If the firm's investment decision deviates from the investment decision made from the rule to maximize its net present value, it is considered inefficient (Gao & Yu, 2020). Several variables can indicate the determinants of the investment efficiency of the company. The general theory that is used to calculate the investment efficiency is called the return on investment (ROI), which determines the efficiency and the profitability generated from the investment. It is expressed by the ratio

of the benefit from the investment divided by the investment's cost. However, some limitations exist. For example, the high rates of return may not refer to the most efficient way to invest (Fernando, 2021). Another classic theory by Keynes suggested that investment solely depends on the marginal efficiency of the capital, and it will invest if the return is above the interest rate and until the marginal efficiency of investment is equal to the interest rate (Keynes, 1936).

Other researchers used the sensitivity of investment expenditure to investment opportunities, which is represented by the Tobin's Q to measure the investment efficiency of the company (Bushman et al., 2007; Wurgler, 2000). This variable is widely used in related studies as a method to measure a firm's investment efficiency and opportunities (Tobin, 1969; Hubbard 1998; Hayashi, 1982). The calculation of this variable is slightly different according to the source of the model. However, the main idea of calculating the Q ratio is the same, which is the total market value of the firm divided by the total assets. If the investment expenditure and investment opportunities are positively related, the firm's investment would be considered efficient (Wan et al., 2015). To illustrate, it also represents the investment efficiency, as the calculation of Tobin's Q explains the ratio of the market value and capital stocks, and the result of which could be seen as the additional capital stock from the investment that a firm has made (Gugler et al., 2004).

However, another variable can be used in this case, which is the value-added growth. According to Wurgler (2000), the researcher claimed that the value-added growth is more appropriate in measuring the investment opportunities than the traditional way, which is the Q ratio and the price-earnings ratio. The researcher tested the relationship between three variables with the sales growth, and the result revealed that all three have a significant effect on growth, but with the value-added growth as the most reasonable one. Given other limitations, the investment cash-flow is not the best way to determine the investment efficiency. To illustrate, it was originally developed to measure the presence and financial constraint on investment, not the efficiency. In addition, it does not directly explain the investment efficiency. Nevertheless, it is correlated with Tobin's Q, which is the reason why it is able to explain the investment. Finally, it explains the deviation of the

optimal investment but does not indicate whether the firm is overinvesting or underinvesting (Gao & Yu, 2020).

Some research has shown results that refute this theory. In addition, such research posits that investment depends on the investment opportunities; however, it depends on other factors as well, such as the cash flow (Howard, 2017). Theoretically, a firm's investment and cash flow in the company should not be related (Modigliani & Miller, 1958). However, Hubbard (1998) argued that a positive relationship exists between the two variables. The agency cost is raised to illustrate the reason for this relationship. It creates an imperfect capital market, as the manager invests in an unprofitable project (Jensen, 1986). Moreover, the information asymmetry also creates a high price of external funding and creates inefficiency, which later provokes the internal cash flow to seek additional investment opportunities (Hubbard, 1998). Accelerator theory is another important idea. It posits that the level of output and capital are based on each other. In addition, the present investment expenditure depends on the past growth of the firm, which is called flexible accelerator theory. It initiates the idea of lagged time in the process of investment because the action in the past will have an effect on the present investment decision (Gao & Yu, 2020). Furthermore, accelerator theory and Tobin's Q have a positive relationship with each other and are seen as the variables to measure investment efficiency (Wurgler, 2000).

In addition, natural monopoly is an important variable that can determine the ownership of the firm, that is, whether it is an SOE or a non-SOE. Such distinction would affect the efficiency of firms. Majority of SOEs have natural monopoly because the government must serve the basic needs of the people. These types of services require a large amount of fixed cost and initial cost. Moreover, providing these services will be more successful if one firm operates them; doing so allows the firm to sustain its market share, which could further be the source of high fixed operation costs (Deeporter, 1999). As aforementioned, these natural monopolistic firms have to deal with high fixed costs, which would lead to higher service costs. Either way, the burden will be pushed to the customers. Thus, the government has to intervene and keep the price at a reasonable rate. Eventually,

this situation would lead to the inefficiency of SOEs. The characteristics of these SOEs easily contribute to the eruption of the agency problem within a firm. To illustrate, the agency cost is the main aspect of inefficiency within the company because of the conflict of interest between the manager and the shareholders (Chen, 2021). Therefore, this problem must be perceived as a factor that prevents the firm from maximizing profit and reaching the efficiency.

Finally, business life cycle theory also affects investments. Under this theory, the factors that determine whether the investment expenditure would be low or high is the firm's market capitalization and the firm's age. To illustrate, a younger firm might invest more than a mature firm, as they have to make advertisements or launch products and services to the market. In other words, a younger firm might have more potential to grow than an older firm (Brewer et al., 1996). According to Dickinson (2011), the business life cycle has five stages; in this case, this cycle tracks the cash flow of investment. First, in the initial stage, the firm's investment cash flow is relatively low because the firm has to spend money to deter entry and advertise their company to the market. Second, in the growth stage, the firm still invests more to deter entry, which is the main objective in this stage. Third, the maturity stage is when firms invest to keep up with the trend of the modern market. Fourth, the shake-out stage affects the investment in both ways. However, the number of new entrants reduces in this stage. Finally, in the decline stage, cash flow in terms of the investment in this stage is high because firms need to liquidate to pay debt generated in the early stages.

2.4.1 Hypothesis

The first hypothesis is that the factors that will influence investment efficiency consists of investment expenditure, investment opportunities, net operating cash flows, leverage, external funding of the firm, firm's market capitalization, and firm's listing age.

The second hypothesis entails examining whether SOEs or non-SOEs perform better in terms of investment efficiency. The underlying evidence from other studies shows that SOEs will have less efficiency in terms of investment compared with non-SOEs because of the agency problems stated prior. The current research investigates SOEs and non-SOEs in ASEAN-5, which consists of Thailand, Singapore, Philippines, Indonesia, and Malaysia within the four main industries that strongly represent the characteristics of SOEs. These industries are banks; transportation; gas, water, and multiutilities; and oil and gas producers.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Model

Testing the hypothesis, which is made in chapter 2, this paper applies the model of investment expenditure to other variables consist of Tobin's Q which represents the investment opportunities, net operating cash flow of the firm, leverage, external finance, market capitalization, firm's listing age and fixed effects as shown in model below (1).

$$Inv_{i,t} = \beta_0 + \beta_1 TQ_{i,t-1} + \beta_2 CFO_{i,t-1} + \beta_3 CFO\_soeph_{\,i,t-1} + \beta_4 Lev_{i,t-1} + \beta_5 Exfi_{i,t_{i,t-1}} + \beta_6 \ln(Size)_{i,t-1} + \beta_7 Listage_{i,t-1} + FirmFixedEffects + \varepsilon_{i,t} \quad (3.1)$$

The model consists of one dependent variable, which is the investment expenditure, along with seven independent variables, including Tobin's Q, the indicator to distinguish SOEs and non-SOEs, net operating cash flow distinguished into all firms and only SOEs in Philippines, leverage, external financing, size, and listing age. These variables in the model are inspired by the literature of Chen et al. (2011). Table 3.1 represents the description, measurement, related theory, and the expected sign of each variable including the dependent and the independent variable.

The dependent variable $Inv_{i,t}$ represents the investment expenditure, which can be calculated by the capital expenditure divided by the total assets of the firm. Meanwhile, independent variables are illustrated by the following detail.

$TQ_{i,t-1}$ denotes the investment opportunities. They can be calculated by the market capitalization plus the total liabilities of the firm divided by the common equity plus the total liabilities (Chung & Pruitt, 1994). The result from the calculation will be illustrated further. If the result is a number less than 1, then the firm's value is still undervalued. In other words, the market value of the firm is less than its replacement value. The replacement value is the cost of replacing assets, which could be the real estate or the

investment security of the company (Twin, 2020). On the other hand, if the Q ratio is more than 1, the company is overvalued at the moment, which means that the market value of the firm is more than its replacement value. To illustrate in terms of the investor, if the Q ratio is less than 1, assets and stocks should be sold; otherwise, if the Q ratio is less than 1, assets or stocks should be bought.

Moreover, the relationship between investment expenditure and the dependent variable to Tobin's Q shows the sensitivity of investment expenditure and investment opportunities. In other words, it represents the amount of money the firm earned from the market after the investment. To illustrate, if the firm earns profits from the market, the earnings give the firm an opportunity to use them to invest. If the earning is high, the sensitivity of the investment expenditure to investment opportunities will also be high and will eventually result in a higher Tobin's Q. Thus, the sign should be positive to signify that more investment opportunities results in more investment expenditure for the firm, which consequently leads to greater investment efficiency within the company.

$CFO_{i,t-1}$ is the net operating cash flow of the firm. Net operating cash flow represents the amount of cash operated in the company, and it works as the indicator of whether the company operates at the optimal level. This study also expresses that the relationship of the net operating cash flow within the SOEs in the Philippines as $CFO\_soeph_{i,t-1}$ to show a strong effect of the investment expenditure. Thus, it is separated from other firms to determine the correlation. In terms of investment, the operating cash flow affects the liquidity in the company, which further helps in the efficient decision making in other sectors, including making investments (Tuovila, 2020). More cash flow means that firms can invest more and even overinvest in some cases. Hence, this variable must be given attention to determine whether the investment from owning a large amount of cash flow will lead to the efficiency of the company's investment decision (Kim & Kwon, 2015; Richardson, 2006; Wajeetongratana, 2019). It is also linked to the discussion of an agency problem that the manager would like to push the firm forward, which is sometimes far from the optimal point (Jensen, 1986). Thus, the sign of this variable is either positive or negative.

$Lev_{i,t-1}$ is the leverage generated by the firm or the debt-to-assets ratio. The leverage is the result of the firm's borrowings, which aim to expand their company. This variable should be negative because it creates agency costs that further cause more problems afterward. To illustrate, when firms are in debt, the debt holder might focus more on paying back principal and interest. Thus, this action would limit the fund from monitoring other sectors, including the agency problem within the firm (Zakaria et al., 2016). The agency cost is the conflict between agency or managers and their principles and the shareholders that have different interests. The manager aims to increase their earnings, while the shareholder aims to increase the share value. To illustrate, the company focuses more on the principal and interest of the borrowings, which prevents the firm from monitoring the agency cost of the company (Zakaria et al., 2016). This problem can be solved in a simple way by finding the common interest of both sides. Leverage reduces the chance of firms to overinvest, as mentioned in Jensen (1986), because it restricts the capital expenditure and reserves some parts to pay interest. To sum up, Lang et al. (1999) studied the relationship between leverage and investment efficiency and growth along with the Tobin's Q ratio. Tradeoff theory also suggests that debt and firm size has a negative relationship with each other and that the company should invest (Lemmon & Zender, 2010). Thus, the leverage variable is used in this field of research as a restriction for firms to invest.

$Exfi_{i,t-1}$ is the external finance, which can be calculated by the cash proceeds by the external financing divided by total assets. Moreover, it is considered an external source of finance; politically connected firms or SOEs would benefit from this source, as mentioned by Khwaja and Mian (2005), Leuz and Oberholzergee, (2006), and Fan et al. (2008). Leverage can help reduce the advantage that politically connected firms can obtain from external sources. Additionally, Oh and Kim (2018) found a negative relationship between investment efficiency and external finance.

Table 3.1

Variables

Dependent Variables	Description	Measurement	Related Theory	Sign (+ or -)
$Inv_{i,t}$	Investment expenditure	$\frac{Capital\ expenditure}{Total\ assets}$	The neoclassical investment shows that firms would invest in order to maximize profits and market value but there are many factors that would deviate the investment decision of the firm.	-

Independent Variables	Description	Measurement	Related Theory	Sign (+ or -)
$TQ_{i,t-1}$	Tobin's Q as a measurement of investment opportunities	$\frac{Market\ capitalization + Total\ liabilities}{Common\ equity + Total\ liabilities}$	Tobin's Q theory (Tobin, 1969) Market value divided by replacement value. If the Q ratio less than 1 means the firm's value is undervalued, the Q ratio is more than 1 means overvalued.	(+) More investment opportunities lead to more investment expenditure

Source: Author's collection

Table 3.1 (Continued)

Independent Variables	Description	Measurement	Related Theory	Sign (+ or -)
$CFO_{i,t-1}$ $CFO\_soeph_{i,t-1}$	Net Operating Cash flow	Firm's net operating cash flow	Accelerator theory as the operating cash flow represents the liquidity in the company which further helps decide the efficient decision making on other sectors including the investment. Agency cost which deviates the allocation of the cash flow from investing to serve other management purpose.	(+) The more net operating cash flow means more investment in a firm (-) If firm has high agency cost
$Lev_{i,t-1}$	Leverage	$\frac{Total\ debt}{Total\ assets}$	Leverage implies debt to assets ratio which is the potential to create an agency cost.	(-) The more leverage means that a firm has to pay more debt.

Source: Author's collection

Table 3.1 (Continued)

Independent Variables	Description	Measurement	Related Theory	Sign (+ or -)
$Exfi_{i,t-1}$	External finance	$\frac{External\ finance}{Total\ assets}$	Information asymmetry as the firm with more information would be able to access to the capital easier and increase cash flow in the firm.	Either (+) or (-) depends on the allocation of this fund.
$Size_{i,t-1}$	Size of the firm	Market capitalization	Size represents the reliability of firms and the power to invest. Also, the tradeoff theory suggests that debt and firm size has a negative relationship with each other. Business life cycle also support the idea of a larger firm might be a longer listed firm.	(+) Firms with bigger market capital would have more resources to invest (-) Larger firms could represent the longer list firm.

Source: Author's collection

Table 3.1 (Continued)

Independent Variables	Description	Measurement	Related Theory	Sign (+ or -)
$Listage_{i,t-1}$	Firm's listing age	Firm's listing age	The transparency of the firm, lower risk and the predictable cash flow and the interpretation of the business life cycle theory.	(-) As above mentioned, the longer a firm operates, it tends to go towards maturity and investment would decline as well.

Source: Author's collection

$Size_{i,t-1}$ is the variable that is used to determine and distinguish a firm's level. A larger firm can obtain more investment power than a small firm in terms of the quantity of the investment. The size also refers to the market capitalization, which can be calculated by the outstanding share of the company multiplied by the current price of one share. The size of firms can indicate a lower chance of bankruptcy, as larger firms tend to diversify risks more. The firm's board size also influences the investment strategy of the firm (Ji, 2016; Kim & Kwon, 2015). Hence, this observation supports the positive value of this variable. However, the larger firm might be a firm that has been listed for a longer time. Thus, according to business life cycle theory, the investment expenditure of the firm might decline because of the maturity of the company (Dickinson, 2011). The variable could be either positive or negative.

$Listage_{i,t-1}$ denotes the listing age of firms. The firm's listing age represents the transparency of the firm, lower risk, and predictable cash flow, which could benefit the investment of the firm (Bolton & Freixas, 2000). In this research, business life cycle theory prevails over other concepts in the literature, as it makes sense that firms might either mature in the older stage or face a new life cycle extension. Thus, the relationship could either be positive or negative. Overall, this variable can still be used in some studies to measure the investment efficiency (Ghafoorifard, 2014; Kipesha, 2013; Oteng-Abayie et al., 2011). For more details, please see Appendix A.

3.2 Sample and Data

This study examines SOEs and non-SOEs in the stock market of ASEAN-5, which includes Thailand, Singapore, Philippines, Indonesia, and Malaysia. Four main industries that represent the characteristics of the SOEs in this region are banks; transportation; gas, water, and multiutilities; and oil and gas producers[1]. The ASEAN-5

[1] These industries are likely to have natural monopoly, thus making them SOEs; the resources in their hand should be manipulated and distributed to a large number of people in the country and should benefit society.

consists of countries with similar economic characteristics and are considered the top five largest economies in the ASEAN region.

Moreover, the data cover the period from 2000-2019. It consists of 2,733 observations or 223 firms; 393 observations or 23 firms are SOEs, while 2,340 observations or 200 firms are non-SOEs. The information used in the model come from Datastream and consists of the investment expenditure, common equity, total liabilities, total assets, market capitalization, firm ownership (whether they are SOEs or non-SOEs), net operating cash flow, leverage, external financing, and firm's listing age.

The data are collected through a refined search of the following section. First, the data should be in the ASEAN-5. Hence, the categories of market, currency, and exchange should consist of only the five countries. The currency of each country is converted into U.S. dollars, as numerous countries, including those in the ASEAN-5, use it as the common currency to trade or make agreements. The U.S. dollar is the world's reserve currency, according to the International Monetary Fund, and it is also the world's largest foreign exchange reserve (IMF, 2021). Afterward, the data are cleaned to filter out missing variables, such as the ownership of the firm, that is, whether it is government owned or private. Other missing data are collected manually by referring to the official website of the firm or the government of each country.

3.3 Statistical Analysis

The multiple regression analysis will show all of the variables in the fixed effects and lagged variables. To illustrate, Hausman test's probability shows Prob>chi2 = 0.0000; the p-value is less than 0.05 and rejects the null hypothesis, which means that the fixed effects are applied to the model, as shown in Appendix B. Thus, the equation should have fixed effects due to the unobserved variables that are correlated with independent variables. Furthermore, the variables are lagged because of the current investment expenditure based on the previous period of the dependent variables in the model. The regression model will be used to test the first objective, which aims to determine the

investment efficiency of SOEs and non-SOEs in the ASEAN-5, and the second objective, which entails comparing the investment efficiency between SOEs and non-SOEs, the regression model will be tested.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Sample Descriptive

This study uses samples of both SOEs and non-SOEs within four main industries, namely, banks; transportation; gas, water, and multiutilities; and oil and gas producers as a representative of the market in the ASEAN-5. The samples are drawn from Datastream with the condition of matching firms in terms of the sectoral and regional terms for what are considered SOEs and non-SOEs. The sample description, empirical result, and sensitivity analysis will be distinguished into two parts: sectoral and regional. They will be represented as follows.

The table 4.1 represents the number of samples, mean and median, standard deviation to see the differences of mean value, maximum and minimum value and t-value existing in the model distinguished by the ownership of the company whether it is the SOEs or non-SOEs.

The research includes 2,733 samples of 226 firms, including 393 samples of 26 SOEs and 2,340 samples of 200 non-SOEs in the stock market of the ASEAN-5 within the four main industries in 2000-2019. Initially, $Inv_{i,t}$ or the investment expenditure has a mean value of 4.4136, while SOEs have a lower mean but higher standard deviation than the non-SOEs, which can be illustrated by the range of the minimum and maximum values of both firms. Second, $TQ_{i,t-1}$ shows the significant difference between SOEs and non-SOEs at a 1% significance level, while SOEs have higher mean and standard deviation than non-SOEs. The mean of $TQ_{i,t-1}$ in SOEs represents a significantly higher value, which means that SOEs have higher investment opportunities. However, $Inv_{i,t}$ results in significantly higher mean value or higher investment expenditure. Thus, even though SOEs have higher investment opportunities from the market, it does not have a significantly higher investment expenditure. $CFO_{i,t-1}$ implies that both the mean and the standard

Table 4.1

Sample descriptive

Variables	N	Mean	Median	S.D.	Min	Max	T-value
Inv	2,733	4.4136	0.8500	9.2072	0.0000	140.2900	0.2182
SOE	393	4.5914	1.6100	7.1086	0.0000	57.9300	
Non-SOE	2,340	4.3837	0.7900	9.5153	0.0000	140.29	
$TQ_{i,t-1}$	2,733	1.2021	1.0417	0.5862	0.0224	4.8435	-6.7871***
SOE	393	1.4151	1.1217	0.7613	0.4129	4.8435	
Non-SOE	2,340	1.1664	1.0335	0.5435	0.0224	4.6972	
$CFO_{i,t-1}$	2,733	0.0478	0.0338	0.0839	-0.8261	1.1284	-1.3134
SOE	393	0.0697	0.0491	0.0922	-0.8261	0.5334	
Non-SOE	2,340	0.0441	0.0316	0.0819	-0.6070	1.1284	
$Lev_{i,t-1}$	2,733	0.2365	0.1781	0.2127	0.0000	2.9163	2.2322**
SOE	393	0.2064	0.1502	0.1816	0.0000	0.8376	
Non-SOE	2,340	0.2415	0.1832	0.2171	0.00001	2.9163	

Note: The significance level is 1%, 5% and 10% which are represented by ***, **, and * respectively.

Source: Author's collection

Table 4.1 (Continued)

Variables (Cont.)	N	Mean	Median	S.D.	Min	Max	T-value
$Exfi_{i,t-1}$	2,733	0.0265	0.0058	0.1199	-1.2995	1.0526	2.5372**
SOE	393	0.0241	0.0082	0.0964	-0.2811	0.9413	
Non-SOE	2,340	0.0269	0.0054	0.1234	-1.2995	1.0526	
$Size_{i,t-1}$ (U.S. dollar)	2,733	121,000,000	735,778	1,200,000,000	17.2251	22,000,000,000	1.5145
SOE	393	27,000,000	548,677	55,700,000	55.885	400,000,000	
Non-SOE	2,340	136,000,000	5,100,000	1,290,000,000	17.2251	22,000,000,000	
$Listage_{i,t-1}$	2,733	15.4340	12.0000	14.5160	0.0000	91.0000	0.6133
SOE	393	12.9645	11.0000	11.2895	0	56	
Non-SOE	2,340	15.8487	12	14.95195	0	91	

Note: The significance level is 1%, 5% and 10% which are represented by ***, **, and * respectively.

Source: Author's calculation

deviation have higher values in SOEs than in non-SOEs. Furthermore, $Lev_{i,t-1}$ and $Exfi_{i,t-1}$ have a significant difference in both SOEs and non-SOEs at a 5% significance level, where non-SOEs have a higher value. Lastly, $Size_{i,t-1}$ and $Listage_{i,t-1}$ present a similar result with no significant differences of both SOEs and non-SOEs. To sum up, the t-value shows a significant difference in the mean value of $TQ_{i,t-1}$, $Lev_{i,t-1}$, and $Exfi_{i,t-1}$ at 1%, 5%, and 5% significance levels, respectively, which can illustrate that the mean value of SOEs and non-SOEs are significantly different in these variables.

4.2 Empirical Results

The empirical result shows details on the factors that affect the investment efficiency, including investment expenditure, investment opportunities, net operating cash flows, leverage, external funding of the firm, market capitalization, and firm's listing age. Thus, the result provides answers to the first hypothesis. This section presents the result from the main estimation, which also answers the second hypothesis, that is, SOEs will have less efficiency in terms of investment than non-SOEs because of the aforementioned agency problems.

Table 4.2 represents the relationship between investment expenditure to other independent variables, which are the investment opportunities of both SOEs and non-SOEs, net operating cash flow, leverage, external finance, size, or the market capitalization, and listing age of the firm.

In Columns 3 and 4, the data are separated into two groups, the SOEs and the non-SOEs. All models also include the year as a categorical variable. Thenceforth, they are tested to determine the correlation between the variables. In addition, the variables present a significant effect to the investment expenditure in all firms, SOEs and non-SOEs.

The model answers the first hypothesis, that is, the factors that will influence the investment performance consists of investment expenditure, investment opportunities, net operating cash flows, leverage, external funding of the firm, market capitalization, and firm's listing age. To illustrate, the model of all firms and only non-SOEs show that all

variables except $Listage_{i,t-1}$ have a significant effect on investment expenditure. Although the model contains only SOEs, $CFO_{i,t-1}$, $ln(Size)_{i,t-1}$, and $Listage_{i,t-1}$ show no significant relationship with the investment opportunities. In terms of overall firms, all variables, including Tobin's Q, net operating cash flow, and external financing, have a positively significant effect at a 1% significance level. On the other hand, leverage and size have a negatively significant effect at a 1% significance level. In addition, this study observed that Philippine SOEs' net operating cash flow and the investment expenditure

Table 4.2

Empirical results

Variables (Year: 2000-2019)	All firms (N=2,733 / 226 firms)	SOE (N=393 / 26 firms)	Non-SOE (N=2,340 / 200 firms)
$TQ_{i,t-1}$	3.9311***	2.5276***	4.3036***
$CFO_{i,t-1}$	6.8963***	-2.8737	7.5690***
$CFO\_soeph_{i,t-1}$	-51.4265***	-44.1711***	(Omitted)
$Lev_{i,t-1}$	-7.3891***	-7.9792***	-7.6189***
$Exfi_{i,t-1}$	6.3620***	4.7630*	6.1450***
$ln(Size)_{i,t-1}$	-0.8472***	-0.6365	-0.8248**
$Listage_{i,t-1}$	-0.0721	0.4541	-0.1029
_cons	11.5579***	8.9134	11.1655***
R^2 (Overall)	0.0965	0.0330	0.0925
R^2 (Within)	0.1237	0.3244	0.1157
RSS	141,334.44	7,616.45	132,665.17
Log-likelihood	-9,269.80	-1,140.12	-8,044.40

Note: The significance level is 1%, 5% and 10% which are represented by ***, **, and * respectively.

Source: Author's calculation

have a negative relationship at a 1% significance level. This factor is separated because it would influence all SOEs' $CFO_{i,t-1}$ to become negative and significant. When it is calculated separately, $CFO_{i,t-1}$ of SOEs shows no significant effect, whereas $CFO\_soeph_{i,t-1}$ has a significant effect, as shown below.

In the relationship between the dependent variables and independent variables, the result is compatible with the second hypothesis, that is, SOEs will have less efficiency in terms of investment than non-SOEs. For SOE, $TQ_{i,t-1}$ indicates that the Tobin's Q ratio of SOEs has a positive relationship with the investment expenditure with a 1% significance level. Meanwhile, a negative impact is observed in $Lev_{i,t-1}$ and $CFO\_soeph_{i,t-1}$ at a 1% significance level. To illustrate, more debt leads to lower cash flow within the company to invest, while agency cost causes the negative relationship of the net operating cash flow in Philippine SOEs with the investment expenditure. In terms of $Exfi_{i,t-1}$, which shows a positive and significant level at 10%, more cash flow in the firm from external financing increases the investment expenditure. The r-squared of this model is only 3.30%, which can explain that the SOEs are mostly driven by the policy rather than other factors, with 393 observations or 26 firms of SOEs.

Non-SOEs or private firms represent similar results to all firms. $TQ_{i,t-1}$ shows a positive and significant effect at 1% on investment expenditure. In other words, the sensitivity of investment opportunities and investment expenditure is positively related. When more capital is generated from the opportunities that the firm obtains from the market, the investment expenditure will be higher. $CFO_{i,t-1}$ and $Exfi_{i,t-1}$ indicate a positive and significant effect at a 1% significance level, which could indicate that the cash flow in the company has a positive relationship to the company's investment expenditure. More operating cash flow leads to higher expenditure on the investment as the firm obtains benefits from having a large cash flow. Meanwhile, $Lev_{i,t-1}$ and $ln(Size)_{i,t-1}$ have a negative impact on the investment expenditure with 1% and 5% significance levels, respectively. To illustrate, more debt will affect the cash flow, thus causing the firm to pay the principal and interest of the borrowings. The size of the firm can also represent longer-listed firms. Thus, a larger firm might be at its maturity stage and reduce its investment.

The second hypothesis posits that SOEs have lower investment efficiency than non-SOEs. As predicted, both SOEs and non-SOEs have a positive and significant effect between the sensitivity of the investment expenditure and investment opportunities. However, SOEs indicate a lower coefficient than non-SOEs. To illustrate, if the sensitivity of the investment opportunities of non-SOEs increases by one unit, the investment expenditure will increase by more than 2.776 (4.3036-2.5276) units compared with that of SOEs. The sensitivity of the investment opportunities of non-SOEs is greater than SOEs. In other words, non-SOEs are more efficient in terms of investment efficiency compared with the SOEs. $CFO_{i,t-1}$ of non-SOEs show a significantly positive relationship, while SOEs present a negative and insignificant effect.

Furthermore, the SOE in the Philippines has a negative and significant effect on the investment expenditure because of the agency problem. $Lev_{i,t-1}$ of both SOEs and non-SOEs has a significant effect in the same direction. This effect entails a negative relationship with the investment expenditure because more debt leads to less capital left in the company, which influences lower investment expenditure. Another variable is the $Exfi_{i,t-1}$, which has a positively significant relationship with the investment expenditure for both SOEs and non-SOEs. This variable can be interpreted similarly to the operating cash flow, as the external finance will also increase cash in the firm.

4.3 Sensitivity Analysis

This section distinguishes firms into four sectors, namely, banks; transportation; gas, water, and multiutilities; and oil and gas producers, in five countries, which are Thailand, Singapore, Philippines, Indonesia, and Malaysia. The research aims to measure the investment efficiency and examine the differences of the coefficient in each sector and their correlations with the investment expenditure. The main hypothesis of this sector is the same as the second hypothesis, that is, SOEs have lower investment efficiency than the non-SOEs. Thus, we test the model with the fixed effect restricted to each sector to see the result in Table 4.3.1 and Table 4.3.2.

4.3.1 By Sector

The table presents four industries, including 1,066 observations from 81 firms of banks; 1,066 observations from 92 firms of transportation; 354 observations of 27 firms from gas, water, and multiutilities; and 247 observations from 26 firms of oil and gas producers. It represents the correlation between the dependent variable, investment expenditure, to other independent variables by sector which are banks, transportation, gas, water and multiutilities, and oil and gas producers. N represents the number of observations.

The variable $TQ_{i,t-1}$ is distinguished into both SOEs and non-SOEs. $Indicator_{i,t-1}$ refers to a dummy variable that describes whether the firm is an SOE or a non-SOE to be able to distinguish between SOEs and non-SOEs. $TQ\_soe_{i,t-1}$ is calculated by using $TQ_{i,t}$ multiplied by $Indicator_{i,t-1}$, which only contains SOEs. As above mentioned, SOEs tend to have more channels to invest, as they are politically connected with the government, which might benefit them either directly or indirectly. $TQ\_nsoe_{i,t-1}$ is calculated by $TQ_{i,t}$ multiply by $Indicator_{i,t-1}$, which contains only non-SOEs. It represents the relationship between investment opportunities and non-SOEs.

From Table 4.3.1, the banking sector has a significant effect on the sensitivity of investment expenditure to the investment opportunities of non-SOEs, with a 1% significance level. Moreover, other variables except $CFO_{i,t-1}$ show a significant effect on the investment expenditure in the banking sector. $Exfi_{i,t-1}$ has a positive relationship, while $Lev_{i,t-1}$ and $ln(Size)_{i,t-1}$ has a negative impact on the investment expenditure due to the debt and business life cycle theory, respectively. $Listage_{i,t-1}$ of the banking system implies a contrast relationship to the theory of business life cycle because of the characteristics of this sector. The banking sector represents the growth of the economy by improving the allocation of capital in the most productive way and providing liquidity to the economy (Beck et al., 2020). Therefore, banks always find new investments to fund and improve the use of financial services, such as a technological investment that can improve the efficiency within the industry.

Table 4.3.1

Sensitivity Analysis by sector

Variables (Year: 2000-2019)	Bank (N=1,066 / 81 firms)	Transportation (N=1,066 / 92 firms)	Gas, water and multiutilities (N=354 / 27 firms)	Oil and gas producers (N=247 / 26 firms)
$TQ\_soe_{i,t-1}$	0.6118	1.1399	1.1329	6.4112***
$TQ\_nsoe_{i,t-1}$	0.4714***	5.8711***	1.9036*	1.1544
$CFO_{i,t-1}$	0.1336	4.2926	-0.9866	10.3794
$CFO\_soeph_{i,t-1}$	(omitted)	-49.8951***	(Omitted)	48.5179
$Lev_{i,t-1}$	-1.1050***	-11.7775***	-2.7811	-1.4366
$Exfi_{i,t-1}$	1.8185***	7.9140***	2.2183	0.8079
$ln(Size)_{i,t-1}$	-0.5259***	-1.3711**	-0.5582	-3.0091***
$Listage_{i,t-1}$	0.0300*	-0.1768	0.2330	-0.6170
_cons	7.2178***	19.2830***	9.8900	43.5671***
R^2 (Overall)	0.1368	0.0705	0.0036	0.0110
R^2 (Within)	0.1623	0.1817	0.1485	0.2536
RSS	355.07	118,079.09	9,873.66	8,943.14
Log-likelihood	-926.6292	-4,044.5518	-1.055.12	-774.7056

Note: The significance level is 1%, 5% and 10% which are represented by ***, **, and * respectively.

Source: Author's calculation

The transportation sector indicates a similar result to the banking system. $TQ\_nsoe_{i,t-1}$ has a positive and significant effect on the investment expenditure at a 1% significance level, which means that non-SOEs show a positive effect on the investment efficiency. $Exfi_{i,t-1}$ also shows a positive effect at a 1% significance level because it provides more cash flow to the company. However, $Lev_{i,t-1}$ and ln $(Size)_{i,t-1}$ have a negative significant effect at 1% and 5% significance levels, respectively, which is the same as those in the banking sector. Hence, comparing between the investment efficiency of SOEs and that of non-SOEs, non-SOEs have a positive impact, whereas SOEs exhibit no significant impact on the sensitivity of investment expenditure to investment opportunities.

$CFO\_soeph_{i,t-1}$ refers to the net operating cash flow of SOEs in the Philippines, which represents a negative and significant effect on the investment expenditure. According to the OECD, transportation and construction are among the most corrupted industries (Kottasova, 2014). This observation is also applicable to the Philippines, as numerous cases have demonstrated how politicians or beneficiaries defrauded construction projects in the country. For instance, in 2009, the World Bank sanctioned contractors for building a highway project (Conde, 2010). The most recent corruption occurred in 2020; in a project that started a few years before, up to 35 percent of the money was defrauded to government officials and employees from the construction project (Philippines Daily Inquirer, 2020). Thus, the negative coefficient of the net operating cash flow to the investment expenditure can be explained by the corruption scam in the Philippines.

For the gas, water, and multiutilities sector, only non-SOEs show a significant effect on the relationship of the sensitivity of investment expenditure to investment opportunities at a 10% significance level, while SOEs imply no significant effect. Other variables show no significant effect on investment expenditure. The oil and gas producers sector has the opposite result from other sectors. The sensitivity of investment expenditure to investment opportunities has a positive effect on SOEs with a 1% significance level, while non-SOEs have an insignificant effect. To illustrate, the oil

and gas in several countries act as the major revenue for governments and their shareholders, such as PTT in Thailand and Petronas of Malaysia (Bauer, 2018). This national oil company's revenue is mostly reinvested in the same sector, thus providing benefits to the company's growth. This process can last a decade before the revenue can be used to improve other sectors of the country. For instance, Petronas of Malaysia generated over 160,000 U.S. dollars in 2014, which was calculated as 181 percent of the government expenditure that year; this amount implies that the government earned the money from this company and wasted it without benefiting the national development (Heller, 2017). Thus, the company's investment efficiency surpasses that of a private firm. Moreover, $ln(Size)_{i,t-1}$ shows a negative and significant effect at 5% on the investment expenditure.

The investment efficiency of SOEs depends on other factors, which can explain the insignificant effect of these firms. The investment opportunities given by the market can explain the investment behavior of SOEs because they are created to serve the government's purposes or policies. Moreover, the agency problem is also lifted because the manager or the government and the shareholder, which are people in the country, are likely to have different aims. As aforementioned, the government establishes these firms for specific purposes, while the shareholder would like these companies to have investment efficiency.

4.3.2 By Country

Another sensitivity analysis will separate the sample into each country in the ASEAN-5 to investigate the relationship between investment expenditure as the dependent variable to other independent variables. Table 4.3.2 represents the relationship of the overall firms, SOEs, and non-SOEs and the correlation between the dependent variable, investment expenditure, to other independent variables of both SOEs and non-SOEs which also distinguished by country consisting of Thailand, Singapore, Philippines, Indonesia, and Malaysia.

Table 4.3.2

Sensitivity Analysis by country

Variables (Year: 2000-2019)	Thailand (N=447)	Singapore (N=404)	Philippines (N=369)	Indonesia (N=700)	Malaysia (N=813)
$TQ\_soe_{i,t-1}$	0.9099	-2.0504	-12.7205	3.2824**	6.3438***
$TQ\_nsoe_{i,t-1}$	9.8364***	4.8891***	-1.2834	5.7866***	1.5908***
$CFO_{i,t-1}$	11.3017*	7.2953	7.5392	-3.1072	-0.2781
$CFO\_soeph_{i,t-1}$	(omitted)	(omitted)	-55.0658***	(omitted)	(omitted)
$Lev_{i,t-1}$	-7.1417	-11.1725***	7.5400	-16.4701***	-2.1634**
$Exfi_{i,t-1}$	7.9294*	6.5162	-7.7071**	3.9037*	1.6755
$ln(Size)_{i,t-1}$	-1.5860	-1.8991**	7.2650**	-0.0632	0.2139
$Listage_{i,t-1}$	0.5502	-0.2570	-0.9353*	-0.9242	0.0065
_cons	10.0393	30.7836**	0.0859	3.4995	-1.6695
R^2 (Overall)	0.0437	0.1793	0.0002	0.0211	0.0213
R^2 (Within)	0.3010	0.1613	0.2025	0.2122	0.0678
RSS	38,981.69	42,110.805	7,024.14	24,471.68	14,396.09
Log-likelihood	-1,632.9281	-1,511.8734	-1,067.1827	-2,237.22	-2,321.8701

Note: The significance level is 1%, 5% and 10% which are represented by ***, **, and * respectively.

Source: Author's calculation

The second hypothesis can be applied to some countries, namely, Thailand, Singapore, and Indonesia. In the case of Thailand and Singapore, $TQ_{i,t-1}$ has a positive and significant effect on non-SOEs, while SOEs experience no significant effect. In addition, Indonesia shows a positive and significant effect on both SOEs and non-SOEs However, $TQ\_nsoe_{i,t-1}$ displays a higher coefficient than $TQ\_soe_{i,t-1}$, which means that non-SOEs have higher sensitivity between investment expenditure and investment opportunities than SOEs. In other words, private firms are more efficient in terms of investment than SOEs.

The Philippines exhibits a negative effect on both SOEs and non-SOEs. However, no significant effects on the sensitivity of investment expenditure to investment opportunities on both SOEs and non-SOEs have been observed. To illustrate, the investment opportunities cannot explain the investment expenditure in Filipino firms, and they might rely on other aspects to invest. For instance, the agency cost that leads to the corruption in the country might prevent the firm from having investment efficiency. Moreover, it can cause the net operating cash flow to have a negative coefficient. According to Varheenmaa (2016), corruption in the company reduces a firm's cash flow. Rosa et al. (2013) also suggested that corruption at the firm level can reduce a firm's performance. Thus, a more corrupt company can have a lower cash flow, which can lead to a negative coefficient of the net operating cash flow of firms in the Philippines. The agency cost is another crucial reason because it is an important factor that drives firms away from reaching the efficiency. Hence, it might be another factor why firms in the Philippines have no significant effect on the sensitivity of investment expenditure to investment efficiency. Moreover, $Exfi_{i,t-1}$ of Filipino firms indicates a negative effect to the investment expenditure because of the similar reason above.

Meanwhile, Malaysia exhibits the opposite direction of the interpretation, that is, both SOEs and non-SOEs have a positively significant effect at a 1% significance level on the sensitivity of investment expenditure to investment opportunities. However, the coefficient of SOEs is higher than non-SOEs, which can be interpreted as the SOEs having higher investment efficiency than the non-SOE. According to Razak et al.

(2008), Malaysian SOEs perform better in terms of the efficiency because Khazanah Nasional, which is the government-owned sovereign wealth fund of the country, is the main shareholder in most of the service and utility providers in the country. Thus, the government will monitor these firms and avoid the underperformance of these firms.

For other independent variables, $CFO_{i,t-1}$ and $Exfi_{i,t-1}$ have a positive and significant effect in Thailand. $Lev_{i,t-1}$ has a negative and significant effect in Singapore, Indonesia, and Malaysia. Lastly, $ln(Size)_{i,t-1}$ has a negative and significant effect on Singaporean firms, whereas it has a positive effect on the Philippines.

In conclusion, SOEs imply a lower investment efficiency in most scenarios, whether the firm is distinguished by a sector or a country. However, in some special cases, such as in the oil and gas producers and in Malaysia, SOEs surpass private firms due to firm management. Furthermore, the insignificant relationship of SOEs' investment expenditure to investment opportunities could be due to the agency cost. Initially, SOEs are firms that have been established to serve the government's purposes and policies. Thus, reaching the maximum profit might become a secondary goal of the company, which leads to the lower efficiency of the SOEs.

CHAPTER 5
CONCLUSIONS AND RECOMMEDATIONS

5.1 Conclusion

In this study, the investment efficiency of both SOEs and non-SOEs are measured through the fixed effect estimation. In line with the hypothesis, the results show that the both SOEs and non-SOEs' investments depend on the investment opportunities that drive their efficiency. The result also indicates that the independent variables consisting of Tobin's Q or the investment opportunities, net operating cash flow, leverage, external finance, size or market capitalization, and firm's listing age have a significant effect on the investment expenditure in the model. However, SOEs represent lower investment efficiency than non-SOEs. To illustrate, the SOEs' investment relies on other factors apart from their investment opportunities, such as their policies or agency problems. Consequently, it easily drives these SOEs to become less efficient in terms of investment than non-SOEs in terms of the measurement of the sensitivity of investment expenditure to the investment efficiency.

5.2 Discussion

The results of this study prove that SOEs are established to serve the government's purpose, that is, whether to provide the basic needs of people by controlling prices or preventing monopolists from owning a specific industry, which can harm the country. The government is concerned with other factors rather than only focusing on profiting from the market to invest in other assets. Thus, this result can imply that the government's decision to invest is not motivated by profit. In other words, even if the firm does not make enough profit to invest, its investment expenditure depends on other aspects. In terms of the sectoral difference, the banking; transportation; and gas, water, and multiutilities sectors have the same results as all sectors combined. However, the

performance of oil and gas producers has an opposite outcome, that is, SOEs are more efficient in terms of investment efficiency than non-SOEs. Additionally, in terms of the national difference, the non-SOEs of most countries perform better in terms of the investment efficiency. To conclude, the investment efficiency of non-SOEs is higher than that of SOEs given the difference in the goals of these two types of firms: SOEs have to serve the government's purpose, while non-SOEs aim to maximize profits only.

This study finds a relationship in which independent variables significantly influence the investment efficiency of the firm. These variables include the Tobin's Q of the private firm, net operating cash flow, leverage, external finance, market capitalization, and firm's listing age. They can be explained with theoretical support with the following explanation. The result that both SOEs and non-SOEs show a positive outcome fits with the theory that firms will invest up to the optimal point where the marginal benefit equals the marginal cost of the capital according to the neoclassical investment. Additionally, the general aspect to the decision making of a firm's investment is due to two major reasons, namely, the maximization of profits and the market value, which can be observed in the behavior of non-SOEs. However, SOEs may contain more agency cost, which diverts the firm's optimal benefit to serve other purposes and lowers the sensitivity of investment expenditure to investment opportunities compared with that of non-SOEs. In addition, accelerator theory indicates a significant impact on the model. To illustrate, accelerator theory suggests that the levels of output and capital are related to each other, which is also compatible with the result in this study that the market capitalization or the cash flow in the company matters when the company decides to invest. Lastly, business life cycle theory supports the contraction of investment expenditure in the larger and longer-listed firm.

The result of this study is consistent with the existing works in several countries, which have demonstrated that SOEs' investment expenditure relies on other factors apart from investment opportunities. Hence, SOEs have lower investment efficiency than the non-SOEs or even have no significant effects on the investment decision based on the profitability or the investment expenditure (Chen et al., 2011; Razak et al.,

2011; O'Toole et al., 2016). This research concludes that SOEs are less efficient than non-SOEs in terms of the investment efficiency.

5.3 Recommendation

The findings suggest that the government consider changing the management behavior and the policy that affect the performance of the firm. Privatization can also help prevent the firm from operating poorly. In addition, the government should stop wasting its expenditure on inefficient firm operations. In terms of the investor or other stakeholders, this research shows the investment efficiency of the firm, which can also contribute to the decision of investing in each sector. These findings enhance the understanding of how government intervention affects a firm's investment efficiency and which factors affect the investment. Such understanding can benefit the government, related officials, and stakeholders of the company.

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APPENDICES

APPENDIX A
VARIABLE DESCRIPTION

A.1 The Datastream's code

Variable	Code
Capital expenditure % total assets	WC08416
Market capitalization	WC08001
Common equity	WC03501
Total liabilities	WC03351
Net operating cash flow	WC04860
Total debt	WC03255
External financing	WC04500
Total assets	WC02999

Source: Datastream

A.2 The definition of each code in Datastream

Variable	Description
Capital expenditure % total assets	The capital that is used to acquire the fixed assets including property, plant and equipment, investment in machinery and equipment and other related assets. For banks: Capital Expenditure / Last Year's (Total Assets - Customer Liabilities on Acceptances) * 100 Other industries: Capital Expenditures / Last Year's Total Assets * 100
Market capitalization	The closing price of the company at year's end.

Common equity	Common shareholder's equity If not available, appropriate, and non-appropriate retained earnings will be used instead.
Total liabilities	Short-term and long-term liability that would benefit the firm.
Net operating cash flow	The net cash flow from operating activities which comes from operation funds for other operating activities and other items.
Total debt	Short-term and long-term debt
External financing	The external source of finance of the company includes the retirement and issuance stock and debt.
Total assets	Banks: The sum of cash and due from banks, net loans, customer liability on acceptances, plant, property and equipment, real estate, total investments, and other assets. Other industries: The sum of cash and due from banks, plant, property and equipment, long-term receivables, unconsolidated subsidiaries investment and other investments, and other assets.

Source: Datastream

APPENDIX B
HAUSMAN TEST

Hausman test of the model between fixed and random effect.

Variables	Fixed Effects	Random Effects	Difference	S.E.
$Tobinsq_{i,t-1}$	3.9311***	2.8939***	1.0373	0.1771
$CFO_{i,t-1}$	6.8963	14.6788***	-7.7825	0.8091
$CFO\_soeph_{i,t-1}$	-51.4265***	-59.4006**	7.9741	.
$Lev_{i,t-1}$	-7.3891***	-1.3036***	-6.0856	0.5680
$Exfi_{i,t-1}$	6.3620***	7.3927***	-1.0307	0.2145
$ln(Size)_{i,t-1}$	-0.8472***	-0.5498***	-0.2974	0.2846
$Listage_{i,t-1}$	-0.0721**	-0.0504***	-0.0217	0.1318
R^2 (Overall)	0.0965	0.1452		
R^2 (Within)	0.1237	0.1076		
RSS	141,334.44			
Log-likelihood	-9,269.80			
Chi^2		197.09		

Note: The significance level is 1%, 5% and 10% which are represented by ***, **, and * respectively.

Source: Author's Calculation

This table represents a Hausman test of the model between fixed and random effect. Chi^2 represents 197.09 with P > Chi^2 at 0.0000 which is less than 0.05 means that the result is rejecting H_o in favor of H_a. In other words, the Hausman test suggests using the fixed effect model.

BIOGRAPHY

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